11399

PHREE Background Paper Series

For Official Use Only

Document No. PHREE/92/66R

Lending for Higher Education:

An Analysis of World Bank Investment 1963-1991

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October 1992

Public Disclosure Authorized

Acknowledgement:

Data were collected for this paper by Omporn Regel, Keith Bickel and Rosemary Rinaldi of the Education and Employment Division at the World Bank. Their assistance is gratefully acknowledged.

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Summary

1. Shortages of managers and professionals for the implementation of investment projects provided the impetus for early World Bank projects to train high level professional and technical manpower. Anxiety about the scope and costs of this enterprise, impatience for results and concerns about the relevance of higher education to basic developmental needs in the 1970s prompted reassessment of the high priority that governments and donors gave to university expansion. World Bank lending for higher education in many countries was re-oriented to address broader national requirements and more importance was given to agricultural, technical and teacher training to support expansion of lower levels of education and supply the labor market with skilled manpower. While higher education lending has tended to reinforce the World Bank's activities in other education sub-sectors, in recent years there has been a shift away from support for technical institutions to support for universities and institutions responsible for advanced scientific training and research.

Patterns of Investment

2. World Bank support for higher education grew from an average of 17% of lending for education between 1963 and 1970 to 37% of lending since 1986. Although higher education's share fell from 43% in the early 1980s, reflecting the growth of lending for primary education, the volume of higher education lending greatly increased. In other words, the competing requirements of the higher education and primary education sub-sectors have been accommodated by the expansion of assistance for education, generally. Lending for higher education is likely to continue to increase in response to expanding secondary school enrollments and the centrality of higher education investments to knowledge based economic growth strategies.

3. The paper surveys the 281 education projects with 432 higher education components between 1963 and 1991. A high proportion of recent investments have provided assistance to East Asian countries amounting to 57% of higher education lending since 1980. While East Asian countries have obtained a disproportionate share of project loans, the regional distribution is generally indicative the relative size of higher education systems with two exceptions. Higher education lending to African countries is much larger than Africa's share of world higher education enrollments. Conversely, the World Bank has directed more of

its lending for education to other sub-sectors in Latin American and Caribbean countries despite the large higher education systems in the region.

4. In China and Indonesia, the World Bank has followed a sub-sectoral strategy of higher education investment. Over more than a decade of multiple, substantial project investments, it has participated in the development of the higher education systems of these countries, producing significant quantitative gains in enrollments and laying the groundwork for successful qualitative improvements. The program of investment in China has been particularly successful vis-a-vis the long term objective of increasing the country's research and training capacities, reforming training in light of international practices and increasing China's participation in the international scientific system. World Bank lending followed a coherent national strategy reinforced by large national investments. In Indonesia, a long term strategy for lending to the higher education sub-sector did not develop until the mid-1980s. Persistent government underfunding of higher education and the difficulties of absorbing the volume of World Bank investment threaten the sustainability of project investments.

5. Many higher education investments have inter-sectoral objectives such as supplying technically trained manpower to facilitate the growth and modernization of manufacturing or agricultural production systems. Expanding advanced scientific training and research capacities to accelerate technological innovation has become increasingly important to many borrowing countries. Higher education and science and technology projects in Brazil and Korea are compared to show how success is influenced by a wide range supporting policies and circumstances. Although Brazil has a much larger scientific community and national research system than Korea, it has derived less benefit from these assets for several reasons. Brazil has a poorly educated labor force and macro-economic policies that until recently provided little encouragement for technological innovation or private investment in research and development. World Bank projects have supported basic and applied scientific research mainly carried out in universities and in other public sector scientific institutions. Only recently has attention been given to ways of fostering utilization of the expertise of these institutions by the private sector. In contrast, Korea has coordinated investments in higher education and science and technology with policies to expand private sector research and development activities, and with support from the World Bank, has established many mechanisms to link public investments in advanced scientific training and research to industrial needs.

6. While a large number of education projects have higher education components, in just 26 of the investments surveyed since 1980 do these components account for 50% or more of the project loan. Many higher education investments are made in order to support broader sectoral lending objectives usually involving training the professionals needed to facilitate expansion of lower levels of education. For example, Yemen received a loan in 1991 for teacher training to reduce costs of employing expatriate teachers. In Malawi and Nigeria, the World Bank is trying to assist governments to re-prioritize educational expenditures in favor of increased national investment in primary education. A major investment in the higher education sub-sector was made in Nigeria (1990) providing support to universities conditional on compliance with cost-control measures while in Malawi, the investment (1989) in tertiary education is small in relation to the sector loan and seeks to reduce unit costs of training teachers and commerce students.

7. A growing number of education projects approved since 1980 have involved policy reforms affecting the expansion, financing and internal efficiency of higher education systems. Policy based lending for higher education reforms in African countries is reviewed. These reforms have required reducing growth of higher education expenditures through controlling university intake, limiting grants and subsidies to students, introducing student fees and rationalizing academic programs and staffing, or some combination of these measures. Implementation experience is varied and results so far are not encouraging.

Lessons

8. Five lessons are drawn to guide future lending for higher education. First, project interventions should be formulated in the context of the higher education sub-sector as a whole. In most of the countries in which it has been active, the World Bank has supported development of many kinds of higher education, though usually for different purposes and without any strategy for the sub-sector. It needs to take better advantage of its lending experience and opportunities to effect system wide improvements.

9. Second, qualitative improvements in higher education can not be brought about unless the supporting circumstances are well understood. Funding for staff development, curricular reform, instructional and research infrastructure and improvements in university planning and administration must be mutually reinforcing and provided in conjunction with

increased national investment, both public and private. Quality gains will be marginal where academic staff are poorly paid and institutions inadequately funded and/or where support is narrowly focused on high priority applied scientific fields and institutional needs are not fully addressed.

10. Third, sustained, long term comprehensive support is required for institution building. Compressing the time frame for institution building is possible only where the World Bank has extensive lending experience, and when the country has focused objectives for borrowing and substantial implementing capacity. Creating these conditions from scratch takes time.

11. Fourth, the dominant role which manpower planning theories assigned to the state in higher education should be re-assessed to reflect changes in the macroeconomic environment and increased private financing and provision of higher education. Patterns of accountability must allow for greater institutional autonomy especially in matters relating to program costs and financing. The state should guide long term development of the sub-sector, coordinating public and private investments, raising standards of instruction through selection of students and accreditation as well as foster links between higher education institutions and the productive sectors.

12. Finally, while the World Bank has a crucial role to play in supporting reforms of financing higher education because of its sectoral experience and analytical expertise, it will need to be more attentive to ways of reducing the political costs of reforms. There have been few successes in policy based lending to countries undergoing structural adjustment. Policy implementation must bring discernable benefits to policy makers and academic communities, not just entail high political risks.

Introduction

13. Since 1963, the World Bank has had a prominent role in assisting the expansion of post-secondary education. In all, 281 higher education projects with 432 higher education components have been supported. That represents almost one third (37%) of lending for education during the period 1963-1991. World Bank investment in higher education has grown from an average of 17% of lending for education 1963-1970 to 37% since 1986.

14. It is likely to continue to grow for several reasons. The most important is that the number of secondary school students who are either eligible or in some countries entitled to pursue further studies has greatly increased. Between 1965 and 1989, secondary school enrollments expanded at an annual rate of 38% in African and Asian countries, and 19% in Latin American countries (Unesco 1990). The change in participation rates is less striking. From 1980 to 1989, the proportion of the secondary school age cohort enrolled in secondary schools increased from 16% to 19% in Africa, 44% to 50% in Asia and from 45% to 52% in Latin America. While the growth of secondary education has only slightly exceeded population growth rates, the quantitative expansion is still impressive and impacts upon higher education.

15. Expansion of higher education is also being reinforced by national educational investment strategies that emphasize capacity building at the highest levels as critical not only to the success of efforts to improve competitiveness in world trade but to fostering equity and achieving other social objectives of development planning as well such as national integration.

16. Human capital theory provided the impetus for early World Bank projects to train high level professional and technical manpower. Donor anxiety about the scope and costs of this enterprise, impatience for results and concerns about the relevance of higher education to basic developmental needs in the 1970s prompted reassessment of the high priority that governments and donors gave to university expansion. World Bank lending for higher education in many countries was re-oriented to address broader national requirements and more importance was given to agricultural, technical and teacher training to support expansion of lower levels of education and supply the labor market with skilled manpower. In recent years, most lending has been re-directed to universities and institutions responsible for advanced scientific training and research, reflecting their

centrality to other human resource and development investments (Muskin 1991). In countries where the World Bank has had sustained involvement in the education sector, it has supported teacher and technical training colleges, universities and other kinds of higher education.

17. This analysis focuses on the World Bank's strategies for supporting higher education, patterns of involvement in the sub-sector, and what it and borrowing countries have sought to accomplish. Below, the number, kinds and regional distribution of project investments during the past three decades are described. Subsequent sections examine projects since 1980 in relation to sub-sectoral, inter-sectoral and sectoral investment strategies. The World Bank's experience with lending for higher education policy reform is also discussed. The conclusion presents some lessons to guide future investments. These emphasize the importance of formulating project interventions in the context of development of the higher education sub-sector as a whole, sustained comprehensive assistance for institution building and quality improvement and, particularly where the World Bank is supporting financing reforms in the sub-sector, greater attention to ways of reducing the political costs of implementing policy reforms.

Patterns of Investment, 1963-1991

Evolution of World Bank Lending for Higher Education

18. The World Bank did not become involved in lending for higher education until the early 1960s at a time when many countries in Africa, Asia and the Caribbean were becoming independent and rapidly developing bureaucracies to manage public investments designed to stimulate economic growth. Educational expansion in the 1960s was the keystone of economic planning, social policies and strategies for fostering political development. Throughout most of the developing world, there was a critical shortage of administrative, scientific and technical manpower. The situation was particularly acute in Africa where higher education institutions were newly established and the senior ranks of the public services were staffed predominantly by expatriates. Governments in developing countries wanted support for institutional development and foreign training. Donors competed to supply the resources required. Assistance could be justified by prevailing wisdom about the educational causes of economic growth, extrapolating findings from developed to developing

countries. The most influential studies demonstrated the productivity raising effects of investments in higher education (e.g. Denison 1962; Schultz 1960; 1963) and showed the magnitude of effects increased with educational level (e.g. Renshaw 1960).

19. The World Bank's first project with a higher education component supported secondary teacher training in Tunisia (1963). A loan was sought to finance construction of middle and secondary schools as well as new facilities for an Ecole Normale de Professeurs Adjoints. The recently established Université de Tunis would be an indirect beneficiary of the project since "once the number of secondary school graduates had expanded sufficiently most university subjects would be taught" (World Bank 1962, 4). The World Bank's first higher education project in Pakistan (1964) supported the establishment of two agricultural universities to increase the supply of agricultural professionals. Between 1963 and 1975, university projects accounted for a majority (61%) of World Bank lending for higher education.

20. In the early 1970s, the priorities of donors and recipients gradually began to diverge while the economic and political justifications for large donor and government investments in higher education, particularly in university development, were being questioned. Rate of return analyses suggested that developing countries were "over-investing" in higher education and that resources should be re-directed to primary education. This theme was amplified in World Bank educational research and policy statements throughout the 1970s and early 1980s. The 1971 Education Sector Policy Paper proposed more emphasis on primary and even non-formal education. The 1974 Education Sector Working Paper criticized the disproportionate allocation of education resources to secondary and higher education that served the modern sector, resulting in underfinancing of basic education which was the more efficient and more equitable investment.

21. The 1980 Education Sector Policy paper, the most recent statement of World Bank policy for investment in the entire education sector, focused on equity issues and on expanding access to basic education within the framework of measures to promote cost effectiveness and external efficiency. It raised concerns about reliance on manpower forecasting and the enthusiasm of many developing countries for vocational training, though it favored investments in polytechnics and other forms of technical training as an attractive alternative to high cost university studies. The number of World Bank investments involving universities declined from 26 in the period 1976-80 to 23 between 1981 and 1985 while the

total number of higher education investments fell from 100 to 88. Perhaps a typical World Bank education project of the period was a 1976 loan to Liberia whose principal objectives were to increase the coverage of primary schooling and adult literacy programs in rural areas, expand vocational training and assess the feasibility of radio for formal and non-formal education. Some project funding went to support teacher training and development of research capacity at the national university to monitor the effectiveness of the project.

22. Nevertheless, the volume of lending for higher education grew more than 50% between 1976-80 and 1981-85, growing from 30% to 43% of education lending---this despite the Bank's sector policies and investment analyses. Assistance was increasingly provided under programs for human resource development and capacity building. These terms have supplanted investment in human capital in World Bank usage though they have a common origin in the influential work of Harbison and Myers (1964, 2). Early strategies for human resource development and capacity building focused on investments in schooling and implications for employment.

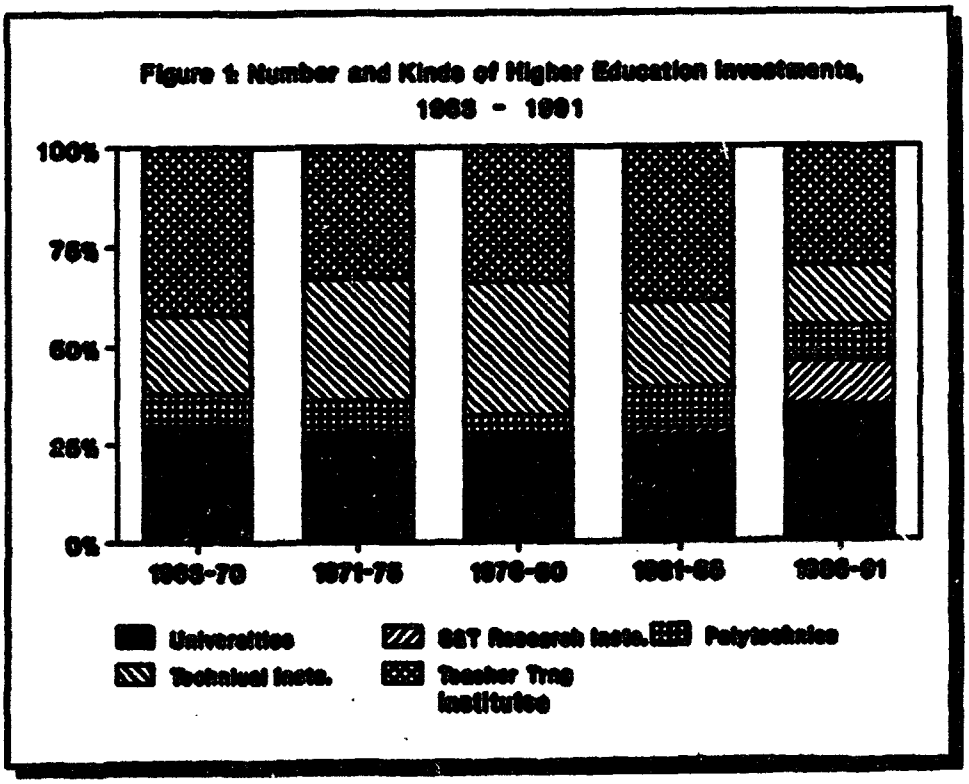
23. Today, human resource development comprises the social sectors of development assistance---education, population, health and nutrition---in recognition of their inter-relationship and joint contribution to economic growth (Hicks and Boroumand 1980; Wheeler 1980). Studies of health, nutritional and fertility behavior began to show a strong relationship between schooling and these outcomes of human resource investments (e.g. Cochrane 1979; Cochrane, O'Hara and Leslie 1980). While that did not provide a rationale for increasing donor investment beyond primary schooling, it did support investments in extension of health, education and social services particularly for rural and special populations such as women. It also prompted donor recognition that weak institutional infrastructures, poor management capabilities and lack of well-trained professional counterparts were serious impediments to assistance efforts (USAID 1984).

24. Population and human resource development divisions were created within the World Bank at the time of its re-organization in 1987. In the period 1986-91, World Bank education lending nearly doubled from 5% to almost 10%, evidence of the high priority that is now being given to human resource investments. The volume of lending for higher education increased from $1,533 M between 1981-85 to $2,590 M since 1986 and the number of higher education project investments from 88 to 111. However, lending for higher education fell from 43% of lending for education between 1981-85 to 37% since

1986. Nearly all of this relative decline can be attributed to rising support for primary education (Lockheed and Verspoor 1991, 212). In other words, the competing requirements of the higher education and primary education sub-sectors have been accommodated by the expansion of assistance for education and human resource development, generally.

Institutional and Regional Distribution of Higher Education Investments

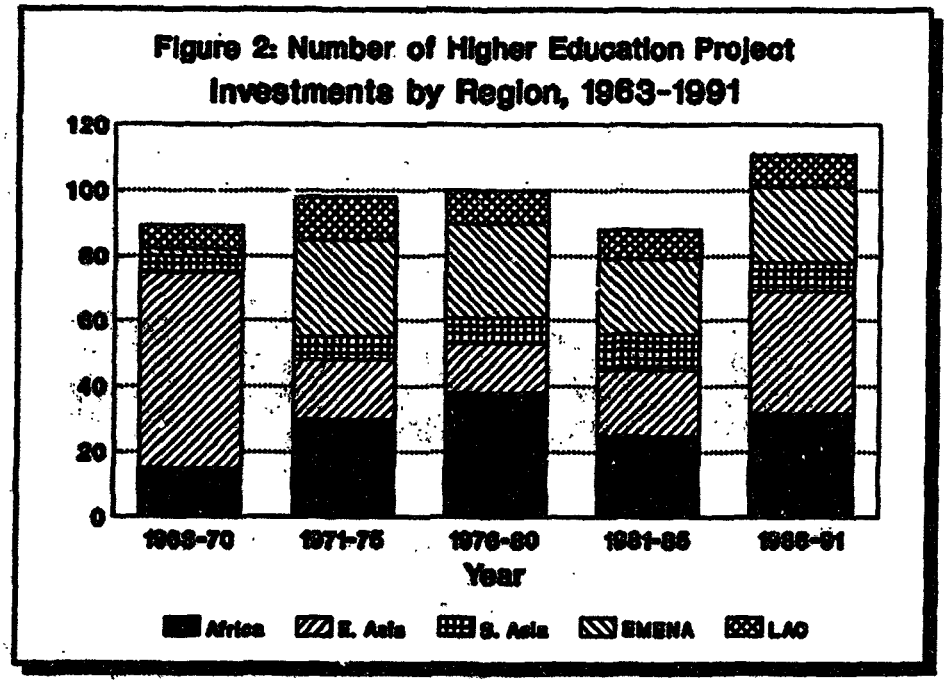
25. World Bank lending for higher education has been mainly directed to institutions which supply educational systems with teachers to facilitate expansion of school enrollments or the productive sectors with technicians (Figure 1 & Annex-Table 1). Since 1986, about a third (30%) of higher education investments have supported teacher training and 24% have involved polytechnics or technical training institutions. The proportion of university projects has increased slightly---to 34% in the period 1986-91. Support for national scientific and technological institutions which carry out advanced training and research is very recent and now represents 12% of project components. Together with universities that in many developing countries employ most scientists and engineers engaged in research and development (Eisemon and Davis 1992), World Bank lending to these institutions between 1986 an 1991 accounted for almost half (46%) of the higher project investments.

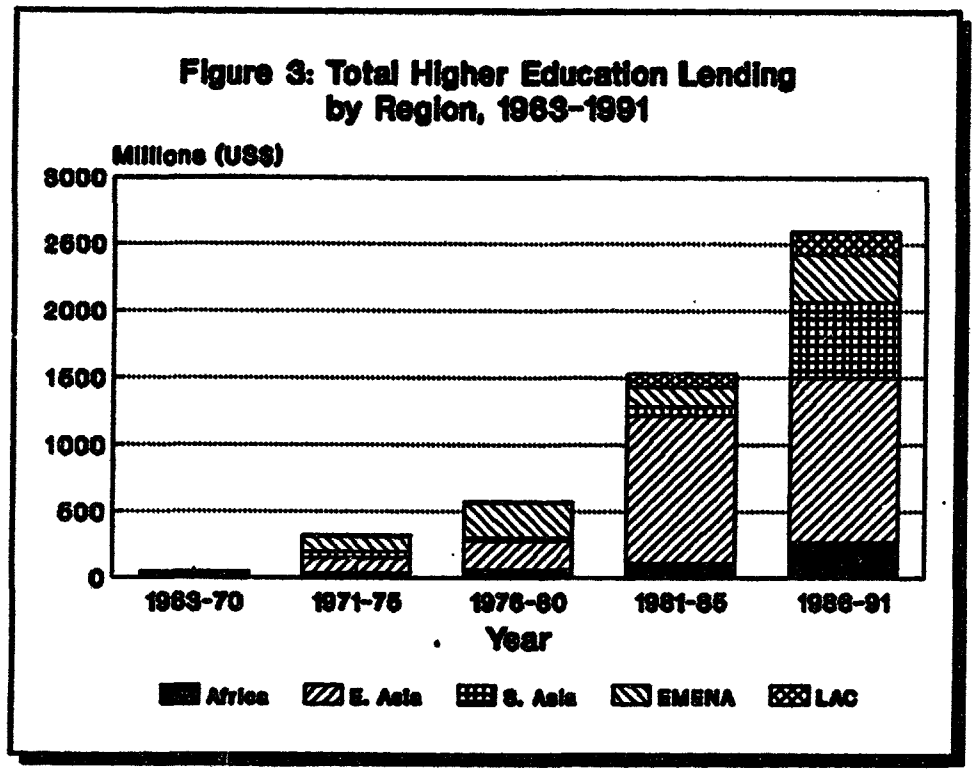


Regional Distribution

26. Investment in European and Middle Eastern and especially in East Asian countries has grown more rapidly than lending to African or Latin American and Caribbean countries (Figures 2 & 3, Annex-Tables 2 & 3). In the most recent period, 1986-1991, East Asian countries---principally China and Indonesia---accounted for 33% of investments and about (47%) of higher education lending. For the period 1963-91, 13 East Asian countries received 52% of total lending ($2.7 B of $5.1 B). However, East Asia's share of lending is down from 71% in the early 1980s. Lending to 6 South Asian and 22 European and Middle Eastern countries has grown in recent years. South Asia's share increased from 4% to 22% of lending from 1981-85 to 1986-91.

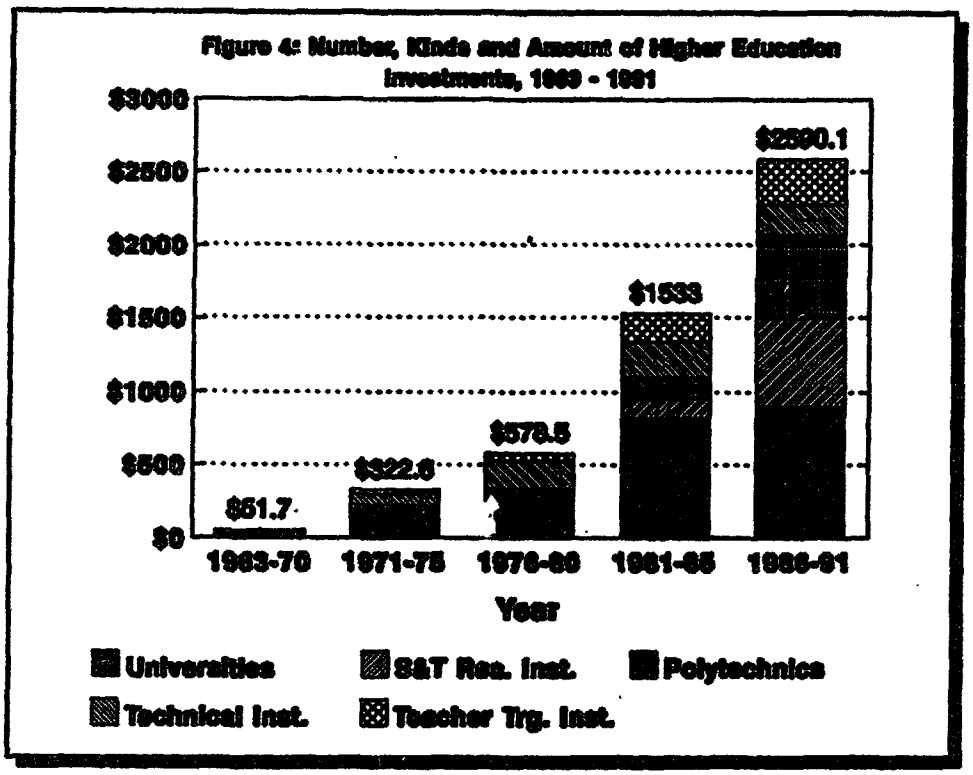
27. Higher education lending to African and Latin America and the Caribbean has diminished relatively. For instance, 37 African countries had almost half (43%) of all higher education investments in the 1960s and received 30% of total higher education lending during a period when many countries in the region were establishing their first higher educational institutions to accelerate indigenization of government services. Africa's share of lending has declined to 11% since 1986. Latin American and Caribbean countries now account for only 6% of higher education lending overall, just 6% for the period 1963-1991 when loans were made to 10 countries.





28. If World Bank lending for higher education was distributed on the basis of the proportion of gross higher education enrollments represented by different regions—which, of course, it is not—the regional allocations would vary somewhat. In 1988 the latest year for which such information is available (Unesco 1988), East and South Asia accounted for about 60% of the developing world's higher education enrollment. These regions received 69% of World Bank higher education lending for 1986-91. Africa which has only 4% of the developing world's higher education enrollment obtained nearly four times as much funding. Among regions, Latin America and the Caribbean have the lowest share of higher education lending relative to higher education enrollments (6% of lending vs 26% of developing country enrollment). In part, the explanation may have to do with the fact that the Inter-American Development Bank has given high priority to lending for higher education and advanced scientific training and research. For example, from 1962 to 1988, 60% of the Inter-American Development Bank's education loans were allocated for higher education and science and technology. This amounted to $622.7 M, nearly three times total World Bank lending to the region (Inter-American Development Bank, personal communication, 1992).

29. A small number of countries in each region have received most of the financing which the World Bank has made available for higher education. These typically have large higher education systems whose expansion and/or rehabilitation requires large investments. Since 1986, Nigeria has been Africa's leading borrower for higher education, Indonesia and India in East and South Asia, Brazil in Latin America and the Caribbean, and Hungary among European and Middle Eastern countries. Overall, Indonesia accounts for the most lending, a half a billion dollars ($629.3 M) since 1986, followed by India ($556.1 M) and China ($293.4 M).



30. Regional variations in the kinds of institutions supported are indicative of the historical development of educational systems, the development planning priorities of borrowing countries as well as emphases in World Bank education lending (Table 1). East Asian countries have the highest number of investments directed to universities and national scientific institutions (48), and Latin America and the Caribbean countries the lowest (8). Economic growth strategies in Far East Asian countries have required large national and international investment in universities and national research systems. In Africa, the

majority (39%) of investments involve teacher training institutions whose enrollments have expanded in response to the demand for teachers generated by efforts to achieve universal primary education that World Bank lending has facilitated, and to increasing pressure for expansion of secondary education in many countries.

31. The university share of higher education lending (Figure 4, Annex-Table 4) has declined somewhat since 1963 (from 63% between 1963-70 to 35% since 1986), but if research institutions participating in advanced scientific training are included, their combined proportion has increased to 58% since 1986. Investment in technical training institutions has become less important while the proportion of lending for teacher training institutions has remained relatively stable and investment in polytechnics has increased slightly. In all lending periods, there were a large number of teacher training project components, generally, small components of primary or secondary education projects---about $3.9 M per component.

32. The World Bank has accumulated a great deal of lending experience in supporting different kinds of higher education in most countries. It has had projects supporting three or more types of higher education institutions in 6 Latin American and Caribbean, 11 Middle Eastern and European countries, 4 South Asian and 5 East Asian countries, including many countries (Algeria, Brazil, China, Indonesia, the Philippines and Portugal) where it has supported universities, S&T,, polytechnical, technical and teacher training institutions. In 16 of the 37 African countries assisted by the World Bank, projects have involved three or more types of institutions.

33. However, a typical project with a higher education component involved one type of institution. Consequently, the benefits of World Bank experience in the higher education sub-sector in particular countries are cumulative rather than concentrated at any point of time. Nevertheless, there are important variations from region to region. Multiple interventions in the same project are most common in South Asian (60% of projects), European and the Middle Eastern countries (50%), and less so in African (38%), East Asian (38%) and in Latin American and Caribbean countries (28%).

Higher Education Projects, 1980-1991

34. Information was collected about the objectives, design and implementation of 144 education projects with higher education components that have been approved since 1980. Almost two hundred (213) separate higher education lending activities were studied. Only 12 of the projects had terminated and project completion and audit reports were available at the time of this survey.

35. Eight East Asian countries account for 28% of the number of investments and 57% of lending. Most investments supported universities and science and technology institutions in these countries. East Asian universities obtained 75% of all lending for university development and 57% of loans for science and technology institutions which together represents 42% of total higher education lending for this period (Table 2). Indonesia and China received twenty four loans with higher education components. Many involved large local and other donor co-financing. For example, the World Bank's share of the Second Indonesia Higher Education project approved in 1991 was $150 M compared to local investment of $122.8 M and Japanese financing of $9.6 M. For an even larger project in China, the Provincial Universities Project approved in 1986, the World Bank's contribution of $120 M represents only a fourth of total project costs ($477 M). The large volume of project funding in East Asia is indicative of the frenzied lending activity in that region during the past decade in response to the massive national investments many Asian countries have made in expanding and improving their higher education and scientific research systems.

36. The African and European and Middle Eastern regions rank behind East Asia in terms of the number of investments and total lending. Sixty three higher education investments were distributed among 28 African countries. Of these, 39 involved support for university development or expansion of teacher training. The World Bank supported higher education in 11 European and Middle Eastern countries. Yemen had the most project investments (6). Only 10 Latin American and Caribbean countries had projects with higher education components. Brazil had 2 projects including two large science and technology projects supporting universities and other public sector scientific institutions. Most (85%) of South Asia's higher education lending was provided for polytechnics: 75% of all support for such institutions.

Table 1

Distribution of Higher Education Investments and Lending By Kind of Institution and Region, 1980-1991 (Million US$)

	Region					
	Africa No. $(000) %	E.Asia No. $(000) %	S. Asia No. $(000) %	EMENA No. $(000) %	LAC No. $(000) %	Total No. $(000) %
University	23 $239.6 6%	22 $1,394.7 33%	4 $31.1 1%	15 $162.5 4%	4 $23.8 1%	68 $1,851.7 43%
S&T Institutes	0 $0.0 0%	11 $417.6 10%	0 $0.0 0	3 $105.2 2%	2 $211.4 5%	16 $734.3 17%
Polytechnics	3 $25.4 1%	4 $130.1 3%	6 $539.4 13%	3 $13.5 0%	3 $7.5 0%	19 $716.0 17%
Technical Institutes	17 $74.6 2%	6 $197.5 5%	4 $37.9 1%	10 $162.9 4%	3 $11.4 0%	40 $484.3 11%
Teacher Training Institutions	20 $55.7 1%	17 $317.5 7%	6 $28.8 1%	20 $89.3 2%	7 $11.7 0%	70 $502.9 12%
Total Project Components	63 $395.3 9%	60 $2,457.4 57%	20 $637.2 15%	51 $533.5 12%	19 $265.8 6%	213 $4,289.1 100%

37. While many education projects have higher education components, in only 66 of the 144 projects surveyed do these components account for 50% or more of the project loan. There are very few higher education projects or projects with significant higher education components where support for the sub-sector is central to overall project objectives. Most

higher education project investments have either inter-sectoral or broader sectoral objectives.

38. Higher education investments can be classified according to how they are articulated with World Bank lending strategies in particular countries as follows:

1) Sub-Sectoral: higher education projects, usually multiple sequential investments in the higher education sub-sector;

2) Inter-Sectoral: education project components and projects that have inter-sectoral objectives such as increasing national scientific training and research capacities; and

3) Sectoral: higher education investments linked to lending for other levels of education---teacher training, for example.

38. In addition, there is a fourth kind of higher education investment consisting of increasing number of education projects undertaken in the context of structural adjustment programs that have higher education policy reform as their primary objective. They include some education projects that have no higher education lending components. But many provide funding for higher education contingent on the introduction of reforms to improve the internal and/or external efficiency of higher education systems.

39. Subsequent discussion focuses on country strategies and investment programs rather than on individual projects in order to better analyze the objectives and cumulative impact of World Bank support. It will also address particular features of project designs that are closely related to country strategies. The experience with these interventions will be assessed and lessons drawn for future project development.

Sub-Sectoral Strategies

40. China and Indonesia illustrate integrated sub-sectoral programs of support for higher education. Governments of both countries have used World Bank financing for expanding their systems of higher education tc accommodate the increasing demand for places as well

as to consolidate gains and bring about qualitative improvements. China's higher education system is highly stratified. The World Bank began its higher education lending by supporting the country's elite national universities whose research and training programs had been disrupted by the Cultural Revolution. Subsequent projects addressed the needs of the provincial universities and other kinds of institutions of higher education. The most recent focus again on national institutions engaged in advanced scientific training and research.

Box No. 1

World Bank Higher Education Lending to China and Indonesia, 1970-1991

	1970s	Early 1980s	Late 1980s	1990s
China		National, Ag. & Tech. Univs.	Provincial Universities	National Universities & State Laboratories
Indonesia	Teacher Tr.Instn.	Public Univer., Teacher Tr.Insts. & Polytechnics	Inter-Univ. Centres,Public & Private Univs.	Teacher Tr. Inst., Polytechnics Insts. & Public & Private Univer., Inter Univ. Centres

Transforming China's Higher Education System

41. Eight projects have supported strengthening the different tiers of the higher education sub-sector within the framework of China's Four Modernizations Plan of 1980. The first project (1980) provided $285 M for improving scientific and technological training at about a third (29) of the country's national universities. World Bank funding facilitated construction and/or rehabilitation of university laboratories and libraries, updating instructional and research programs with foreign scientific expert assistance and upgrading the professional qualifications of academic staff through foreign training. More than 2,400 staff were sent abroad for short or long-training, including senior university administrators. Provision was also made for improving the management capacity of the Ministry of Education and State Education Commission. Project implementation was guided by a Chinese Review Commission comprised of many of the country's leading scientists, as well as by an International Advisory Panel, with the American National Academy of Sciences providing its secretariat (International Advisory Panel & Chinese Review Commission 1991). Somewhat similar international advisory structures were developed and implemented successfully in earlier Korean Science and Engineering Education Projects.

42. "In almost every respect, project outcomes have surpassed appraisal expectations," project evaluators concluded. "Enrollments both at graduate and postgraduate levels have been growing faster than anticipated, the staff improvement programs had reached much larger numbers, and as a result numerous new courses and programs have been created, research projects undertaken and contributions to international research made" (World Bank 1989, vi). The only major difficulty in implementation had to do with the slow return of most of the Chinese students sent abroad for degree studies, a problem China's State Education Commission tried to avoid in subsequent projects through more short-term non-degree training and by increasing emphasis on building local postgraduate training capacity.

43. The next three projects, two agricultural training projects (1983,1984) and a polytechnic/television university project in 1983, were concerned with expansion of agricultural and technical universities and specialized training and research institutions like the National Rice Research Institute for which World Bank support was sought with generally positive capacity building results (World Bank 1990b; World Bank 1991a). Quantitative targets for undergraduate training were exceeded; for example, the target for postgraduate student output under the Agricultural Education and Research Project (1983) by 44%, undergraduates by 27% (World Bank 1990b, iv).

44. A Second University Development Project was approved in 1985 to strengthen economics and engineering programs at 35 national universities supervised by Government ministries. But neither this project nor the previous ones were intended to address in any significant way the increased pressure for expansion of the country's very selective system of higher education. They were mainly designed to enable China's elite higher educational institutions to catch-up in scientific training and research after a long period of professional isolation during the Cultural Revolution.

45. The Provincial Universities Project (1986) embraced the largest, most diverse component of the higher education sub-sector---60 of the country's more than 700 second tier medical, technical, agricultural, normal, technical and comprehensive universities spread out over 28 provinces. These bear the burden of accommodating most of the social demand for higher education and are as well, instruments for promoting balanced regional educational development. Although the project gave importance to quality improvement measures such as staff development, curricular reform and investments in laboratories and libraries, more importance was placed on expansion of enrollment than in earlier projects.

Most local and World Bank investment was directed to normal and comprehensive universities whose enrollments could be more rapidly expanded at less cost. Some assistance was also given for development of a master plan for the sub-sector to guide future investments and combined with significant funding for enlarging China's cadre of foreign trained university planners and administrators. The project was implemented in the context of a radical de-centralization of the State Education Commission's responsibility for financing and directing the growth higher education at the provincial level. Project implementation was monitored and innovative programs initiated by a Chinese Review Commission and International Advisory Panel with the Association of Canadian Colleges and Universities providing a secretariat.

46. Subsequent projects have supported university presses to increase the availability of instructional texts (1989) and the most recent, the Key Studies Development Project (1991), attempts to strengthen postgraduate training and research at 133 State Key Laboratories and Special Laboratories either at selected national universities or in institutions administered by the Chinese Academy of Science. A large network of State Key Laboratories was established in the early 1980s to concentrate research and training resources at centers of excellence as designated by the State Planning Commission. Seventy five laboratories, selected through a competitive peer review process, will receive support for research and graduate training. Some Special Laboratories which do not meet the State Planning Commission's requirements (typically because they carry out research and training in basic rather than in applied sciences) will be assisted as well. Most (95%) of the foreign exchange component of the project loan is for acquisition of laboratory equipment. Minimal funding was sought for foreign training.

47. A particularly innovative feature of this project is a pilot program to improve laboratory management. As in the earlier university development and polytechnic projects, international program advisory groups will be established to monitor activities except in this case, the panel chairmen and most members will be Chinese and the secretariat based in China. The project has benefitted from an impressive amount of higher education sector work, the outcome of sustained efforts to develop better information about programs and enrollments and patterns of financing and management.

48. Reviewing the World Bank's program of assistance to Chinese higher education in the 1980s, Hayhoe (1989) notes that

> Approximately 183 higher institutions in the formal system out of the 1985 total of 1,016 regular institutions were included in these projects: 30 universities under the Ministry of Education (now the State Education Commission), 34 under a range of other national ministries, 32 under agriculture and forestry (including 13 provincial), 14 under public health, 56 at the provincial level, and 17 short-cycle vocational universities administered by city governments (Hayhoe 1989, 166).

Its outstanding feature, she emphasizes, was "the broad spread of assistance, in which no major sector (of the higher education system) was neglected."

49. Over the course of more than a decade and through multiple project investments in increasing quality, access and efficiency, China's higher education system has been strengthened considerably. At the end of the Cultural Revolution, the Government embarked on a massive effort to join the Newly Industrialized East Asian countries in terms of the production of scientists and engineers, and to promote technological innovation in agriculture and industry through increased access to scientific and technological expertise in other countries. Although the quantitative expansion of scientific and technological training has been impressive, China is still far from matching countries like Korea in the per capita output scientists and engineers, and probably also in terms of the overall quality of scientific and technological training offered by its many universities. Since 1988, the State Education Commission has required to freeze university intake out of concern for the qualitative implications of rapid enrollment expansion; "(it) felt that institutions were not able to accommodate the new students and that teaching conditions had deteriorated" (International Advisory Panel and Chinese Review Commission 1991, 39).

50. World Bank assistance has facilitated China's re-entry into the international mainstream in many fields of scientific training and research. By the mid-1980s, the mainstream scientific output of Chinese university scientists had grown considerably (Frame and Narin 1987), reflecting the country's new scientific, educational and development priorities and increased international scientific co-operation. Important curricular reforms have occurred. For instance, in the engineering sciences, the number of different degree programs has been reduced from 665 to 100 (World Bank 1991a, 4). Programs are still overly specialized by comparison to many industrialized countries. But the change has been dramatic. Educational management and planning capacities at the national, provincial and

institutional levels have been greatly enhanced. The sheer size of China's higher education system, however, makes any assessment of the impact of these projects difficult. "Inevitably, " Hayhoe observes, "there are a large number of institutions... that have not participated in World Bank projects and are almost certain to fall farther behind in both material and intellectual resources. Overtime, the important test will be "the degree to which the participation (of project institutions) is seen to strengthen the support for other institutions (to play) a transformative role either within China or in a world context" (Hayhoe 1989, 188).

51. The World Bank, in turn, has acquired experience throughout the higher education sub-sector, an understanding of how its different tiers are related to each other, and has become better able to target its lending. Nevertheless, the World Bank has largely been unable to enter into a policy dialogue with the Government on financing and efficiency issues that are central to the sustainability of its large investments. For example, ongoing negotiations with the Government over reducing the large number of provincial (and municipal) universities and colleges with small enrollments and many staff has not so far led to major policy reforms, although the recent Education Development in Poor Provinces Project (1992) will support a small number of experimental pilot programs at the higher education level to increase internal and external efficiency by encouraging merger of institutions, reorganization of teaching programs and reassignment of redundant teaching staff.

Supporting Expansion of Indonesia's Higher Education System

52. Project investments in Indonesian higher education since 1980 have followed a different pattern---concern for increasing the quality and efficiency of higher educational institutions is a feature of newer projects. The earliest projects placed more importance on quantitative expansion of enrollments. Indonesia's higher education system is less selective, less stratified and more recently developed than China's. There is less government control of enrollments and institutions, significant private financing of higher education and serious constraints on the capacity of Government and higher education institutions to effectively utilize the donor assistance being directed to them. Each of these circumstances has influenced the World Bank's lending for higher education in that country.

53. The World Bank supported expansion of secondary teacher training institutions in the 1970s and that was its point of entry into the higher education sub-sector. The First University Development project was not approved until a decade later, in 1980. This project financed expansion programs in science, agriculture, engineering and economics and staff development at three of the country's major public higher educational institutions; the University of Indonesia, Gadjah Mada University and Andalas University. The project got off to a slow start due to difficulties in negotiating a technical assistance contract with a consortium of American universities and weak project management at the governmental as well as institutional levels.

54. Two projects involving support for higher education were designed in the early 1980s to augment Government efforts to increase access to secondary education through expansion of secondary teacher training (1982 & 1984) which at the time, accommodated much of the resulting demand for higher education. The second of these projects added 16,000 places at eight teacher training colleges. In the interim between the two teacher education projects the World Bank funded a polytechnic project (1983) which, following on a previous project approved in 1979, expanded enrollments at seven institutions and established eleven new ones. Meanwhile, with support from bilateral donors, the Government founded an open university, the Universitas Terbuka in 1984, as well as four new public universities, Tadulako and Halu Oleo in 1981 and Riau and Bengkulu in 1982.

55. The establishment of these institutions was the high water mark in the expansion of public higher education under the New Order Government (Oey-Gardiner 1991). Most future expansion, the Government decided, was to occur in the private higher education sector. This brought its policies for higher education into line with those for secondary education. By 1983/84, the country had 95 private universities (compared to 30 public universities) which accounted for about 44% of total university enrollments (World Bank 1985b, 1).

56. The Second University Development Project (1985) sought to consolidate postgraduate training and research in 16 Inter-University Centers at five universities, including the new Open University which received funding to establish a Center for the Improvement and Development of Instructional Activities. Most of the other Inter-University Centers were created to carry out advanced training in scientific and technological fields and were located at the country's strongest public universities. Half of

the amount loaned ($73 of the $147 M) was allocated for foreign training for university staff. A complimentary project approved in the same year (the Science and Technology Training Project) provided 1,500 overseas fellowships to students in engineering and the physical sciences. This project was conceived as a stop-gap measure "to meet critical shortages of trained manpower" in light of the "low output...and poor quality of university programs, "while the two university development projects strengthened undergraduate and postgraduate training over the long term (World Bank 1985c, 3).

57. The Second University Development project laid a foundation for future support for development of higher education in Indonesia. A National Graduate Education Council was established to guide development of postgraduate training with advice from foreign experts. The review and evaluation functions of the national Directorate of Academic Affairs and the activities of the Higher Education Planning Unit were strengthened and a university management training program for Government and university administrative staff funded. The first higher education sub-sector studies focusing on the management, internal and external efficiency of the public and private universities were carried out under the auspices of the Second University Development project.

58. The Higher Education Development Project (1988) provided additional support for training university managers and administrators, developing management information systems and for studies and evaluations of the performance of higher educational institutions. Its most significant feature, though, were various sub-programs in support of qualitative improvement of private higher education. Standards for accrediting private institutions were to be increased and their activities more closely monitored, funds provided to the administrators and academic staff of these institutions to upgrade their qualifications, and library and laboratory facilities constructed to support their programs. The latter were to be jointly financed and shared by the private institutions to facilitate their participation in the training of scientists and engineers. The key public universities received additional assistance for staff development, research and expansion of instructional facilities. A more de-centralized project implementation structure was developed to overcome the serious difficulties resulting from reliance on a Central Project Implementation Unit with responsibility for the rapidly expanding portfolio of higher education projects.

59. Two projects approved in 1989, Professional Human Resource Development Project and the Second Secondary Education and Management Project, had other sub-sectoral or

other sectoral objectives and did not have much to do with the public and private universities. The Professional Human Resource Development Project supported overseas training of some administrators at private universities while most project funding was directed to staff of central, provincial and local government agencies. Project funding was also directed to strengthening science and technology policy analysis and management. Gadjah Mada University was involved in organizing short-term professional training for examination specialists under the auspices of the Second Secondary Education and Management Project which primarily supported examination reform, in-service teacher training and improving school management.

60. The Second Higher Education Development Project (1991) is the most recent initiative and the $150 M loan one of the largest interventions the World Bank has undertaken in the higher education sub-sector. Its scope is certainly the broadest of the Indonesian higher education projects involving public and private universities as well as teacher training and polytechnic institutions and unlike earlier projects, expansion of enrollment capacity is subordinated to promoting greater efficiency in use of resources and improving the quality of instruction and research.

61. The Action Plan for Higher Education to be implemented during the course of the project, calls upon the Government to moderate expansion of public university enrollments in light of instructional and financial resource constraints, efforts to increase admissions standards and growing graduate unemployment. Essentially, it addresses policy issues which earlier projects avoided. Polytechnics are to be removed from administrative control by the universities and teacher training programs in the universities and teacher training colleges evaluated "with a view to eliminating inefficiencies" (World Bank 1991b, 16). The performance of the Inter-University Centers will be evaluated as well, presumably with the intention of consolidating some of them (World Bank 1991b, iii), while transitional funding is provided to enable the others to eventually become self-supporting. More funding is allocated for staff development at public and private institutions, for a competitive research grant program, purchase of basic science research equipment and establishment of environmental study centers at selected public universities, to support training of science teachers, to construct and operate science and technology resource centers to upgrade training at private universities and to improve engineering and polytechnic training. More funding will be made available to strengthen higher education management, improve management information systems and studies to guide future policy reforms.

62. Reviewing two decades of lending for higher education in Indonesia, the World Bank's Operations Evaluation Department (1991) emphasizes the role of assistance in expanding enrollment capacity in order to address the country's ambitious manpower training requirements. Its report ascribes the poor performance of the country's higher education system in the 1960s and 1970s, qualitatively and quantitatively, to "persistent underfinancing" (World Bank 1991c, 27). Higher education expenditures began to increase faster than enrollment in the mid-1980s after the shocks to the Indonesian economy caused by lower oil prices (World Bank 1991c, 2), but at a very modest rate (about 2% per annum for the period 1986-1989), well below the rate of inflation (7% for this period). One consequence is multiple employment of university staff: "The average salary for public university teachers (is) around one-third of what is considered a minimum income. This forces them to take second jobs elsewhere, which reduces the quality of their teaching and adversely affects the academic environment" (World Bank 1991c, 3). Many staff have other jobs at private institutions. The rapid expansion of private higher education has been subsidized to considerable extent by the underfinancing of the public university system.

63. University enrollments greatly increased over the period reviewed; public university enrollments, for instance, quadrupled, and enrollment in private institutions nearly doubled (World Bank 1991b, 1). This achievement must be qualified by the fact that graduate unemployment in the late 1980s increased from 9% to nearly 13% (Oey-Gardiner 1991, 35). Nevertheless, there are still reported to be severe shortages of scientists and technologists in many fields despite the fact that several higher education projects aimed at increasing training capacity in these fields.

64. A very large amount of project funding was used to support staff development through study abroad; about $640 M from 1980. This was the primary instrument for qualitative improvement of university training, and most funding went to support staff at the public universities. Yet by 1990 when some the largest cohorts of staff had returned from their overseas studies, the proportion of staff with any advanced degree was only 25%, up from 18% in 1987, and still well below the public university systems of neighboring Southeast Asian countries (World Bank 1991b, 4). Production of international mainstream scientific research is also much lower, less than half of Thailand's in 1990 (215 versus 583 scientific papers, ISI 1990). A recent study (Thulstrup 1992, 40) of the research and training outputs of 15 World Bank funded Inter-University Centers in Indonesian universities, each with a professional staff of more than 40 scientists, showed that only 2 mainstream scientific

papers have been produced between 1985 and 1990. About fifty (48) doctoral and more than two hundred (253) Master's degrees had been awarded to students affiliated to these centers. The centers have been slow in starting up activities. In 1990-1991, the volume of research and training activity increased substantially. More than seventy (77) scientific papers were produced that year (none in mainstream scientific journals), 15 students received doctorates and 354 obtained Master's degrees. A large number of instructional texts were prepared in the national language which is one of the significant outputs of the Inter-University centers though they were not established primarily for this purpose. Thulstrup concludes that while "the educational efforts have been considerable...the research accomplishments seem disappointing" (Thulstrup 1992, 39). Waworuntu and Holsinger (1989) attribute the low level of research productivity among staff in Indonesian public universities to the lack of importance given research in professional promotion. Multiple employment of university staff another and perhaps more important factor.

65. Important investments have been made in improving university management and planning, amounting to about $110 M since 1980. But the scope for further improvement is substantial. For example, the most recent higher education project notes in passing that "the average annual recurrent cost per university student is not exactly known at either public or private universities" (World Bank 1991b, 3). Reliable data are still not available on postgraduate enrollments and graduates in scientific and technological fields, particularly in private institutions.

66. Have the postgraduate training capabilities of public and private institutions increased, quantitatively and qualitatively? This was the overall objective of the program of World Bank support for Indonesian higher education. It may be to early to pass judgement on the effectiveness of the lending program. However, the World Bank has learned at least three things according to the review carried out by its Operations Evaluation Department: 1) the value of a sub-sectoral approach to improving "the quality, relevance and efficiency of higher education investments;" 2) the need to "participate in the process of policy formulation itself"; and 3) the importance of "a solid factual and analytical foundation" for policy dialogue with Government (World Bank 1991b, 32 &33). These lessons have been learned only after a decade of significant investments. For much of this time, there has not been---as there was in China---a coherent strategy for development of the sub-sector, a plan for reform or even the data needed to guide such initiatives.

Using Accrediting Mechanisms to Promote Curricular Reform

67. In both China and Indonesia and in an increasing number of other countries, World Bank projects have sought to promote curricular changes through introducing and/or strengthening accrediting mechanisms. The intention is to improve the quality of training and the correspondence between training profiles and labor market requirements, although usually more importance is given to one or the other of these objectives as the practical implications for designing effective accrediting procedures are quite different.

68. China's State Education Commission is the country's principal accrediting authority. The Commission recognizes institutions and approves new programs of study offered by national, provincial and municipal colleges and universities. The Commission's first and second departments of higher education have responsibility for formulating standards of instruction for most fields of higher studies; basic and applied sciences, professional fields such as medicine, agriculture, education and engineering, the social sciences and the humanities. The two departments are organized into bureaus with responsibility for a particular domain of study which in the case of most professional fields is congruent with responsibility for specialized institutions like the agriculture or engineering universities. The bureaus develop guidelines for programs of study in collaboration with the institutions, the provincial and national government ministries that operate these institutions as well as with the State Economic and State Planning Commissions.

69. In the late 1970s prior to the World Bank's involvement in supporting reform of the country's higher education system, the bureaus of the State Education Commission began reviewing academic programs especially in the applied physical and social sciences (Hayhoe 1989, 42-53). The first and second university development projects supported and extended these efforts with assistance for revision of national curricula with a focus on engineering and economics and finance. The advice of international experts and the sustained involvement of the American National Academy of Science facilitated curriculum reform. Reference has been made above to the progress in broadening engineering training and reduce the number of specializations. The reform of economics and finance programs was perhaps more successful (International Advisory Panel and Chinese Review Commission 1991, 59-78). These were radically changed with profound long term implications for the training of policy cadres who have played a central role in transforming the country's economy. In 1990, undergraduate programs in economics and finance at 250 universities

and colleges were directed by the State Education Commission to begin using the new teaching market economics syllabi developed by expert panels of Chinese and foreign scholars.

70. "In contrast to the scattered bilateral projects in this field, " Hayhoe notes, "(the World Bank's international advisory panels) could bring a foreign social science influence to the center of Chinese internal policy processes" (Hayhoe 1989, 178). This would not have been possible without Chinese consensus on both the need and direction of curricular reform, including recognition that western social science training models could be adapted to the Chinese situation. However, the new programs are being introduced at a time when enrollment in economics and finance is falling due to government policies despite the projected long term demand for graduates in these fields (International Advisory Panel & Chinese Review Commission 1991, 61-62).

71. Restructuring engineering education has presented more complex problems, perhaps because it is difficult introduce reforms in training i.i anticipation of changes in the structure of engineering employment. Developed country engineering programs, which vary considerably in how basic and applied scientific instruction are articulated with each other and with practical experience, are organized on the premise that an engineering career involves performing assignments requiring a wide range of expertise, a sound theoretical training and some social science knowledge in preparation for managerial responsibilities. Engineers are more likely to change jobs (and careers) than many other university trained professionals.

72. In socialist economies like China's, despite the efforts in the 1980s to de-link engineering education from manpower planning and create a labor market for engineers, the state remains the principal employer of engineering graduates and the configuration of professional responsibilities is not easily changed. This seriously affected what could be accomplished by the international advisory panels for engineering and by the State Education Commission.

Box 2: Accreditation of Teacher Training Institutions

In Indonesia, the World Bank transplanted the notion of accreditation in the Second University Development and Second Teacher Training projects mainly to bring expansion of private higher education under some government control and also to improve the standards of public institutions responsible for teacher training. As Joni frankly acknowledges in an analysis of a pilot program to accredit teacher training institutions, the "idea of program accreditation, which was introduced as institutional self-study coupled with peer validations, was indeed not only a novel undertaking but, at the same time, a rather radical departure from the traditional ways of thinking." Specifically, self-criticism and especially criticism of others to inform judgements about claims for scarce resources is contrary to the *adat* tradition ("everyone shall get his/her turn") that guides public policy. The experiment with accreditation is having some success but has necessitated significant and interesting modifications of international accreditation practices. A pilot program was established in 1987 to test develop a scheme for accrediting teacher training programs along the United States National Council on the Accreditation of Teacher Education model in selected institutions subsequent to the Government's decision to upgrade all pre-service teacher training to university level status. The objective was to arrive at an agreed upon set of standards by which all teacher training institutions could be evaluated as well as to establish a baseline for a program of institutional development. Five autonomous Institutes of Teacher Training and Pedagogy (Kinstitut Keguruan dan Ilmmu Pendidikan or IKIPs) were selected on a competitive basis to participate in the program and eleven teaching subject areas (e.g. Mathematics Education, etc.) were identified as foci for study. Small planning grants were made available to each institution to enable them to do a self-study which was externally evaluated ("validated") by other professionals and by educational practitioners. Importance was placed on ensuring that these validations were "non-threatening and collegial ...shortcomings, when found, are viewed not as something to be penalized...On the contrary, they are perceived as the institutional starting points to initiate the necessary improvement efforts." The results of the evaluation were presented at a national seminar organized by the Directorate General of Higher Education in 1989 at a time when the shortcomings of the IKIPs were receiving a great deal of political scrutiny. The pilot study was useful in generating acceptance for accreditation as mechanism to improve teacher training. An Education Consortium was subsequently established to advise the Directorate General of Higher Education on standards of teacher training and investments in qualitative improvements. Joni draws three conclusions from this experience:

> First of all, the ideas underlying the change efforts need to be internally coherent as well as externally significant. Secondly, their translation into ways of thinking and doing things need to be as congruent as possible with the existing mechanisms and procedures. And lastly, the personnel involved need to possess a sense of ownership. (Joni 1989, 30)

Where accrediting mechanisms do not exist, there is much to recommend introducing them on a pilot basis in order to demonstrate the potential benefits to institutions as well as to policy makers.

73. There has been a proliferation of accrediting bodies in Indonesia to better guide government and donor efforts to strengthen the system of higher education. Under the Second University Development project, accrediting bodies were established in each of the large provinces to assess the programs of private institutions. The programs of these institutions have been given three kinds of accreditation: 1) registered (meeting minimal

standards); 2) recognized (as having somewhat superior facilities and standards of instruction); and 3) equalized (i.e. deemed to be equivalent of the programs of public institutions). The provincial accrediting bodies administer tests to students in the private institutions to ascertain levels of performance and inspect their programs, relying on the staff of the public universities many of whom also teach part-time in private institutions. The ratings programs receive influence the fees private institutions are able to charge students and, thus, are taken seriously. Unlike the scheme developed for teacher training institutions (Box 1), the procedure for accrediting the programs of private institutions results in a qualitative verdict reached by external assessors whose impartiality is open to question, rather than in a plan for self- improvement agreed to by the accrediting body and the institution concerned.

Inter-Sectoral Strategies

74. Higher education projects in Brazil and Korea represent a different kind of investment which is both an integral part of the World Bank's country education strategy as well as supportive of lending to agriculture, industry and other sectors. They are also examples of recent efforts to develop national scientific and technological research capacities through institutional innovations in the system of higher education.

75. Brazil is a scientifically advanced, developing country with a well elaborated higher education system and a large network of public scientific institutions. Like India and Argentina, Brazil is a major producer of science and technology and scientists and technologists. But it has not derived full benefit from its substantial research and training capacities for several reasons. The country's work force is still poorly educated and largely unskilled. The country's research and development capabilities are mainly concentrated in the public sector (Schwartzman 1991). There is a very low level of private investment in research and development and because of large, protected, oligopolistic internal markets, few incentives for technological innovation by state owned enterprises or by private firms (Dahlman 1984; Schwartzman 1991). Korea, though not one of the developing world's major producers of science and technology, has a well educated, highly skilled work force and a sophisticated, internationally competitive, research intensive manufacturing sector. This is the result of Government policies that have emphasized public and private investments in all levels of education, expansion of key export industries, and utilization of

the products of the country's public sector research and training institutions by private firms (Westphal 1978, Westphal, Rhee and Pursell 1984). The two countries present an interesting contrast in strategies for scientific, educational and industrial development.

Supporting Scientific Training and Research in Brazil

76. In 1983, Brazil obtained a loan from the World Bank for expanding agricultural and industrial training, following on the First Education Project loan (1971) which supported establishment of eight agricultural and two industrial technical schools. Despite evidence of an over-supply of agricultural technicians and university trained agriculturalists, a shortage of "middle-level" personnel was perceived, particularly in the most underdeveloped northeastern regions (World Bank 1983, 5). In the manufacturing sector as well, while the labor market could not absorb university graduates, a shortage of technicians was said to exist. This could not be remedied by "downward substitution of engineers (because that) would normally lead to lower levels of job performance...and to un-necessarily high labor costs" (World Bank 1983, 6). The project financed short-term expansion of the output of secondary agricultural and technical institutions in conjunction with development of long-term Government manpower training policies for these sub-sectors.

77. For many years, the World Bank provided little assistance to higher education apart from what was necessary to support Brazil's agricultural research system and expand research on non-fossil fuels and the ecology of the Amazon basin. No rationale had been developed for greater involvement in the higher education system. Indeed, from a sectoral perspective, there was little justification for major investment.

78. The Science and Technology Project approved two years later (1985 for $72 M) reflected a radical change in the World Bank's approach to the higher education sub-sector. Better exploitation of the country's agricultural, mineral and other natural resources is presented in this project as requiring increased investment in the country's infrastructure for scientific and technological training and research strained by the rapid growth of enrollments during Brazil's economic miracle from 1964 to 1979 and, subsequently, by economic crisis. A rationale for investment is developed focusing on the implications of investments in research and training for economic growth and the country's poor performance on science indicators relative to OECD and East Asian countries:

> Brazilian science and technology boasts numerous examples of the impact of indigenous research on economic growth, even under the sub-optimal sectoral conditions currently prevailing....In an environment of severe scarcity of public resources, Brazilian authorities (and the country's external financiers) may fail to give sufficient attention to those research and human resources development activities of longer term and less certain results upon which Brazilian technological capacity---and international competitiveness---in the next century ultimately depends (World Bank 1985a, 55 & 57).

79. Sector work identified the principal weaknesses of Brazil higher educational and national research systems as: a) dispersion of scarce resources "across too many discrete (research and training) activities" with the result that projects and programs are inadequately funded; b) "over production of dubious quality personnel (in some fields while) especially in the sciences, the numbers of highly training professionals needed...for intensifying research and development in priority areas, or for immediate employment in the productive sectors have not materialized;" c) "mismatch between availability and orientation of scientific and technological expertise, and the unexploited natural resource base and acute development challenges in the northeast, center-west and north;" d) poor scientific support services and access to scientific and technological information; and e) ineffective mechanisms for setting scientific and educational priorities and funding projects and programs (World Bank 1985a, 6 & 7).

80. A human resource sub-program to expand postgraduate and diploma training in higher education institutions located in natural resource rich but scientifically and educationally less developed regions was funded together with a large targeted research grants program mainly in applied fields serving agriculture, industry and energy administered by the Agency for Financing Studies and Projects. Procedures for peer review of research proposals carried out under the auspices of the Federal Secretariat for Science and Technology were to be strengthened. Investments were also made in informatics, weather forecasting services, improving industrial standards and quality control assessments and in developing local capacity to produce reagents and repair and maintain scientific equipment. As well, funding was made available for science curriculum development, improving science teacher training and for science popularization.

Box 3: Support for Peer Review and Competitive Research Funding in Brazil

The awarding of research funding on a competitive basis is a major departure from previous practices and is a key element of the World Bank strategy to strengthen Brazil's scientific community. However, implementation has been difficult despite the strong support for the principle of competitive funding from many researchers and now several years of experience. In the current Scientific Research and Development Project, there are still problems in scheduling disbursements so that there are two to three rounds of research awards per program per year. A high proportion of funds have been committed too early in the project cycle. A related difficulty is that the national funding agency has not retained 20% of the funds to be allocated in each round for support of new projects, completion of ongoing projects and reconsideration of previous requests. Research committees have compounded this situation by determining a priori not only the volume of resources to be expended in each round, but also the number of projects to be approved. These practices have substantially compromised program flexibility.

In addition, the guidelines developed for many of the programs have been confusing to applicants, results have not been announced in a timely manner and disbursements to successful researchers have been delayed, especially grants made for purchase of imported laboratory equipment. Moreover, in at least one of the research sub-programs, the impartiality of the peer review process has been called into question. Many members of this research committee (40%) had projects funded by the program. (While that casts suspicion on the review process, it may simply indicate that at least some committee members are active researchers.) In another program, a majority of project proposals were deemed to fall outside program guidelines and, thus, were not sent out for expert peer review.

Source: Kuperman, A. (1991), "World Bank Supervision Report for Brazil Science and Research and Training Project," Washington, D.C.: World Bank, processed.

81. A second scientific research and training project was approved in 1990 "to consolidate the still fragile institutional reforms made in the first project, such as open competition, peer review, and decentralized planning, as well as rationalization of the importation process and strengthening of industrial norms" (World Bank 1990a, 12). The project continues the focus on the public sector research system and "activities which the private sector will not finance." Additional funding is provided to the applied scientific fields supported by the earlier project and two more are added; materials science and environmental studies. Almost half (46%) of project funding ($150 M) is to be expended for purchase of scientific equipment.

82. Much of the rationale presented for these project investments rests on the assumption that Brazil is not producing enough high quality science and well trained scientists and engineers. The problem is insufficient research and training capacities rather than

insufficient utilization of the country's public higher educational and research assets by productive sectors. Yet the appraisal report for the most recent project draws attention to many areas of concern. The public sector, it notes, may finance as much as 90% of total scientific and technology investment (World Bank 1990a, 34), a much higher proportion than in many OECD and East Asian countries. While state funding has declined from the early 1980s as a result of continuing austerity, overall Federal Government spending on research and development has remained stable, reflecting "not only the political power of the Science and Technology community, but also a favorable attitude of the Brazilian Congress toward funding of Science and Technology activities" (World Bank 1990a, 35). The prominent involvement of the Federal Government

> is not a peculiarity of Brazil...What is worth noticing is that while Brazil (has) remained extremely dependent on public funding for S&T expenditures, other countries have been able to evolve toward a growing share of privately financed Research and Development as their industries matured. The most striking example in this category is South Korea (World Bank 1990a, 38).

83. As Brazil's economic crisis deepens, there is growing under-utilization of these assets as evidenced by declining private investments in research and development, and further concentration of research activity in public scientific institutions (Wolff 1991). Meanwhile, Brazil's production of mainstream scientific papers has increased from 3,412 scientific papers in 1985 to 4,129 in 1990 (ISI 1985, 1990). Brazil is a rare example of a country in economic turmoil whose scientific community is almost entirely dependent on government research funding, that has sustained its mainstream scientific output (Eisemon and Davis 1992). The production of postgraduates in scientific and technological fields has also continued to increase. In 1988, about 28,000 students were enrolled in postgraduate programs in Brazilian universities which graduated 4,300 students that year, three fourths in applied scientific fields (Unesco/CRESALC 1991, 31 & 48). More recent estimates put the number of postgraduate students as high as 50,000 (Wolff 1991a, 11). Ten per cent of Federal Government investment in advanced scientific training and 40% of competitive research funding, most of which is captured by universities, is presently derived from World Bank loans (Wolff 1991, 6).

84. Macroeconomic reforms introduced by the Federal Government in 1990 have profound implications for whether the country will ultimately benefit from investments in

expanding its higher education and science and technology systems. Protected internal markets are being opened and firms encouraged to compete, with tariffs being reduced substantially. State owned enterprises which account for a substantial share of national research and development investment will soon be privatized. Such measures might stimulate private research and development and greater utilization of the research and training capabilities in public sector scientific and higher education institutions. But they might also extinguish much of this capacity as Brazil does not possess obvious comparative advantages as a source of applied scientific and technological research in many of the fields in which Government has invested heavily such as electronics and computer science.

85. Much will depend on the structures the country develops to facilitate research utilization and stimulate technological innovation as well as on investment in increasing the educational and skill level of the labor force. Brazil's science and technology system is conspicuously underdeveloped in terms of mechanisms to transfer applied science from the public to the private sectors (Schwartzman 1991). Strategies for rectifying this situation are only now being studied under the auspices of the Second Science Research and Training Project (World Bank 1990a, 15). Poorly designed revisions of the tax regime in 1988 to increase private investments in research and development have not significantly changed firm behavior and will need to be recast, and different incentives devised especially for small and medium sized firms. More important, increased investment in basic education will be required to fully exploit the country's scientific and industrial potential.

Investing in Science and Technology in Korea

86. Korea illustrates a successful integrated sub-sectoral, sectoral and inter-sectoral approach to developing national scientific and industrial capacities. Korea up to the 1960s, like Brazil today, had a relatively large, mostly private, mainly poor quality higher education system oriented to undergraduate instruction (Lee 1989). The first American model postgraduate programs in science and engineering were not established until 1961 (Lee 1989, 40). Compared to Brazil and also to many Asian and African countries that experienced colonialism and whose scientific institutions were linked to imperial scientific systems (Eisemon, Davis and Rathgeber 1985), Korea lacked a significant public infrastructure producing applied research and providing various scientific services. However, there was no tradition of a dominant role for the state in advanced scientific training and research to

be perpetuated. Instead, there was much scope for carefully planned, high impact public investments in a predominantly private higher education system.

87. Korea was fortunate in another respect as well. At a time when prevailing development ideologies gave importance to government mobilization of resources for technological innovation fostered by restricted access to foreign technology, Korea had to import technology as it was unable to generate much of its own (Westphal, Rhee and Pursell 1983). It relied on private investment and foreign training for this purpose while the country developed long-term scientific, industrial and educational strategies intended to build technological capacities.

88. In 1949, Korea re-organized its educational system, made primary education a Government responsibility and established increasing coverage of the primary school age cohort as a national priority. In the mid-1960s, the Minister of Education approached the World Bank for a primary education project

> However, the Bank's...reaction was negative: the Minister was advised that the project in which he was interested at the time---primary school construction to accommodate the growth in population of primary school age---did not qualify under Bank criteria since neither normal population increase nor primary school construction was eligible for consideration (World Bank 1977, 1).

89. Secondary technical and vocational education were considered more appropriate investments for the World Bank at the time. Thus, the First Education Project (1969), and the next three (1973, 1975 and 1977), expanded vocational and technical education. In the first project, the Government requested some assistance for development of university level training in engineering, marine biology and basic science to compliment investments at the pre-university level. The World Bank did not think that this was advisable (World Bank 1977, 1). The Second Education Project (1975) had a small technical teacher education training component at the university level, though the World Bank expressed reservations about this as well (World Bank, 1983, v).

90. However, by the Third Education Project (1975) the World Bank was ready to become somewhat more involved in supporting higher education; specifically, by providing

funding for three agricultural colleges, a fisheries college and a merchant marine college. The Fourth Education Project (1977) continued support to secondary and post-secondary vocational and technical institutions. It was implemented in the context of universal primary education, achieved in 1975, and rising secondary school participation which reached more than 80% by the early 1980s.

91. While the World Bank was investing in the periphery of Korea's rapidly expanding university system, the Government was moving to control growth of the tertiary level. In the mid-1960s, the Government tried to introduce quotas on the intake into private institutions which as early as 1945 accounted for the majority of university enrollments (Lee 1989, 37). In 1982, it enlarged the functions of the former Korean Association of Universities and Colleges making the new Korean Council for University Education an accrediting body for all institutions of higher learning. Substantial government funding was made available for foreign training and expansion of postgraduate programs to facilitate staff development in both public and private institutions. Between 1967 and 1983, the proportion of university staff holding a doctorate increased from 10% to 40%. The majority (61%) had degrees from Korean institutions (Lee 1989, 39).

92. Throughout the 1970s, Korean firms increased purchases of technology from abroad, mostly from Japan, though even firms in export industries were relying mainly on endogenously developed "know how" (Westphall, Ree and Pursell 1983, 282 & 284). Local "know how" refers to the ability to assimilate, adapt and innovate upon new technologies. By the early 1980s, it could be claimed that "Korea's proficiency in plant operation far surpasses that in product and plant design" (Westphall, Ree and Pursell 291). The country's "know how" capability enhanced through investments in primary, secondary and vocational education, and creation of a mass system of higher education, as well as its relative openness to foreign technology, was far in advance of its "know why" capability to invent production technologies derived from basic science (Fransman 1983, 10).

93. The Government was already taking important steps to rectify this situation. The Korea Institute for Science and Technology was founded in 1966 and the Korea Advanced Institute of Science in 1971 to promote basic research and advanced scientific training outside the public and private universities, to more efficiently utilize scarce research resources in institutions where a critical mass of expertise could be developed, and research and training efforts focused on industrial needs (World Bank 1978, 4). These institutions

were later merged to form the prestigious Korean Advanced Institute of Science and Technology in 1981.

94. Increased funding was made available to support expansion of postgraduate training at elite public and private universities as well as at Government institutions carrying out advanced scientific training and research resulting in a more than tenfold growth in the output of Master's and doctoral students between 1965 and 1986 (KEDI 1986, 194-195). Government funding for university based research also increased, and between 1980 and 1985, the production of mainstream research in basic and applied scientific fields rose dramatically (Eisemon and Davis 1989, 335). Although Government economic plans established specific industrial priorities, research production and graduate training was concentrated in high quality institutions rather than in particular fields of commercial importance (Eisemon and Davis 1989, 53; Lee 1989, 42).

95. By the early 1980s, private research and development expenditures already exceeded those directed by Government to universities and public scientific institutions (Kim 1986). This reflected private sector response to a plethora of Government policies to stimulate "industrial dynamism (Westphal 1978; 1981), "chiefly through incentives to firms involved in technology intensive export markets, coupled with generous tax exemptions for research and development investments (Lee 1989, 51 & 52). In brief, Korea was creating a private sector market for the products of its higher education and science and technology systems while it was expanding its capacity for advanced scientific training and research through Government investment.

96. A $100 M World Bank loan approved in 1980 supported expansion of training in management, engineering and certain technical fields, the bulk of the funding being allocated to expanding engineering and the majority of that to private institutions most in need of qualitative improvement. An important feature of this project was the development of an accrediting body for engineering institutions. Student teacher ratios were to be significantly reduced as Government increased salaries and funding for research and staff development (World Bank 1980, 22). In contrast to earlier projects and most other higher education projects of this period, the Higher Technical Education project covered "the whole sub-sector, public and private" (World Bank 1980, 26).

97. Four more projects were approved between 1989 and 1991, involving total loans for higher education and scientific research of $153 M. One project will fund a competitive research and equipment grants program for universities in recognition of the fact that about 60% of scientists and engineers engaged in research and development with postgraduate degrees are employed in universities (World Bank 1990c). The others are designed to strengthen links between public sector science and technology producing institutions and industrial users through support for the rapidly proliferating linking mechanisms that the Government has established for this purpose. The list of beneficiaries includes the Industrial Technology Center, the Korea Electro-technology Research Institute, the Genetic Engineering Center, the Korea Standards Research Institute, the Korea Institute of Energy and Resources, the Korea Basic Science Centers, the National Institute of Industrial Research as well as the country's flagship research and training institutions, the Korean Institute of Technology and the Korean Advanced Institute of Science and Technology. Guiding these efforts is the Government's four-pronged strategy of: a) concentrating talent in high priority basic and applied scientific fields; b) encouraging inter-disciplinary research and training activities; c) facilitating collaboration between the university research community and the productive sectors; and d) focusing research training on topics with industrial applications.

98. In the three decades of World Bank educational lending to Korea, the Government's participation in advanced scientific training and research has expanded while the private sector's contribution to national research and development investments has also grown. Korea now ranks with industrialized countries in terms of the proportion of GNP invested in research and development, having invested as little as .57 % of GNP as recently as 1980. More than 2% of GNP was invested in research and development in 1987, 80% of which is carried out by the private sector (Carnoy 1992, 22). It is the parallel development of public sector scientific capacity and private investment that sets Korea apart from countries like Brazil with much larger science and technology systems. Indeed, Korea's ability to derive commercial benefits from its expanding infrastructure for scientific training and research prompted objections by representatives of some OECD countries to its most recent loans.

Box 4: The Korean Basic Science and Engineering Research Centers Program

Funded through the Korean Science and Engineering Foundation, the program makes long term institutional development grants to universities on a competitive basis. Importance is given to supporting training at the postgraduate and at the undergraduate level "in areas where industrial personnel are needed." (Korea Science and Engineering Foundation 1991). In the 1989 and 1990 competitions, the Korean Science and Engineering Foundation made 30 grants to universities, 14 for Basic Science Research Centers and 16 for Engineering Science Research Centers to support activities in such fields as molecular plant biology, artificial intelligence, bio-process engineering, satellite technology research, and dialectic and advanced matter physics. The centers encourage exchange of personnel between universities, government research institutions and industries and their research projects are jointly developed by representatives of these sectors. They collect membership fees to support some of their operating costs from government institutions and private firms which makes them partners and ensures that the intended beneficiaries of the program take an active interest in centers' work.

Sources: Korea Science and Engineering Foundation (1991), "Science Research Centers/Engineering Research Centers: 1991," Seoul: KSEF, processed; Parker, L., "Industry-University Collaboration in Developed and Developing Countries," PHREE Working Paper, (Washington, D.C.: World Bank), processed.

99. Lending for strengthening institutions for advanced scientific research and training is becoming increasingly important to the World Bank. The long term success of such investments, as the Korean experience indicates, is dependent on a wide range of supportive circumstances and coordinated government interventions. Macro-economic policies must foster technological innovation and private investment in research and development. This generates demand for the expertise and graduates of higher education and research institutions. Mechanisms must be established to facilitate utilization of these assets. Finally, there must be large national investments in raising educational attainment and especially in improving the quality of schooling to supply the productive sectors with the skilled labor that a technologically dynamic economy requires.

Sectoral Strategies

100. Many investments in higher education are closely articulated with lending to other levels of the educational system. Investment in expansion, improvement or reform of the higher education sub-sector is needed to strengthen investments in lower levels of education. This may be accomplished by a project to increase the production of school teachers or other education specialists, or by an intervention to control expenditures for higher

education in order to redirect resources to other levels of the educational system. A teacher training project for Yemen approved in 1991 and two Nigerian higher education projects of the late 1980s are representative of sub-sectoral investments that are designed mainly to address sectoral issues.

Expanding Teacher Training in Yemen

101. A Secondary Teacher Training Project (1991) was developed to assist Yemen to reduce reliance on expatriates who constitute a significant number of the staff of secondary schools, particularly those outside urban areas in the poorer northern parts of the recently united country. A deteriorating macro-economic situation worsened by the repatriation of Yemeni skilled workers from Saudi Arabia and other countries in the region after the 1991 Gulf crisis, dramatized the need for a higher education intervention to reduce foreign exchange costs. Rapid expansion of secondary education from 1975—enrollment has grown from 1,000 to 300,000 in 1991—has seriously strained instructional facilities and resources (World Bank 1991d, 6). In addition, it has swelled university enrollments. The number of students eligible for admission to university increased more than five times between 1979/80 and 1988/89 (Selvaratnam and Regel 1991, 18).

102. The Government guarantees employment to every university graduate. Until 1988, the Yemenization of the civil service created sufficient opportunities for placement of most university graduates in positions related to their training. However, since then it has been difficult for the Government to generate suitable employment for the many graduates of arts and social science programs.

Box 5: Twinning Institutions

A Secondary Education Sector loan to Malawi (1989) is similar to many projects which have small higher education components and objectives tangential to the sub-sector. In this case, a higher education component has been added to a lengthy list of primary, secondary school and distance education activities to be supported by one of three sub-projects. About $8 M is allocated for higher education.

The overall objective of the loan of $37 M is to support the country's ten year education investment plan. Although the investment plan proposes a doubling of university enrollments and significant additional investment, the government was persuaded by the World Bank "that this be postponed, since some increase in student numbers can be achieved without new investments, and the present growth in employment opportunities does not warrant a large general increase."

The project will support a wide variety of interventions ranging from improving the production and distribution of textbooks and school science kits, examination reform, and upgrading school facilities to using radio instruction in primary schools. The investments to be made in tertiary education are less ambitious. Some funding will be provided to increase efficiency and strengthen teacher training—by raising student/teacher ratios from 16:1 to 20:1. In addition, the Faculty of Commerce at the University of Malawi will be assisted to develop distance education and evening courses to increase the remuneration of lecturers and arrest staff attrition to the private sector. The fees generated from teaching part-time students will be used to supplement salaries. The Faculty will receive technical assistance and 15 staff years of postgraduate fellowships tenable at an overseas institution with which it will be "twinned." The Faculty of Commerce at the University of Saskatchewan (Canada) has been selected to be this institution.

Twinning arrangements have a long history. Many higher education institutions in colonial Africa, for example, were affiliated with metropolitan universities which supervised instruction, examined their students and awarded them degrees. Institutional twinning was also an important and effective vehicle of bilateral educational assistance during the "institution building" era of the 1960s and early 1970s. Since then, twinning arrangements have become more focused, usually involving an agreement between a department or sometimes a faculty in a developing country institution and a counterpart in a developed country to supply technical assistance and training for staff development either abroad or locally. Factors such as the length of the twinning relationship, the capacity of the contractor to provide experts for overseas assignments, and experience in international collaborations influence success. The congruence between the research and training activities and interests of the academic units is equally important (Thulstrup 1992). Twinning works best when both parties derive professional benefits from the arrangement. Twinning arrangements like the one proposed for the Faculty of Commerce and other forms of highly targeted assistance are, however, no substitute for creating a stimulating university environment where academic work is full time employment for most staff. The recipient institution must be strengthened as a whole in order to sustain qualitative improvements that may result from successful twinning of academic units.

Sources: World Bank (1989). Malawi: Secondary Education Sector Credit. (Washington, D.C.: World Bank); Cooper, L. (1984). The Twinning of Institutions: Its Use as a Technical Assistance Delivery System. World Bank Technical Paper No. 23. Washington, D.C.: World Bank; Eisemon, T.O. (1974). US-Educated Engineering Faculty in India. Bombay: Tata Institute of Social Sciences; Eisemon, T.O. and Kouroumo, M. (1991). "Foreign Assistance for University Development in Sub-Saharan Africa and Asia." Paper presented to Senior Policy Seminar on Improvement and Innovation in Higher Education in Developing Countries organized by the World Bank, 1-4 July 1991, Kuala Lumpur, Malaysia; Thompson, K.W. and Fogel, B.R. (1976). Higher Education and Social Change. New York: Praeger; Thulstrup, E. (1992). "Research Capacity Building: A Study of Selected Danish-Developing Country Twinning Relationships." Report to Danida, processed.

103. A one year postgraduate diploma program in education is being developed at the University of Sana'a as a component of the Secondary Teacher Training Project to retrain university graduates; up to 900, annually. Other project components involve expanding four year undergraduate programs and in-service teacher training. An Advisory Group for Trained Manpower will be created to facilitate the deployment of graduates of teacher training programs to areas of need. This is to be reinforced by targeted stipends and other incentives. To strengthen the training of educational administrators and other school professionals, a Master's degree program will be established through a "twinning arrangement" with an overseas institution which would provide technical assistance for curriculum development and enter into a "long term professional relationship" with Sana'a. Universities in Jordan, the United States and Britain are being considered.

104. The needs of the tertiary sector will be assessed in study to be carried out in conjunction with the project loan focusing on the internal and external efficiency of the country's institutions of higher education. Longitudinal employment data will be collected from recent graduates to obtain a better information on labor market conditions and the demand for particular configurations of university training. Correcting any imbalances will require fundamental changes in the present policy of offering university admission to all students who have successfully completed secondary school, providing university education at no cost and guaranteeing employment to graduates. For the present at least, the World Bank will direct its attention to other sub-sectors of the educational system whose needs can be more easily addressed.

Re-Prioritizing Educational Expenditures in Nigeria

105. The objective of the first of the two Nigerian education projects approved in the 1980s, the Technical Education Project (1987), was to rehabilitate four polytechnics and a technical college administered by the Federal Government. As the Staff Appraisal Report frankly acknowledged, "the proposed project (was) intended as a bridging operation...to re-establish relations with the Government, and to prepare the groundwork for follow-up, policy-oriented operations" (World Bank 1987, 6). The World Bank had been inactive in the education sector for many years. The selection of technical/vocational education as a re-entry point reflected Federal Government priorities and also previous but mainly unsuccessful lending experience. Through out the late 1970s the World Bank had supported expansion of "diversified" secondary education and technical teacher training in Nigeria and

many other African countries, an effort that it later judged to be a failure and misguided (Psacharopoulos and Loxley 1980; Middleton and Demski 1988).

106. Increasing oil prices in the 1970s enabled massive expansion of Nigeria's university system, Africa's largest (Eisemon 1979; Eisemon and Davis 1992). Significant de-centralization of responsibility for education combined with the proliferation of new state governments, accelerated expansion of secondary and post-secondary education in the early 1980s when oil prices began to decline. Since independence, federal and state governments had relied upon teacher education and post-secondary technical education to accommodate a high proportion of the demand for university education. The importance of technical education to Government strategies for development of the education sector was increased by efforts to give a more "practical orientation" to secondary and even primary education through federal reforms of the structure of the educational system beginning in 1982.

107. By 1988/89, almost as many students were enrolled in post-secondary technical institutions as in the federal and state universities; 130,000 versus 160,000 (World Bank 1990d, 4). Unfavorable economic circumstances eventually led to the suspension of Federal Government plans to expand technical education. Campus construction at many federal polytechnics and technical colleges had not been completed, instructional facilities poorly equipped, and enrollments were low. World Bank assistance was sought to remedy these problems at a few of the strongest institutions including the Federal Technical College, Yaba.

108. The World Bank was planning another project for higher education, directed to the universities, both interventions being in support of future involvement in improving the quality of primary education (1990). The technical education project provided a forum to initiate a policy dialogue with the Nigerian Federal Government on costs and financing issues that would be crucial to the success of these efforts.

109. The Federal Government had abolished food subsidies for students in federal higher educational institutions in 1985, and student fees at technical institutions already amounted to 30% of recurrent costs, "probably the highest contribution existing in any country in the (African) region" (World Bank 1987, 5). The five federal technical institutions received $23. M of support, almost all of it for rehabilitation of their facilities. Some funding was also

provided to strengthen the National Board for Technical Education which accredits federal institutions and advises Government on their funding needs.

110. The Nigerian Federal Universities Development Project (1990) is one of the most far-reaching initiatives to improve the quality and efficiency of university education in Sub-Saharan Africa. The project is based on comprehensive study of the cost and financing of Nigerian universities (World Bank 1988a). Throughout the 1980s, direct Federal Government expenditures for education were declining while the proportion going to support higher education was increasing partly as a result of devolution of Federal Government responsibilities for funding education (World Bank 1990d, 3 & 4).

111. Since the mid-1970s, the World Bank has encouraged governments to give priority to primary education, and oriented its education lending and policy dialogue accordingly (World Bank 1990e; Lockheed and Verspoor 1991). In 1988, education accounted for less than 4% of the Federal Government budget, and 62% of this went to universities. The university share of federal and state education budgets was estimated to be about 19% (World Bank 1990d, 5). According to World Bank calculations, the unit costs of educating a student at a federal university in 1985 were 60 times higher than per student costs at the primary level. The Federal Government established a National Primary Education Commission in 1988 and announced that it would pay about 65% of primary school teachers' salaries (World Bank 1990d, 2). That could only be accomplished if "real resources from the Federal Government for the universities (did not) show any substantial growth" (World Bank 1990d, 2).

112. This, in turn, could not be assured unless the Federal Government reasserted control of university education which it had largely relinquished to the states. The Federal Universities Development Project was designed for this purpose. Federal control of the university system, including both federal and state universities, was to be exercised through allocations by Nigerian Universities Commission to institutions which complied with its funding guidelines.

113. Created in the 1960s to advise the Federal Government on the financial needs of the universities and monitor funding, the Nigerian Universities Commission had few real powers as allocations were largely determined through negotiations between the individual institutions and the federal and state governments. In the 1970s, the Commission's powers

were ostensibly strengthened through being made a statutory body, though it continued to serve mainly as a conduit for the block grants provided to the universities. Perhaps its most important function at the time was organizing expeditions of senior university administrators to Europe and North America to recruit expatriate staff and opening offices in London, Washington, and other capital cities to administer staff development programs.

114. With the country's worsening economic situation in the mid-1980s, the Nigerian Universities Commission (NUC) became more powerful: "Given the very small amounts currently derived from non-governmental income and a recent reduction of the reserves accumulated by the universities, the NUC's ability to control the distribution of public finance gives it substantial powers over the universities" (World Bank 1990d, 3). A 1985 decree gave the Nigerian Universities Commission powers to establishment minimum academic requirements for programs and by 1988 it had formulated an ambitious plan for rationalizing the undergraduate and postgraduate programs offered by the federal universities.

115. The Federal Universities Project was designed to transform the Nigerian Universities Commission into a University Grants Commission de facto through powers to allocate discretionary funds based on compliance with its norms and directives. Eligibility criteria were established for such funding requiring some institutions to: a) reduce the number of academic and non-academic staff; b) eliminate sub-degree programs and those with small enrollments; c) introduce fees for student accommodation, generate a larger proportion of their operating budgets from non-governmental sources; d) standardize procedures for procurement of equipment; e) develop plans for maintaining instructional facilities and equipment; and f) and establish management information systems to guide university planning and resource allocations. Meanwhile, Federal Government policies were revised to support institutional reforms. Postgraduate fees were de-regulated to allow full cost-recovery, grants to institutions for student accommodation reduced to encourage introduction of fees, the federal student loan scheme re-financed, assistance was provided to the universities to off-set redundancy payments, use of block grants to construct facilities made subject to space-utilization norms and, most important, the allocations to universities for personnel costs adjusted in light of the Nigerian Universities Commissions' guidelines.

116. Compliance with these criteria would be voluntary and rewarded differentially, depending on how many eligibility criteria an institution was able to satisfy. It was predicted

that all federal universities would be eligible for some funding chiefly for staff development, library materials and laboratory equipment and consumables. About two thirds of them would eventually comply with the most stringent criteria and receive additional funding.

117. Project funding would also strengthen the Nigerian Universities Commission whose secretariat would be expanded "as far as possible (with staff) drawn from the universities" whose payrolls are being reduced (World Bank 1990d, 20). It would receive funds to develop research capacity, and an International Advisory Panel consisting of six foreign scholars would be appointed to assist the Commission in making periodic inspections of the universities and advise it on academic matters, "thus increasing (the Commission's) acceptability to the university community" (World Bank 1990d, 21). In addition, the federal Student Loan Board was to be revived, the failure of earlier efforts being attributed mainly to lack of trained staff and poor record keeping rather than to difficulties in tracking and attaching the incomes of university graduates in a large country without an efficient, comprehensive income tax regime.

118. The Federal Universities and Technical Education projects are significant interventions in Nigerian higher education. Important cost and financing reforms are being sought and steps taken to control expansion of enrollments. Funding is being provided for necessary qualitative improvements, though small in relation to the objective needs of the federal universities and technical institutions which have suffered enormously during the country's economic crisis (World Bank 1988b).

119. Announcement of the project led to widespread protest from the university community (Bako 1990) that has not yet subsided. Rationalization of programs, staff retrenchment and introduction of cost-recovery measures have thrown the federal university system into turmoil. So far, less than half—only nine—of the universities have complied with the least stringent cost and efficiency eligibility criteria. Continuing procurement problems have delayed distribution of financial rewards to these institutions, threatening successful project implementation.

120. The technical education and federal universities projects are concerned with the most costly components of the higher education system. The Federal Government is attempting to restrict the growth of the oldest, largest federal universities to 2.5% per year while allowing the newest ones to expand at 10% until they reach a critical size. Federal technical

institutions will be encouraged to expand at a rate of 15% per year until they also reach a critical size (World Bank 1988a, 4). No long term, comprehensive strategy for accommodating the rising demand for higher education is proposed.

121. The most rapidly expanding components of the higher education systems will not be effected---the state universities and most federal and state technical and teacher training institutions. They are the most poorly supported higher educational institutions. In the early 1980s, the civilian Federal Government, recognizing that resources were insufficient for expansion public higher education provided in conventional ways, proposed a national open university as well as establishment of self-financing private higher educational institutions. The new Federal Military Government suspended these initiatives. Nevertheless, ways will ultimately have to be found to further diversify Nigeria's higher education system, and to better articulate federal and state higher educational planning. As Nigeria moves toward elected civilian government, it is likely that there will be increased pressure for devolution of the Federal Government's role in educational matters that constitutionally and for most of the independence period have been largely relegated to state governments. This will have important implications for the sustainability of World Bank's strategy for reform of the federal universities and for its plans for the education sector, generally.

Lending for Policy Reform

122. Reforms of the higher education sub-sector have become central to sectoral strategies emphasizing quantitative expansion and qualitative improvement of compulsory education as well as to efforts to bring public expenditures into line with the resource mobilization capabilities of many governments. Two concurrent shifts in lending strategies in the past decade have influenced policy dialogue with governments about higher education. The first enlarged the scope of sectoral analyses and, subsequently, education lending programs to include most higher education, addressing the inter-relationships of the various education sub-sectors from the point of view of public and donor investment.

123. The Education Sector Working Paper of 1974 and the Education Sector Policy Paper approved by the Bank's directors in 1980, proposed that lending to poor countries with limited educational coverage of the primary school age cohort focus on basic education

while support for expansion of higher education should be carefully targeted to critical manpower requirements like teacher and technical training. The approach to middle income countries with more developed educational systems emphasized selective support for higher education in response to economic growth strategies requiring large investments in increasing the skill and, hence, the educational level of the work force. In order to build up "institutional capacities of the education system with differing priorities based on levels of development" (Ziderman 1990, 9), the World Bank needed to better understand how the different components of the higher education sub-sector functioned in relation to each other and in relation to lower levels of education as well as with respect to the policies and objectives guiding development planning.

124. At the same time, there was a second shift "away from traditional public investment reviews, designed to identify sector priorities within the macro framework, to comprehensive public expenditure reviews that include recurrent expenditures" in countries with rapidly escalating demands for increased education, health and other social investments (Schwartz and Stevenson 1990, i). This put analyses of education spending in a much broader context emphasizing trade-offs between various social and other kinds of public expenditure. However, a 36 country study of public investment and expenditure reviews completed during the period 1985-90, including 28 multi-sector reports, showed few connections between macro and education sector analyses. The authors conclude: "Reports focus on intra-sectoral rather than inter-sectoral resource allocation. The assumption--usually without clear justification--is that inter-sectoral reform is less feasible than intra-sectoral reform (Schwartz and Stevenson 1990, iii)." Only in recent years and then usually in the most extreme situations of social sector collapse like Uganda, has the World Bank given serious attention to inter-sectoral reallocation of government expenditures (requiring, in this case, reductions in spending for national security), and to strengthening the capabilities of governments to mobilize resources for social investments, generally.

125. In the absence of a broader approach to the problems of inadequate resource mobilization for social investments and resulting distorted patterns of resource allocation, public expenditure reviews have concentrated on what can be accomplished through reducing global levels of expenditure, introduction of cost-recovery and cost-sharing measures particularly in social sectors, and intra-sectoral reallocation of resources based on efficiency and equity criteria.

"Over-Investment" in Higher Education?

126. The level of public allocations to the higher education sub-sector in poor countries is often singled out for criticism. Typically, unit costs for higher education (simply, public expenditures per student) are many times higher than those for primary and general secondary education, and in the poorest countries, a multiple of per capita GNP as well. International comparison of relative per student public investments in different levels of education, or unit costs as a proportion of GNP, magnify these differences, strengthening the proposition that higher education is overfunded. Although "comparing (public expenditure review) assessments across countries provides a striking picture of the lack of credible comparative standards in the sector" (Schwartz and Stevenson 1990, 29), unit cost and cost/per GNP comparisons have nonetheless profoundly influenced policy based educational lending. More specifically, they have served to: a) demonstrate the comparative underfunding of primary education; and b) pointed to funding for higher education, implicitly, as part of the cause and a potential solution to this problem.

127. Two studies carried out by the World Bank in the 1980s presented an approach to policy reform in the education sector leading to radical structural reform of the higher education sub-sector. Financing Education in Developing Countries: An Exploration of Policy Options (1986) drew on the findings of more than fifteen years of research much of it produced by World Bank economists, indicating that in many developing countries

> present financing arrangements contribute to the misallocation of resources devoted to education in the sense that the high degree of public subsidization of tertiary education boosts the demand for higher education, (compared to primary or secondary education) the relatively less socially efficient educational investment. The high subsidization of higher education is reflected in the difference between the private and social rates of return (World Bank 1986a, 10).

128. Considerations of equity and efficiency required reductions in public subsidies for higher education which poor countries could ill afford: e.g "(in Burkina Faso) the allowances given to University of Ouagadougou students amount to 770 percent of the country's per capita income" (World Bank 1986a, 11).

129. Tuition and other cost recovery measures supplemented by selective scholarships and student loans were proposed to align social and private rates of return to investments in education. Although early international comparisons of educational rates of return had suggested comprehensive, progressive taxation as a complimentary strategy and in some cases could achieve similar results even when high public subsidies for higher education were maintained (Psacharopoulos 1973), this apparently was beyond the implementing capability of most developing countries. While the study presented a global analysis and general prescriptions, the African region provided the most compelling examples of the need for reforming the financing of higher education.

130. Education in Sub-Saharan Africa: Policies for Revitalization, Adjustment and Expansion (1988), developed many of the same themes but went much farther in linking reform of financing higher education to a comprehersive strategy for development of the education sector as a whole. Higher educational institutions in Africa, it said, were

> now producing too many graduates of programs of dubious quality and relevance and too little new knowledge...the quality of these outputs shows unmistakable signs in many countries of having deteriorated so much that the fundamental effectiveness of the institutions is in doubt...the costs of higher education are needlessly high...the pattern of financing higher education is socially inequitable and economically inefficient (World Bank 1988, 5).

131. The criticism was addressed to African universities. They produced too many graduates in arts and social science fields, too little research and few services required by governments and donors. Students had few opportunities to acquire practical training. Instruction emphasized "rote learning of theory from professorial lectures and chalked notes on blackboards" (World Bank 1988, 75). Dropout and repetition rates were unacceptably high, pushing up the cost of each graduate produced. This was exacerbated by relative low student/staff ratios, the small enrollment and residential character of many institutions and especially by the generc bsidizes provided for housing and boarding students. The report identified four objectives to guide policy reforms in higher education---improving quality, increasing efficiency, constraining output and expanding cost-sharing by beneficiaries---and for each, discussed policy reforms that could be introduced and/or the kinds of investments that might be effective.

132. To improve the quality of instruction, for example, governments should strengthen testing for admission and graduation and create centers of excellence in postgraduate training and research. Investments in staff development, better library and laboratory facilities, and textbooks should be encouraged to strengthen training. Cost-sharing might involve permitting private institutions to accommodate the social demand for higher education, charging fees in public institutions, work/study programs, student loans, higher taxes on the earnings graduates or some combination of these measures. The report's general recommendation on higher education was that "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" (World Bank 1988, 80). Any future expansion of African higher education should be undertaken only after significant "consolidation...to re-establish a pedagogically and economically sound base" (World Bank 1988, 80). Endorsed by the World Bank's directors as a policy statement to guide future investments, lending to an increasing number of countries in the region from the mid-1980s embodied many of these strategies.

Policy Based Lending

133. Since 1986, education sector adjustment loans to ten Sub-Saharan African countries have been designed to produce higher education sub-sectoral reforms. In less than half of these cases, four of them (Niger, Nigeria, Madagascar and Zaire), funding has been provided to higher educational institutions in order to facilitate and stimulate reform, through a higher education project or higher education project component. The Nigerian Federal Universities Project described above is an example. The majority have required policy changes affecting government expenditures for higher education though no funding has been provided to support reforms as in Senegal where a primary education project is being used as a vehicle for policy dialogue on higher education. Altogether, lending to six of the countries has involved some attempt to re-prioritize educational expenditures: in Senegal and Mauritania, through ceilings imposed on the growth of the higher education budget; and in Burundi, by reducing the proportion of the education budget for higher education from 22% to 20%.

134. Higher education policy reform in all ten countries focuses on containing or reducing public expenditures for degree granting higher education institutions. Teacher training colleges, polytechnics and agricultural training colleges are usually not directly effected,

notwithstanding the fact that they are a large and often the most rapidly expanding cost-component of the higher education sub-sector (Eisemon 1991, 3). The implication is that public sector manpower requirements continue to necessitate these investments whereas the demand for more expensively trained university graduates does not.

135. Strategies for containing/reducing expenditures for universities may combine restrictions on enrollment growth with lower per-student grants and subsidies as well as introduction of a variety of cost-recovery measures. Governments have been encouraged to either lower or reduce the rate of expansion of university enrollments in four Francophone countries---Mali, Mauritania, Madagascar and Guinea---where possession of the baccalaureate confers a place in a public university. With the exceptions of Madagascar and Guinea where the World Bank has tried to get governments to decrease the number of university students, the strategy in other countries has been to reduce expenditures for student support. Controversially, it has encouraged introduction of fees for boarding, accommodation and certain instructional expenses and in Nigeria and Malawi with equity concerns in Nigeria, Malawi, Ghana, and Senegal addressed by student loans.

136. A complementary strategy in lending for higher education policy reform is increasing internal efficiency. Sub-sectoral analyses often depict African universities as un-necessarily expensive and also underutilized. For example, student/academic staff ratios in African universities are presented in regional and country studies as generous by comparison to those in many Asian and Latin American countries (World Bank 1988a, 10; World Bank 1988b, 76). Support staff/academic staff ratios are even higher (World Bank 1988b, 77). Poor remuneration of academic and non-academic staff is a cause of high staffing but part of the cost-factor. So gains in efficiency must be achieved by rationalizing recurrent costs; i.e. by retrenching staff as has been attempted in Burundi and Nigeria.

Box 6: Sector Adjustment Lending and Higher Education Policy Reform in Senegal

The Senegal Primary Education Development Project was designed to respond to the rapid expansion in primary education in the three regions of the country with the lowest enrollment rates. The project supported measures aimed at lower unit costs by improving the efficiency of resource use. Expansion would be without additional public resources, by restructuring intra-sectoral budget allocations. Resources from higher education would be reallocated to primary education by imposing growth ceilings on the higher education budget. Other measures included: a) the reduction of fellowship budget; b) the reduction of indirect subsidies to University of Dakar for student services; and c) the introduction of a cost recovery program.

Once the credit was in place, very little success was achieved in reducing expenditures on higher education. The situation moved in the opposite direction as required by the loan agreement. The higher education budget increased as a percentage of education spending, student subsidies increased dramatically, as did the amount and size of student scholarships. Fellowships increased 50% in real terms between 1986 and 1989. With assistance from the French and Italian governments, a new university was opened.

The attempt to reallocate funds for higher education to other sub-sectors pitted powerful elites - students, their parents and university staff- against the poor and politically voiceless clientele of the primary schools. In the end, the President of the Republic found himself negotiating with the student leaders and the Minister of Education was dismissed.

Source: World Bank (1986), Senegal: Primary Education Project. (Washington, D.C.: World Bank).

137. More indirect approaches to increasing internal efficiency have involved making student support contingent on academic performance (Madagascar) or, simply, increasing private financing of public higher education. The Nigerian Federal Universities Project proposes the most ambitious assault on internal inefficiency issues; i.e. elimination of academic programs that are "uneconomic" in terms of their enrollment and staffing, staff retrenchment and increased private financing of student welfare for which participating institutions will be eligible for funding from the Nigerian Universities Commission to increase the quality of some instructional inputs.

138. Negotiation of higher education policy reforms with African governments has been very difficult and implementation experience is not encouraging. The World Bank has often, during appraisal, retreated from a strong position on financial reform because it felt that pursuing the main objectives of a sector loan, usually involving investments in primary education, outweighed whatever might be gained by more comprehensive package of reforms. In Senegal and in Ghana, for instance, the World Bank has put off major reforms until it is in a position to support them with a loan for higher education. In Nigeria, in

contrast, it put reform of higher education at the center of its sectoral strategy, supporting movement toward compliance with restructuring the federal universities with a loan for primary education.

139. Implementation of higher education policy reforms has touched off student rioting in many African countries. After the Government announced its intention to reduce student scholarships in early 1991, Mali's Minister of Education was attacked by students and "necklaced." The Minister of Education and senior ministerial staff in Guinea were rescued from a similar fate that year. Elsewhere, protests by the university community have closed universities, disrupting instruction and prompting governments to withdraw or seriously moderate financial reforms. In an effort to avert student disturbances, Ghana which withdrew student boarding subsidies, did not introduce fees for accommodation as it had agreed with the World Bank, and instituted a heavily subsidized student loan scheme to offset fees that is not likely to produce significant net cost-savings.

140. There have been some successes in reforming the financing of higher education. In Malawi, as yet untouched by the democratic "winds of change" sweeping Africa, a 1987 education sector credit led to more cost-recovery which has been sustained, in part, by increasing investment in selective student loans. In Madagascar, an army colonel appointed to improve management of student services at the country's main university, expelled 4,000 students who were ineligible for free lodging and other subsidies. The Federal Military Government of Nigeria has fully privatized student boarding arrangements. But few governments have shown the willingness to experiment with or capacity to successfully implement major financial reforms.

141. Sometimes, as in Senegal, the World Bank has encouraged reforms prior to undertaking necessary sub-sectoral analytical work, with predictable failure. In other circumstances, it has collected a wealth of information about the costs and financing of universities to guide reforms but still encountered many difficulties. The politics of higher educational reform are generally poorly understood except as possible "risks" to successful project implementation. Management of these risks receives little treatment in sector studies and staff appraisal reports. The issues are complex as students, academics and university administrators are important actors in the political systems of most African countries and, traditionally, have been privileged elites (Van den Berghe 1973). African universities, in both Francophone and Anglophone countries, have enjoyed a great deal of

academic autonomy but statutes and patterns of governance subordinate the institutions to the state in matters affecting their cost-structure such as the determination and distribution of student intake (Eisemon 1980). As a result, disputes with students often evolve into serious political conflicts between universities and the state as university administrators are powerless to deal with the underlying causes of student grievances.

142. Cost-containment, cost-recovery and internal efficiency reforms must confer tangible benefits to governments and university communities and be introduced in the context of more fundamental reforms affecting the autonomy and financing of higher educational institutions and by implication, the role of the state. They can not be expected to succeed if the reforms only involve substantial political costs to governments for minimal gains in financing primary education. Similarly, attempts to restrict university enrollments or reallocate funds from higher to primary education run contrary to what many African governments feel is necessary for political legitimacy as well as make assumptions about resource allocation processes that have little relationship to how priorities are actually established.

143. Conditionalities requiring reallocation of resources from higher to primary education are predicated on the belief that governments establish a global envelope for educational expenditures, and then decide what proportion institutions of higher education will receive. In the majority of African countries, higher educational institutions are the responsibility of many ministries and where there is a ministry of higher education for all institutions, the apportionment of expenditures among institutions is often determined by inter-ministerial negotiations. Few if any governments use unit cost calculations to optimize educational expenditures inasmuch as the resource needs of the different tiers of the educational system are so varied. Moreover, most graduates of higher educational institutions continue to enter government employment even in many of the poorest countries (e.g. World Bank 1992, 26 & 27). For this reason, the relation of higher education to public policy is quite different from that of primary or other levels of education, and its claims on public resources have necessarily much stronger political backing.

Conclusion

144. Five lessons may be derived from reviewing almost three decades of World Bank lending for higher education to guide future investments. First, the World Bank has been most successful where through a series of project investments, it has developed a sub-sectoral strategy for intervention. The different kinds of institutions comprising a higher education sub-sector---universities, institutions for advanced scientific training and research, polytechnics, teacher and technical training colleges, both public and private---constitute a system. Although projects may focus on only one of these kinds of institutions, how they relate to each other and to the higher education sub-sector as a whole needs to be taken into account.

145. In China and Korea, project loans have involved different tiers of the sub-sector in ways that have generally strengthened the quality of higher education guided by government policies and reinforced by large national investments. In other countries, the World Bank's interventions have been much more limited in scope, particularly when it has initiated higher education projects mainly for the purpose of supporting sector lending. In most countries, projects have involved multiple higher education interventions either in the same loan or overtime. Greater benefits can be derived from this experience if the interventions are formulated in the context of a sub-sectoral strategy for development and reform embracing all kinds of institutions of higher education.

146. Second, qualitative improvements in the training, research, service and other activities of higher educational institutions can not be brought about unless the supporting circumstances are well understood, and the scope of intervention is broad enough. Funding for staff development, curriculum reform, instructional and research infrastructure and improvements in university planning and administration must be mutually reinforcing, and provided in conjunction with increased national investment, both public and private. Qualitative gains will be marginal where academic staff are poorly paid and institutions inadequately funded.

147. The high costs and associated risks of supporting institutions of higher education has led to many projects focused on discrete teaching and research activities in high priority applied fields such as the commerce program at the University of Malawi. The inter-

relatedness of academic programs and of institutions of higher education is seldom appreciated. High quality instruction in engineering, medicine, agriculture and in applied social sciences, for example, requires sound training in the natural sciences, mathematics and even the humanities whose importance to national economic planning is less obvious and, thus, is less apt to attract donor support. Advanced scientific training and research requires strong undergraduate programs and a large, diversified higher education system so that undergraduate and postgraduate training do not compete for scarce staff and financial resources. In brief, whole institutions and systems of higher education must be strengthened to produce sustainable improvements.

148. Third, institution building and strengthening can not be easily accomplished, nor progress in meeting project objectives evaluated meaningfully, in a normal five to seven year project cycle. Sustained, long term comprehensive support for higher education institutions is needed. Compressing the time frame for institutional development is possible in situations where the World Bank has a great deal of lending experience and when the country has made a head start; i.e.it has well focused objectives for borrowing, much experience with donor funding for the sub-sector, and substantial implementing capacity. Conversely, creating these conditions from scratch takes time as the World Bank's experience in Indonesia and many other countries illustrates.

149. Fourth, policy dialogue should explicitly address the roie of the state in higher education. For many years, manpower planning policies and structures in a large number of developing countries connected higher education to other sectors of the national economy and to development planning, generally. It legitimated a dominant role for the state not only in the supply and allocation of highly trained human resources but also in the provision of higher education that was analogous to the government's position in primary and secondary education. Today, many countries are developing private higher education sectors and public sector expansion is insufficient to absorb the graduates of higher education systems.

150. The role of government in determining enrollments, the distribution of public subsidies and private costs and in the governance of public higher education is especially fundamental to education sector financing reform in African countries that are experiencing structural adjustment. In other countries like Indonesia and Brazil that have public and private higher education institutions, or those which intend to develop pluralistic systems,

what role government should play in regulating expansion of private institutions and improving the quality of training they offer is a crucial policy concern. Also important is relationship between public investments in advanced scientific training and research and public policies to develop private sector demand for the graduates and other products of public scientific and higher education institutions.

151. Fifth, the World Bank's comparative advantage among donors to higher education is its long involvement in reform of educational financing and analytical expertise in financing higher education, specifically. Financing issues have become increasingly important to developing countries as the capacity to finance expansion of higher education systems from public expenditures has declined. The World Bank has an important role to play in supporting reforms of financing higher education.

152. This has proven to be the most problematic domain of World Bank involvement. There have been few successful World Bank supported reforms of higher education financing. Faced with fiscal austerity, many countries have been content to permit expansion of enrollments, allowing inflation to erode real expenditures, rather than to undertake fundamental reforms that would protect educational quality and improve efficiency. The political costs of reforming the finance of higher education have been simply too high with the result that lending conditionalities requiring observance of enrollment targets, expenditure restraints or greater cost-recovery have frequently been repudiated. In its analytical work and policy based lending, World Bank will need to be more attentive to ways of reducing the political costs of financing reforms.

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Annex-Table 1

Number and Kinds of Higher Education Investments, 1963-1991

	63-70		71-75		76-80		81-85		86-91		Total	
Institution	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Universities	10	29	25	26	26	26	23	26	38	34	122	28
S&T Research Institutes	0	0	1	1	0	0	3	3	13	12	17	4
Polytechnics	3	9	9	9	6	6	9	10	10	9	37	9
Technical Institutes	7	20	30	31	34	34	19	22	17	15	107	25
Teacher Training Institutions	15	43	33	34	34	34	34	39	33	30	149	34
Total	35	100	98	100	100	100	88	100	111	100	432	

* S&T Research Institute refers to national scientific institutions involved in advanced scientific training. Polytechnics include institutions offering three year degree or diploma programs. The programs of technical institutions are of two years duration and lead to a post-secondary diploma than is normally equivalent to those given by primary teacher training colleges.

Annex-Table 2

Number of Higher Education Project Investments by Region, 1963-1991

	63-70		71-75		76-80		81-85		86-91		Total	
Region	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Africa	15	43%	30	31%	38	38%	25	28%	32	29%	140	32%
E. Asia	6	17%	18	18%	15	15%	20	23%	37	33%	96	22%
S. Asia	5	14%	7	7%	8	8%	11	13%	9	8%	40	9%
EMENA	2	6%	30	31%	29	29%	23	26%	23	21%	107	25%
LAC	7	20%	13	13%	10	10%	9	10%	10	9%	49	11%
Total	35		98		100		88		111		432	

Annex-Table 3

Total Higher Education Lending by Region, 1963-1991 (Millions US$)

Region	63-70		71-75		76-80		81-85		86-91		Total	
	$	%	$	%	$	%	$	%	$	%	$	%
Africa	15.6	30.2	43.3	13.4	69.7	12.0	111.7	7.3	279.0	10.8	519.3	10.2
E. Asia	11.9	23.0	108.0	33.0	214.4	37.0	1,103.1.0	72.0	1,219.0	47.0	2,656.4	52.0
S. Asia	17.4	34.0	54.0	17.0	22.6	4.0	67.9	4.0	569.3	22.0	731.2	14.0
EMENA	3.0	6.0	104.9	33.0	264.5	46.0	149.9	10.0	357.4	14.0	879.7	17.0
LAC	3.7	7.0	12.4	4.0	7.4	1.0	100.4	7.0	165.5	6.0	289.4	6.0
Total	$51.7		$322.6		$578.6		$1,532.9		$2,590.1		$5,075.9	

Annex-Table 4

Total Lending by Type of Institution Supported, 1963-1991

Institution	63-70 No. $(000) %	71-75 No. $(000) %	76-80 No. $(000) %	81-85 No. $(000) %	86-91 No. $(000) %	Total No. $(000) %
Universities	10 $32.3 63%	25 $187.6 58%	26 $268.0 46%	23 $824.5 54%	38 899.7 35%	122 $2,212.1 44%
S&T Research Institutes	0 $0.0 0%	1 $2.8 1%	0 $0.0 0%	3 $129.5 8%	13 $604.8 23%	17 $737.0 15%
Polytechnics	3 $4.1 8%	9 $32.6 10%	6 $66.9 12%	9 $149.5 10%	10 $566.5 22%	37 $819.6 16%
Technical Institutes	7 $8.1 16%	30 $75.2 23%	34 $189.9 33%	19 $240.1 16%	17 $209.9 8%	107 $723.1 14%
Teacher Training Institutions	15 $7.2 14%	33 $24.4 8%	34 $53.7 9%	34 $189.4 12%	33 $309.2 12%	149 $584.0 12%
Total	35 $51.7 100%	98 $322.6 100%	100 $578.6 100%	88 $1,533.0 100%	111 $2,590.1 100%	432 $5,075.9 100%