ANNUAL REPORT
ON THE WORLD BANK RESEARCH PROGRAM

FISCAL 1990
Goals for World Bank Research

When the research program was formalized in 1971, senior management gave it several basic goals, which remain intact to this day:

• To support all aspects of the Bank's operations, including the assessment of development progress in member countries.

• To broaden understanding of the development process.

• To improve the Bank's capacity to provide advice to member countries.

• To assist in developing indigenous research capacity in member countries.

While very broad, these goals underscore the basic philosophy of Bank research and are the guiding principles for research projects.
MEMORANDUM TO THE EXECUTIVE DIRECTORS

Subject: Bank Group Research Program

December 12, 1990

Each year management reports to the Executive Directors on the World Bank's research program. This year's report has three objectives. The first is to show how Bank research affects and is affected by the Bank's operational activities, a question frequently asked by the Board. The second is to provide a comprehensive overview of Bank research. The third is to give a sense of the special issues and concerns that are guiding individual departments and regions as they prepare their research strategies for the 1990s.

The report begins with a series of case studies to illustrate that Bank-sponsored development research is, indeed, different from most research done outside the Bank. While the subject and mechanisms of the five cases differ, each points to the same general conclusion: the unique interaction between researchers and operations staff makes Bank research high in technical quality and sufficiently "down to earth" to be relevant for policy.

The report's coverage of ongoing research begins in Part II with the three areas singled out for special emphasis by research managers in last year's annual research report: the environment, private sector development, and socialist economies. Research programs are now well established in each of these areas, and important results are beginning to emerge. The review of findings from research completed in fiscal 1990 for the remaining program objective areas underscores both the breadth of the Bank's research program and the emphasis on priority issues.

As with other activities in the Bank, the scope and course of research is influenced mainly by the program objectives established by senior management. Each department and region nevertheless faces special problems and concerns that should--and are--influencing research strategies for the 1990s. These are presented in the final part of the report.

The Bank's research program must achieve balance between the need to serve the institution's priority areas and the need to maintain continuing expertise in a wide range of sectoral, policy and regional issues. It must also achieve balance between the need to tackle fundamental development problems that do not yield to short-term efforts and the need to provide findings that have direct and immediate consequences for Operations. I look forward to receiving your views on whether the program described in this report is achieving this balance.

Barber B. Conable
President
# Table of contents

Executive summary \textit{v}

Part I. Research in an operational setting 1

- Research driven by Bank operations 2
- Research driven by institutional mandate 4
- Traditional interaction between research and operations: tax policy research 5
- Traditional interaction between research and operations: trade policy research 7
- Technical research 9

Part II. Highlights of the research program in fiscal 1990 12

- Research priorities 12
- Serving the Bank's other program objectives 18
- Dissemination and outreach 24
- Evaluation of completed research 27

Part III. The Bank's research strategy for the early 1990s 29

- PRE priorities 29
- Regional priorities 34
- Other research 36

Endnotes 37

Appendices 39

1 Research at the World Bank 39
2 Research-related Bank committees 41
3 Operational Directive 16.00 43
4 Tables 46
5 Visiting Research Fellow Program 56
6 Bank research output, fiscal 1990 57
Executive summary

Each year this report takes one aspect of the Bank's research program and looks at it in depth. In past years the emphasis has been on such issues as serving Bank priorities, building research capacity, and improving the dissemination of research output. This year's report also reviews progress for each of these (and other) aspects of the program, but its particular emphasis is on the links between research and the Bank's operational activities.

Research at the Bank is different from research at universities and free-standing research institutes. The Bank's lending operations serve as a constant reminder to research staff that the real world is much more complex than the world of theory. Those operations and the Bank's continuing interaction with its member countries also underscore the fact that moving from theory to practice requires a thorough understanding of political, cultural, and institutional constraints. Although the Bank's lending operations influence all Bank research, there is no fixed relationship between research and Operations, no single "life cycle" for Bank research. The patterns of interaction and flows of information vary from project to project and subject to subject.

To give Executive Directors a sense of the many avenues for interaction between research and Operationx, we begin this year's report by presenting five cases of Bank research. We then report on the research program in fiscal 1990—on the administrative details of that program, on the efforts in three areas of special priority in research, and on progress in supporting the Bank's program objectives. We conclude by spelling out the institution's research strategies for the early 1990s. (Appendix 1 defines the term "research" as it is used in this report and discusses how research is managed and funded in the World Bank.)

Research in an operational setting

The five case studies set out in the body of this report cover the spectrum of Bank research—from research that is directly operationally driven, to research driven by institutional mandate, to technical and engineering research. In each case one message comes through clearly: no matter what the starting point, the final product of Bank research is almost always heavily influenced by the involvement of researchers with Operations and the involvement of Operations staff with researchers.

The first case study on land titling shows that research can be responsive to the direct demands of operations, and that researchers, Operations staff and local counterparts are each essential inputs into successful research. This theme is repeated in the second case study of the Living Standards Measurement Study (LSMS), an initiative driven by presidential mandate. The LSMS also underscores the fact that, when the Bank sets out to explore new research areas, it must be prepared for a considerable period of investment. The third and fourth cases show how research and operations interact in two areas of long-standing interest to the Bank—tax policy and trade. The fifth case sets out the story of one of the Bank's
major technical research undertakings, the High-way Maintenance Study. This last case carries many of the same messages of the first four—the need for an early and sometimes lengthy phase of applied research, the importance of operational feedback, and the value of having research located in the Bank rather than contracted out. But it also provides unique lessons to guide future technical research.

RESEARCH DRIVEN BY OPERATIONS. The history of a recent body of work by Bank staff on the relationship between land titling and farmer productivity in Thailand shows that operational concerns are often the direct impetus to a research—and operational—breakthrough. It shows how researchers’ support of lending operations can lead to work that has far-reaching effects not only on Bank Operations but also on the way the economics profession thinks about a particular issue. In the Thai land titling study, operational staff identified an important gap in knowledge and brought it to the attention of Bank researchers. Thai researchers, in addition to their intellectual input, provided Bank researchers with the institutional knowledge they lacked and arranged for effective dissemination of the policy implications in Thailand. Bank researchers provided “on-the-job” training to the Thai researchers in new methods of analysis and pushed the economics profession to rethink their stand on the value of formal land titling.

RESEARCH DRIVEN BY INSTITUTIONAL MANDATE. Presidential statements of institutional priorities are always important in shaping Bank research, and occasionally the mandate from on high is more specific. Such is the case with the Living Standards Measurement Study (LSMS), a major Bank effort to further our understanding of poverty through improved methods for collecting and analyzing information on household standards of living. The LSMS illustrates the significant investments required for entry into new areas, the critical importance of field and operational constraints in successful research, and the central role of staff interaction in linking research and operational activities. Under the LSMS, Bank researchers provided intensive technical assistance to their counterparts in Côte d’Ivoire during the critical planning phase of the project. Operational staff provided invaluable oversight as part of their regular mission activities to Abidjan and worked with research staff to put together a funding package to underwrite the project’s startup costs. Operational contacts in Abidjan also helped researchers identify an administrative home for the project and smoothed the way for a new administrative structure to manage the project. The philosophy and much of the specific methodology behind the Côte d’Ivoire Living Standards Survey are now being used in nearly a dozen member countries.

TRADITIONAL INTERACTIONS BETWEEN RESEARCH AND OPERATIONS. The Bank’s core research programs also provide insight into the ways in which Operations and research staff interact. Two examples are given, one based on the Bank’s extensive research on issues of taxation, and the other on trade research.

Research on fiscal issues in general—and tax issues in particular—illustrates well the interplay between Operations and research in a mainstay area of research. As the tax case shows, new research often starts with the development of a general theory or set of models that may be too removed from reality to be useful in Operations. Bank researchers are then drawn into mission activities, and these experiences lead to a second generation of models that can be applied to real world settings. Along the way new issues arise, and the cycle begins again.

For the tax research a major cycle of ideas and projects began with work on a multifaceted tax model for India. This initial work was heavily influenced by operational missions on tax issues in Malawi, Ghana, Nigeria, Zaire, and Bangladesh. In every case the application of general tax policy principles to specific country settings engendered a new set of research activities the findings of which strengthened our policy dialogue in the next country study. This ability to perform operational work in a variety of country settings led Bank tax researchers to the realization that taxes and public sector pricing had to be considered in concert, not as a set of isolated policies, a principle that guided much of the Bank’s tax work during the 1980s.

The Bank has also been a serious player in trade research for several decades. The trade case underscores the value of maintaining a core of high-quality research and researchers in major policy areas even when those areas are not at the forefront of the current policy debate.

By the end of the 1980s the Bank’s trade policy work had reached a natural point of consolidation.
The World Development Report 1987 brought together the accumulated knowledge of the past two decades and Bank staff produced a policy paper in 1989 that set out the practical lessons from both research and experience. Many of the statements in that paper look comfortably obvious and predictable from today's vantage point, but they would have looked radical and untested as little as a decade ago.

Technical research. Although the largest part of the Bank's research portfolio concerns questions of economic policy design and uses socioeconomic methods, the Bank also supports research on technical issues. The Bank's research for the Highway Design and Maintenance (HDM) Standards Model brings out the challenges of undertaking technical research "in-house" and the advantages and disadvantages of having such research done in collaboration with outsiders.

Technical research is almost always an expensive proposition and is likely to take a sustained commitment to bring to fruition. These characteristics make it difficult for the Bank to go it alone — and hence the tendency for collaborative and consortium arrangements involving other donors and other researchers. Collaborative arrangements have many advantages, among them cost-sharing, providing a mechanism for an operational organization (the Bank) to feed its concerns into applied research and placing the Bank at the cutting edge of technical research. But those arrangements do bring serious managerial challenges with them. The Bank's experience with the HDM project shows that institutional and managerial commitment is even more important for technical research than it is for social science research.

Highlights from research in fiscal 1990

Last year's annual report on research demonstrated that substantial research programs underpin almost all of the Bank's operational emphasis areas. This year's report shows that the broad base of research in support of program areas continued to solidify in fiscal 1990 and that progress was substantial in areas seen as less-than-adequately served by the fiscal 1989 program.

Changing patterns of research emphasis. The areas singled out last year for special research priority — the environment, private sector development, and socialist economies — registered clear increases in research activities.

Research on the environment and forestry increased overall by 30 percent with a fourfold increase in funding from the Research Support Budget (RSB expenditures are a leading indicator of future research directions).

Private sector research increased by 81 percent from fiscal 1989 to fiscal 1990, and RSB expenditures more than doubled.

Although comparable figures do not exist for fiscal 1989 the presence of the Socialist Economies Reform Unit attests to the very significant increase in research on transforming socialist economies.

Changing patterns of research emphasis are reflected in changing patterns of resource allocation in other areas as well:

- During fiscal 1990, 18 percent of the Research Support Budget was devoted to work on adjustment, trade, and debt, down substantially from 28 percent in 1989, although the percentage of PRE staff time devoted to this research rose. This pattern of declining RSB funding and increasing staff time is typical of research that is entering a more mature phase and consistent with the role of the RSB as one of the principal avenues through which new research directions are pursued.

- Human resource development accounted for 11 percent of the Research Support Budget, up from 8.6 percent in 1989, with RSB research on women in development increasing nearly fourfold.

- In apparent contrast, roughly 13 percent of the Research Support Budget and 17 percent of PRE staff cost for research went to research on poverty reduction and food security, down somewhat from 17 percent and 25 percent in 1989. Much of the change is attributable to the World Development Report 1990, which absorbed a large fraction of PRE's work on poverty in fiscal 1990.

WDR-related research is not included in the statistics on research.

Research spending and staff time both up in fiscal 1990. Administered by the Research Committee, the RSB disbursed a record $6.4 million in fiscal 1990, compared with $3.6 million in fiscal 1989 and $4.0 million in fiscal 1988 (these are actual disbursements in each of the years, not authorizations). This dramatic increase resulted from two factors: the steady rise in RSB funding of new projects since the 1987 reorganization, and the completion of a "catching-up" process to put all RSB-funded research projects on firm timetables. RSB disbursements will return to long-run sustainable levels of around $5 million in fiscal 1991.
The staff time reported by departments on research or research-related activities (research preparation, for example) increased from 122 staff years in fiscal 1989 to 131 staff years in fiscal 1990. The growth in staff years came principally from an increase in the inputs of Sector Policy and Research staff, reflecting that vice presidency’s growing involvement in priority research areas, especially the environment and human resources.

Research activities during fiscal 1990 represented 17.5 percent of the total analytical work undertaken by the Bank in support of its lending operations, up from about 14 percent in fiscal 1989. (Economic and sector work accounted for 54 percent, and policy analysis for 28 percent.) As a share of the Bank’s fiscal administrative budget in fiscal 1990, research activities accounted for roughly 4.2 percent, compared with 3.5 percent in each of the preceding three fiscal years.

More research proposals and tighter funding authorizations. Requests for RSB funding are a leading indicator of the health of the research program and the degree to which departments seek additional resources to augment their own allocations to research. During fiscal 1990, the centrally funded research portfolio contained 160 active projects, up from 134 in fiscal 1989. Of these 160 projects, 79 were new starts, including 29 research preparation activities. Sixty-five projects were closed during the fiscal year, leaving an active portfolio of 95 projects at the end of fiscal 1990.

Dissemination and outreach. The World Bank Economic Review and the World Bank Research Observer are now well established, with 5,700 subscribers to the Observer and 13,000 to the Review. Both journals now have extended pipelines of articles approved by the journals’ editorial boards, pipelines that make it easier to strengthen the mix of articles in each issue. Bank researchers were also prolific publishers during the fiscal year through other outlets, including 44 articles in other leading journals, 15 books, 51 technical and discussion papers, and more than 300 working papers and discussion papers.

The Policy and Research Series moved into its second year with nine issues on such topics as competition policies, industrial restructuring, and agricultural diversification. The PRE Working Paper Series, now in its third year and heading toward number 600—with 230 papers published during fiscal 1990—continues to release quickly the findings of work in progress, to other researchers and to staff in the Operations complex. The Policy Research Bulletin, successor to Research News, was launched in January 1990 to provide the policy research and development community with up-to-date information on the Bank’s research program. It is distributed to 21,000 researchers, policymakers, and business people, a circulation three times that of the old Research News.

The Annual World Bank Conference on Development Economics for 1990 was held at the end of April. The keynote address was by Vaclav Klaus, finance minister of Czechoslovakia, who spoke about the unfolding transition to market economies in Eastern Europe. The four topics discussed at the 1990 Conference dealt with appropriate policy responses for moving from stabilization to growth, sustainable development and the environment, the role of population growth in development, and a reexamination of project evaluation. The Conference ended with a roundtable discussion on “Development Strategies: The Roles of the State and the Private Sector,” in anticipation of the review of development economics that will be the subject of the World Development Report 1991.

Through the Visiting Research Fellow Program, funded by the Research Support Budget, the Bank hosted 13 research fellows during fiscal 1990. These fellows focused on a variety of areas, including the political economy of structural adjustment, the importance of nontariff barriers in trade agreements, poverty alleviation and income distribution issues in the context of structural adjustment, and urban land and management problems in Sub-Saharan Africa.

Research strategy for the 1990s

The report concludes with a look at the future of Bank research. A basic institutional goal is to reduce the poverty of poor nations and the poverty of people within those nations. To do this, we must improve nutrition, reduce sickness, increase life expectancy, and increase the access to education. We must also boost the rate of economic growth and ensure that developmental policies and practices are sustainable in the long term—not just economically sustainable, but socially, politically, and environmentally sustainable. To meet this goal we will need to know more about development and the effects of policies aimed at achieving it on a broad front. Nowhere is the need more critical than in the four areas of program emphasis (other than poverty reduction) now
guiding the Bank's planning and operations: the environment, private sector development, human resources, and debt and adjustment. The departmental research programs for PRE and for the four regions reflect each unit's interpretation of these overarching goals and objectives.

**AGRICULTURE AND RURAL DEVELOPMENT.** The Bank's research strategy for agriculture and rural development takes as its starting point the recognition that many of the most pressing issues facing policymakers and project designers are outside of economics and in the realm of technology. One major challenge therefore is to understand, use, and influence technological change. AGR will continue to conduct research on economic issues, where we know the problems and how to bring findings to the policy table. But the department will also do more in technology assessments — to draw lessons about the process of technological change, to bolster the technical packages in investment projects, and to strengthen the policy dialogue with national authorities.

**INDUSTRY AND ENERGY.** The research strategy for industry and energy in the first part of the 1990s is moving beyond technical and engineering issues to larger questions of governance. Issues of revising the social contract between governments, enterprises, and consumers are now directing IEN's emergent research. Part of this new work involves reviewing the situation today — to show where and how things are not working. And part involves providing guidelines for putting in place mechanisms for making difficult decisions and for ensuring public accountability. At the core of the IEN approach is the notion that a competitive environment to promote efficiency can be established only by developing capital markets that support private ownership of what now are public utilities. Specific research issues that IEN will address in the early 1990s deal with the importance of foreign private investment in the transfer of technology, the development of domestic capital markets to accommodate the needs of firms for working capital and foreign exchange, and the transport and communications infrastructure that has to be in place to move goods to markets and speed transactions.

**INFRASTRUCTURE AND URBAN DEVELOPMENT.** The Bank's research strategy for infrastructure emanates from the assessment that government responses to the increasing demand for urban infrastructure services have been inadequate — and that these inadequacies seriously constrain productivity growth, not only in the low-income countries of Africa but in Latin America and the fast-growing countries in east Asia. Deteriorating services, inefficient public enterprises and institutions, and overregulated markets for water, housing, transport and waste disposal dictate three priority areas for INU's analytical work. The first is on the fiscal, financial, and real sector links between infrastructure and the macroeconomy. The second is on the political, institutional, regulatory, and financial constraints to productivity. The third is on what individual policy changes would mean for the productivity of firms and households, for the welfare of the poor, and for the environment.

**POPULATION AND HUMAN RESOURCES.** The Bank's research strategy for population and human resources in the 1990s also has three main thrusts. The first concerns poverty assessment and policy impact on household consumption and human resource investments. The second is on human resources and economic productivity, with special attention to women's economic productivity and to the formation and use of human capital. The third is on the management of human resource development — especially economic management, but also technical and institutional management. These emphases relate to the second of the two-pronged attack on poverty articulated in the World Development Report 1990: the development of human resources to enable people to take advantage of expanded economic opportunities to use their labor productively that structural reform can bring.

**ENVIRONMENT.** The overriding priority of ENV's work is to encourage the integration of environmental strategy into the mainstream of the Bank's lending activities — and to strengthen research on the underlying causes of environmental degradation and on the feasibility of alternative policy interventions. With operational work now on track, ENV staff are refining their thinking and deepening their research on public policy issues. For example, ENV will begin to do more work on the cost-benefit analysis that incorporates global externalities. Research is also being developed on the links among poverty, population, and the environment.

**COUNTRY ECONOMICS.** Perhaps the major development question for the 1990s is how to improve the
prospects for sustainable long-run growth in stagnating and declining economies. New research is under way on the determinants of long-run growth and on institutional development in the public and private sectors—to improve private savings mobilization and support efficient investment. As part of its focus on long-run growth, CEC is also addressing ways of making the concept of environmentally sustainable growth an integral part of the Bank's lending operations. To support its efforts to understand and promote institutional development, CEC is building up research on reforms in such areas as deregulation, entrepreneurial development, private provision of public services, and the strengthening of private financial intermediaries to support private sector development. And because national policies have significant environmental impact through their economic incentives and disincentives, CEC is building up research on the environmental impact of trade and fiscal policy reforms.

Consistent with the agenda set out in World Development Report 1990, CEC is initiating research on the impact of tax policy and public spending on the poor, particularly through targeted spending programs. With labor markets and employment as major determinants of the returns to labor—the main asset of the poor—CEC will resume research on labor market and employment questions, research largely neglected since the reorganization in 1987. To keep pace with and learn from the far-reaching changes in Eastern Europe, CEC is building up research on price reform, enterprise reform, and social safety nets.

INTERNATIONAL ECONOMICS. Research on international economics takes a global perspective—on the long-term prospects for developing countries, on the management of debt, and on the likely developments in major commodity markets. A main area for research concerns the global determinants of long-run productivity and economic growth—to find out more about how the external environment affects countries' growth prospects—as a complement to CEC's focus on internal considerations. A second priority is the development of the next generation of global models for analysis of the interactions and links among developed and developing countries. Particularly important refinements that will incorporate Eastern Europe's joining the world market economy: A third priority area is to assess the effects of global commodity shocks, like the 1990 oil shock, on individual economies—and to evaluate the policy responses to those shocks. Finally, to understand better the contribution of external finance to growth, IEC will analyze why some countries are able to support much higher relative levels of indebtedness than others and the causes of private capital outflows and reflows.

REGIONAL PRIORITIES: Research in the Operations complex both mirrors and complements the research in the Policy, Research, and External Affairs complex.

For the Africa region, the long-term perspective study—Sub-Saharan Africa: From Crisis to Sustainable Growth—defines the research agenda for the foreseeable future. Work is being intensified on the determinants of fertility and on reversing the vicious circle of rapid population growth, slow agricultural growth, and deteriorating natural resources. Research is being launched on the government's role in promoting the informal sector's development, on the experience with trade reform, on what regional integration means for trade strategies, on the mobility of labor under adjustment, and on policies for export development. These efforts will help inform AFR's program of regional studies on a wide range of sectors and themes—population, financial sector reform, regional integration, efficient management of external finance, and alternatives for dealing with debt difficulties.

Poverty remains the main topic of research for the Asia region but new research is moving beyond problems of measuring poverty to identifying the practical policy levers for improving the access of the poor to public services, especially education and health. Exploratory work is under way to find out what governments can do to reduce school dropout rates and improve learning outcomes, and on the determinants of demand for health services—and the links among epidemiological patterns, the financing of health services, and the equity of access to these services. The region will also conduct a major study of the links between poverty and population, analyzing how governments can best intervene. And as part of the Bankwide forestry initiative, the region will support a major effort to consolidate thinking on regional environmental issues.

The immediate concern in the Europe, Middle East, and North Africa region is the transformation of centrally planned economies and their changing links with the Soviet Union. The core research issues concern the transformation of enterprises—efforts to make public firms private, to
restructure policies and institutions, and above all to introduce competition. Other important questions on the EMENA research agenda include evolving trading relationships and the extent to which existing external debt will affect potential investors’ attitudes toward foreign direct investment and other capital flows in the region. Another critical area of continuing inquiry is the environment, an issue that deeply affects welfare throughout the region.

Latin America’s massive structural reforms and reassessments of the public sector’s role are influencing the areas of research in the region. Comparative analysis of the size of governments, reform of civil services, and fiscal decentralization will be important areas of new work. The region is also drawing lessons from private sector responses to reform programs during the last few years, particularly trade reforms. In addition, the experience with social investment funds associated with adjustment operations has raised questions about the appropriate design of safety nets and the relative merits of employment programs versus targeted transfer programs to provide social services. Studies of these questions aim at improving the design of future projects by drawing lessons from experience. For research on the environment, the region will be evaluating policies that reduce pollution through changes in relative prices and policies that regulate pollution through administrative controls.

These departmental and regional research plans add up to a challenging agenda driven by problems that are technically complex and often politically sensitive. Many of the underlying issues cut across division, departmental, and vice presidential boundaries, underscoring the need for effective management and coordination. To improve coordination within its own complex and to further coordination throughout the Bank, PRE is developing a new system that will act as a clearinghouse and institutional focal point for cross-cutting issues.
At almost every Board discussion of the Annual Report on the World Bank Research Program, the Executive Directors question how Bank-sponsored research fits into what is essentially an operational institution. How does research influence Bank operations? How do operational staff interact with research staff in producing Bank research? What role does the Operations complex play in setting research priorities? How is research in the Bank different from research in universities? To answer these perennial questions this year's report focuses on the role of research in the Bank, particularly on how researchers and operational staff interact to produce the Bank's unique research product.

Research in the Bank is different from research in universities and free-standing research institutes in at least two ways. First, Bank operations serve as a constant reminder of the complexity of real world problems and constraints, raising issues for research underscoring the need for practical solutions. Second, those operations provide a unique mechanism for putting the new ideas that emanate from our research into practice. Well-known formal channels in the Bank's administrative structure have been established to ensure good communication and collaboration between Bank research and Operations. The participation of the Policy, Research, and External Affairs (PRE) complex on the Operations Committee, the participation of the Operations complex on the PRE Committee, and the participation of both groups on the Research and Publications Policy Council and the Research Committee are four examples. The regional chief economists also do much to identify pressing operational issues, coordinate research, and disseminate its results, as do the several sector and research retreats held each year. But these official channels are only part of the story. Much critical interaction occurs at the initiative of individual staff members — interaction that is difficult to describe in general terms but essential to understanding Bank research.

We choose here to give a sense of the importance of these interactions between research and operational staff by presenting five cases of Bank research. The cases were selected not because they are examples of successful research but because each illustrates an important and frequently encountered form of interaction between Operations and research. Each case is based on a completed research episode to bring out both the immediate and much longer term effects that Operations can have on the nature and direction of Bank research.

While all five cases confirm the value of having Bank research produced in close association with Operations staff, each of them also delivers its own special lessons. The first two cases — one on land titling and one on measuring living standards — illustrate how the impetus for research can come from many sources. The third and fourth cases — on tax policy research and trade policy research — look at what might be called conventional research activities. These are areas of longstanding interest in the Bank, areas in which the institution has invested heavily and is likely to want a continuing presence. They illustrate, among
other things, the need to maintain and continu-ously update our stock of knowledge in the Bank's core policy areas. The fifth case — on road maintenance — concerns one of the Bank's smaller number of research projects on technical rather than economic issues. It shows the commitment that technical research requires and the special challenges of such research for the Bank.

Before we turn to the case studies, three points of information may be useful in guiding the reader. First, for those not familiar with the World Bank's research program, Appendix 1 discusses the meaning of research as it is used in this report and gives a short introduction to the structure for funding and managing Bank research. Second, throughout this and subsequent parts of the report we provide references to endnotes for those wanting more detail on a particular project or subject. And finally, this report's thematic focus on the relationship between research and operations should not be seen in any way as reducing the importance of other Bank research clients or objectives. Such perennial issues as building research capacity and disseminating policy findings to the development and research community, reviewed in Part II of this report, remain important objectives of the program.

Research driven by Bank operations

The history of a recent body of work by Bank staff on the relationship between land titling and farmer productivity shows that operational concerns are often the direct impetus to a breakthrough in research. It also shows how researchers' support of lending operations can lead to work that has far-reaching effects not only on Bank Operations but on the way the economics profession thinks about a particular issue. The land titling study is a classic illustration of how researchers, operational staff, and local counterparts interact to produce better policy analysis than any one of these groups would have been able to produce alone.

In 1983 a group of operational economists was conducting a cost-benefit analysis of a prospective Bank-funded program to enhance land ownership security among Thai farmers through land titling. The rationale for the project came from traditional economic theory, which argues that strengthening legal ownership of farmland (and reducing the fear of eviction) will lead to increased farm productivity through increased investment by farmers. Although the theory was straightforward, arriving at quantitative estimates of the project's expected benefits was not. Operational staff turned to what now is the Agriculture and Rural Development Department for help in searching the available literature for quantitative estimates of the effects of land titling on farm productivity. An initial review of past research turned up two interesting and disturbing facts. First, the importance of secure ownership to farm productivity was well discussed in qualitative terms, but quantitative information on the effects of different ownership arrangements was virtually nonexistent. Second, the land titling literature left the impression that titling was simply a bureaucratic procedure with little or no direct economic function or impact.

The lack of convincing quantitative evidence on the effects of land titling on productivity led Bank researchers to launch a study on the subject. Before work began in earnest, Bank researchers and operational staff established working contacts at two levels in Thailand — contacts that were to prove essential to the study's eventual success. Operational staff arranged discussions with Thai officials to ensure government support of a study on land titling and to establish conduits for transforming research findings into policy. Bank researchers also established contact with a group of Thai economists who were prepared to collaborate in designing and conducting the proposed study. Funded through a grant from the Bank's Research Support Budget, the study began in 1984.

Fairly early in the project, the Bank team uncovered a critical finding. Farmers who did not hold legal title invested less than farmers who held clear title, but the difference did not appear to stem from a fear of eviction. Careful analysis that drew heavily on the Thai researchers' institutional knowledge showed that even for squatters on government-designated forest reserve lands, de facto ownership security was very high. It appeared therefore that further strengthening the sense of ownership among Thai squatter farmers — the original motive for the lending operation — was not likely to have much effect on productivity. But why, then, was there a difference in investment levels between squatters and those with legal titles? The overlooked answer became obvious once the research results were considered: farmers with legal titles to their land had ready access to relatively cheap credit through official financial channels, as their land could serve as collateral. Farmers who did not hold legal title did not have access to such credit.
The research demonstrated clearly that establishing the exact mechanism through which land 
"ownership" increased productivity was critical to the design of land titling schemes. This fact was 
to play a central role in the policy discussions on another potential land registration loan that the 
Bank and the Thai government were considering during 1985-86. While the Thai government was 
eager to increase the productivity of squatter farmers, forestry officials objected to granting 
unrestricted ownership to squatters who were farming land in forest reserves. Thai officials 
argued — and the Bank had previously accepted this position in its structural adjustment loan oper-
ations, at least as an interim step in long-term reform — that "user certificates" would be enough 
to increase squatters' tenure security, providing the same productivity-enhancing outcomes as full 
titled ownership without the need to provide legal titles. Bank researchers, operational staff, and 
Thai researchers argued to the contrary: non-transferable user certificates would do little to 
 enhance farm productivity, because official credit channels would not accept them as collateral.

At this point in the story, the willingness of the three groups to work together became critical (see box 1). Since the original research project had not studied user certificates, conclusions about their 
effectiveness in raising productivity were only indirect. The Thai government wanted stronger 
proof. The original research design was modified and new results were obtained that directly con-
 firmed the Bank researchers' predictions: granting user certificates did little to enhance farm 
 productivity.

All three parties — Bank researchers, Thai researchers, and operational staff — exhibited as-
irable openness to new ideas and each displayed an essential willingness to listen to the others. 
Operational staff identified an important gap in knowledge and brought it to the attention of Bank 
researchers. The Thai researchers provided Bank researchers with the institutional knowledge they 
lacked and arranged for effective dissemination of the policy implications in Thailand. The Bank 
researchers provided "on-the-job" training to the Thai researchers in new methods of analysis. This collaboration kept the Thai government and the Bank from extending a user certificate program 
that would not have yielded the desired productivity benefits. The results also provided quanti-
tative information and a method of cost-benefit analysis to strengthen the economic justification 
for a follow-on titling project (recently approved by the Bank).

The Thai story ends here, but the impact of this piece of Bank research does not. The main research 
presentation from the study, Land Policies and Farm Productivity in Thailand, won the Quality of Re-
search Discovery Award of the American Agricultural Economics Association in 1989. The wide 
dissemination of results and the growing concern over land ownership issues in the development 
community led to a grant to the Bank by the U.S. Agency for International Development for a study 
applying the method and approach to Sub-Saharan Africa. Studies drawing on the Thai methodology 
were recently completed in Rwanda, Kenya, Ghana, and Burkina Faso. And the Agriculture 
and Rural Development Department is planning a new policy paper on issues of land ownership, for 

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Box 1 The value of local collaboration

The best Bank policy research comes from a blending of connected with the political system, and these connections 
three inputs: operational staff with an eye for problems proved invaluable in ensuring that study findings reached 
specific to countries and sectors, Bank researchers who can a wide range of senior government officials. The Thai 
put these problems in a broader context, and local researchers who can bring critical institutional knowledge to 
the project. The Thailand land titling project shows how this mix of ingredients can produce a first-rate policy research 
outcome and how the role of local researchers is critical.

The Thai researchers at Kasetsart University who collaborated on the project had little experience analyzing land 
titling issues, but they knew rural Thailand. They were instrumental in deciding what questions to ask Thai farmers 
and how to ask these questions to elicit the information needed for the proposed analysis. They also were well

Research driven by institutional mandate

The impetus for new directions in Bank research comes from many sources in the Bank. Presidential statements of institutional priorities are always important in shaping Bank research, and occasionally the mandate is more specific. Such is the case with the Living Standards Measurement Study, a major Bank effort to improve methods for collecting and analyzing information on household living standards. The history of this study illustrates one of the many avenues through which the push for new directions in Bank research can come, as well as the significant investments often needed for entry into new areas: the critical importance of field and operational constraints in successful research, and the value of the interaction of Bank staff in linking research and operational activities.

In 1973, then-President McNamara, in his well-known Nairobi speech, called on the Bank to increase the effectiveness of its lending activities as a means of directly reducing poverty and improving living conditions for the poor. By the end of the 1970s this new mandate had clearly influenced the makeup of Bank lending, but the large flow of resources into this international war on poverty began to raise questions among supporters and skeptics. Were the Bank’s programs actually reaching the poor? Were the effects of the program permanent or temporary? When staff, management, and the Board asked these questions, it became clear that national data systems were not designed to answer them. McNamara’s response was to establish the Living Standards Measurement Study (LSMS). The study’s mandate was to develop an integrated data collection and analysis system that would provide project designers with information on the poor, their conditions and behavior, and that would permit the Bank and others to assess the effectiveness of efforts to reduce poverty and to design cost-effective programs for reaching the poor.

In the study’s early years LSMS staff concentrated on assessing past attempts to monitor living conditions and measure changes in those conditions. By 1983 they had developed a lengthy draft questionnaire and several prototype studies to demonstrate how to use the new data. During this phase the project’s links to operations were minimal, and operational reactions to the project predictable: another expensive academic exercise of little use to staff in the trenches. Moreover, by the end of 1983 a near standoff had developed between the economists leading the project (who specified the types of data needed to monitor welfare) and the survey design experts (who had to translate these data needs into administrable surveys). The sticking point was whether conventional survey techniques were adequate for collecting the data that the economists, as prospective users, wanted.

At about the same time, all Bank research projects were reviewed as part of a reorganization of Bank research. A fresh look at the LSMS project showed that a point of diminishing returns had been reached for additional desk study. Growing concern about the feasibility of administering the LSMS questionnaire could be addressed only by confronting theoretical design with the rigors of a field test. Meanwhile, independent of the LSMS project, a researcher in the Bank’s Development Research Department had teamed up with a country economist in the Africa Region to study the determinants of welfare levels in Côte d’Ivoire. These two strands of work—the LSMS and the Côte d’Ivoire study—were natural partners, but funding was a problem. The solution: bring them together under the auspices of a research project funded by the Research Support Budget. A new questionnaire was designed to meet monitoring and analysis objectives, and the Côte d’Ivoire Living Standards Survey (CILSS) was launched in 1985.

The project was by all measures a success, due in large part to its combination of research and operational support. Researchers provided intensive technical assistance to their counterparts in Côte d’Ivoire during the critical planning phase of the project. Operational staff provided invaluable oversight as part of their regular mission activities to Abidjan and worked with research staff to put together a funding package (part Research Support Budget, part technical assistance) to underwrite the project’s substantial startup costs. Operational contacts in Abidjan helped researchers identify an administrative home for the project and smoothed the way for a new administrative structure to manage the project. Operational staff also opened doors to the Ivorian user community—the ministries and directorates that would ultimately use the data—so that their views and concerns could influence the initial design.

With guidance from the Bank’s Population and Human Resources Department, the philosophy and much of the specific methodology behind the Côte d’Ivoire Living Standards Survey (CILSS) have now spread to nearly a dozen countries (see
The LSMS model is also one of the building blocks for the Social Dimensions of Adjustment (SDA), the major initiative to improve the Bank's ability to protect Sub-Saharan Africa's poor during times of economic crisis. LSMS data provided the basis for a good part of the detailed analysis for the World Development Report 1990 on poverty and serves as a test of several of the major recommendations in the forthcoming policy paper on poverty. Many of these new efforts have developed through the initiative of operational staff, and all have involved substantial collaboration between research and operational staff.

Had the LSMS project been located outside the Bank, there is little doubt that it would have ended up as yet another dust-covered entry in the annals of household survey history. The willingness of Bank operational staff to incorporate new ideas into their lending programs (again, see box 2) was just as important to the current success of the LSMS model as were the painstaking research inputs that shaped its original design.

**Traditional interaction between research and operations: tax policy research**

Research on fiscal issues in general — and tax issues in particular — has a long and respected history at the Bank, one that illustrates well the traditional interplay between operations and research. New research often starts with the development of a theory or model to address a specific problem. However, initial variants may not immediately be useful in operations. Bank researchers are then drawn into mission activities, and these experiences lead to a second generation of models that can be applied to real world settings. Along the way new issues arise, new research starts, and the cycle begins again. Researchers push the intellectual frontiers. Operational staff provide the questions and the constraints. The active participation of both parties is what makes Bank policy innovative and practical.

Before 1980 Bank policy advice on tax issues was for the most part limited to policy issues involving specific sectors; the IMF was responsible for national tax structures as a whole. Operations work was increasingly focused on tax issues as the key to domestic resource mobilization to relieve the debt crisis. In parallel, the Bank began an internationally recognized body of research on optimal taxation; a significant product of this period was The Theory of Taxation for Developing Countries, the most definitive source on this topic so far.

Bank research on tax issues changed in the early

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**Box 2 Operations and the LSMS**

The LSMS system's ability to deliver a wide spectrum of information on poor households quickly and accurately has made it increasingly popular for the design of structural adjustment programs. Adjustment operations in Ghana, Mauritania, Jamaica, and Bolivia have all used the LSMS methodology to monitor the poor during adjustment and to design new programs to protect them. New surveys are about to be launched in Morocco, Pakistan, Laos, and Venezuela, and discussions are under way in a half dozen other countries.

Jamaica is a particularly interesting case because it illustrates once again the distinct roles of researchers, operational staff, and local counterparts. In January 1988, as Jamaica's Human Resource Development Program was nearing implementation, the Bank received a personal request from the Prime Minister: would the Bank work with Jamaican statisticians to establish an LSMS system to monitor the program's effects? Could a system be developed and put in place fast enough to provide baseline data against which the program's impact could be measured?

A team of LSMS researchers, Bank operational staff, and Jamaican statistical experts took up the challenge. To avoid duplication, lower costs, and reduce the time between design and implementation, the first phase of the new Jamaican Survey of Living Conditions was grafted onto an existing labor force survey. The adoption of the LSMS methodology to this new setting required a coordinated and intensive effort by all three parties involved. LSMS staff had to adapt the wording of the questionnaire to the new system. Bank operational staff had to provide an overall policy focus for the new survey. And Jamaican collaborators had to ensure that the new approach would work in Jamaica. The collaboration went smoothly. In a remarkably short nine months after the project was launched, the new survey produced a set of baseline data on poverty and the use of social services by the poor that operational staff and the Jamaican government could use to design specific elements of the Human Resources Development Program. The speed of implementing the first phase of the survey was instrumental in establishing the Jamaican government's solid commitment to subsequent refinements of the survey. More recent analysis of the survey has led to major changes in Jamaica's Food Stamp Program, making it much more effective and efficient in providing nutrition to the poor and protecting them during periods of structural adjustment.
1980s, due largely to the involvement of Bank researchers in operational work that highlighted the drawbacks of a sector-by-sector approach. The starting point for this change came in 1983 during a dialogue with India on the desirability of changing its coal pricing policy to increase revenues from the sale of government-mined coal. The review led to two unexpected findings. First, the Indian government had good reason to be skeptical of the net revenue gains from such a change. The government was a major coal consumer, so net revenue increases would be much lower than projected. Second, and of wider significance, staff realized that exploring revenue issues within a single sector — the coal-producing sector in India — was analytically and practically wrong. Public sector price and tax issues should be assessed in much broader terms than had traditionally been the case.

The realization that taxes and public sector pricing had to be considered in concert, not as a set of isolated policies, led to a new program of tax research that extended over much of the 1980s. The research began with an effort to develop a model of tax analysis that recognized the interdependence of prices and taxes economywide. The model had its intellectual roots in earlier research on optimal taxation, which was highly theoretical and demanding of data, but the emphasis had shifted to developing analytical concepts and tools applicable in actual country settings. The first multisectoral tax model was developed for application in the Indian context, and researchers soon extended the model to other settings. Pakistan and Mexico were selected for additional work to test the model's applicability, first in a similar context and then in a very different one.

The need for a broader approach became even clearer in a series of country studies in Sub-Saharan Africa. The first of these took place in 1984 when Malawi was negotiating a major structural adjustment loan that involved new sector-specific taxes. With considerable foresight, Malawi's Minister of Finance asked the Bank to expand its analysis to the entire tax structure. The Bank's research management responded by sending a five-person mission in May 1985 to review all aspects of Malawi's tax system.

The scale and nature of Bank support in this area were unprecedented, as detailed analysis and advice on general tax policy issues had traditionally been provided by the IMF. Bank and Fund staff soon agreed, however, that the Bank complemented the Fund's ability to offer tax policy advice. In six months the team drew up a series of options for reforming Malawi's tax system. These options were based on principles developed during the Indian exercise, but with one major change. The mathematical models for India could not be applied to Malawi because much of the required data did not exist. Researchers came away from this experience with a clearer understanding of the constraints that operational staff face in applying the newly developed tax models to data-poor countries.

The Malawi tax work was in many respects a watershed for Bank tax research. The mission's success demonstrated the value of systemwide tax analysis and showed that many of the principles of modern tax theory could be applied even in data-poor environments. The Malawi work also underscores two general lessons for the Bank: the need to have highly skilled researchers available for operational mission work, and the critical role of operational work in redirecting research. Bank researchers had to reconsider such diverse issues as the relationship between a country's internal tax system and its trade tariffs, including the efficacy and efficiency of uniform tariffs, the relative merits of tariffs and internal taxes on imported goods as sources of revenue, the administrative complexities of value-added tax systems (see box 3), and cash flow versus accrual methods for corporate taxation. The experience proved instrumental in opening the door to new tax work in other parts of Sub-Saharan Africa — with Ghana, Nigeria, and Zaire as prime examples. In 1986 a similar, but analytically more sophisticated, approach was also successfully applied to Bangladesh. At this point regional staff also began conducting tax analysis based on the same general intellectual approach in Morocco and Turkey.

The story so far has emphasized the role of operations in shaping research, but there has been considerable movement in the other direction as well. The Bank's work on value-added taxes (VATs) shows how research influences operations. In 1986 the research complex sponsored a conference on value-added taxation that considered both the underlying theory and the implementation of VATs. Practical experience in Malawi and Zaire showed that simple VAT-type taxes could be designed to work in administratively constrained settings. In addition to placing the Bank at the center of professional debate and discussion on developing-country tax reform issues, the conference led to the rapid acceptance of VATs as a core element of tax reform packages.
And, of course, the findings and implications of the Bank's tax research were a major input to the World Development Report 1988 on public finance in development.

The Bank's research on tax issues is now increasingly emphasizing sectoral issues, especially the role of taxation in controlling environmental degradation. This is, therefore, an appropriate time to synthesize the policy lessons from a decade of research and operational work. The taxation policy paper now under preparation will bring to an effective close a productive chapter in the Bank's continuing tax research.

Traditional interaction between research and operations: trade policy research

The Bank has been a serious player in trade policy research for the better part of two decades. Obviously, a full characterization of the work during that period cannot be attempted here. What we provide instead is an example of how research in the Bank's principal economic policy areas is produced, fed into operations, and influenced by operations — to illustrate the payoff from maintaining a core of high-quality research activities in key policy areas.

In the 1970s the Bank's trade policy researchers were on the cutting edge of the professional debate over the role of trade in economic development. But for at least a part of that decade, they were out of step with the development community at large. By 1980, however, the economics profession had reached broad agreement on the central role of international trade in promoting economic development, and the Bank was beginning to develop a clear sense of the advice it should give member countries on trade issues.

Trade is — and always has been — a complex and contentious area, one that became even more heated as trade policy became the leading edge of most Bank-approved adjustment programs. While an increasingly large section of the economics profession accepted the importance of openness in international trade, the Bank's operational staff found it difficult to convince their counterparts in member countries of the benefits of liberalizing trade barriers. Dismantling distorted trade regimes — ones dominated by high tariffs, widespread quantitative restrictions, and rigidly managed and overvalued exchange rates — can be painful not only for those who benefit directly from restrictive practices but for the economy as a whole. Were the gains worth the perceived economic and political costs? As the Bank increasingly emphasized trade policy as the centerpiece of adjustment reforms, demand grew within the Bank for two new types of trade policy research. Operational staff asked for convincing evidence on the benefits of trade liberalization in low-income and middle-income developing countries and on the main costs associated with trade liberalization. They also wanted more guidance on designing and packaging trade liberalization programs, especially on how trade reforms fit with other policies and projects.

These operational concerns about practical matters of trade policy and the solid foundation of conceptual work by Bank researchers in the 1970s served as the launching pad for several major research efforts in the 1980s. The largest initiative on trade-related issues came in 1984 in the form of a major Bank comparative study, an effort to learn from the trade reform experiences of 19 developing countries (see box 4 overleaf). This project and related Bank-sponsored research addressed such practical questions as the relationship between trade and fiscal reform, the complementary policy and project changes needed to make trade reforms work, and the political challenges of making trade

Box 3 More lessons from Malawi: an administratively simple tax system

Mission work can yield insights that feed into future research and operational work. In Malawi, for example, Bank researchers learned the value of a thorough and complete understanding of the tax system in operation. At the outset of the tax discussions, Bank staff recommended that the government broaden its tax base and minimize tax-induced distortions by establishing a value-added tax (VAT) system. The initial response was that a VAT, desirable as it might be on theoretical grounds, would impose unmanageable demands on an already overburdened tax administration system. The Bank team decided to take a closer look at the existing system to see if it could be simplified. What they found was a set of tax regulations and collection mechanisms as administratively demanding as a VAT system but with precisely the opposite efficiency and neutrality effects of a VAT. Armed with this evidence, the team convinced the Malawian authorities to implement what became known as a "proto-VAT," a relatively simple VAT that captured many of the benefits of a more complicated VAT system but with only a marginal increase in administrative costs over the tax system already in place.
and other policy reforms credible and sustainable. By the mid-1980s the payoff to a decade and a half of high-quality Bank research on trade policy was evident. Many of the countries facing trade reform challenges were middle-income developing countries with civil servants sophisticated in economic analysis. Bank staff found that to be persuasive in policy negotiations they had to be armed with the best up-to-date arguments and analysis on trade issues.

Mexico is a case in point. Mexico's well-known efforts to reform its trade system began in the early 1980s, and by 1985 attention was concentrated on reducing barriers to imports needed to fuel the expanding economy. In the extensive discussions, analysis, and policy design work between 1985 and 1989, Bank staff sat across the table from some of the best-trained government trade economists in the world. The fact that Bank research had addressed the main issues on the negotiating table, most notably how to sequence trade reform and stabilization efforts, did much to move these discussions forward.

In Africa the issues are different. Countries are less convinced of the need for trade reform and want to know more about the institutional and infrastructural investments that have to accompany trade reform to make it work. Some of these concerns had been addressed in earlier Bank research on trade, and some had led to the formulation of new research projects. And in South Asia, countries want to know how to replace their often pervasive systems of quantitative restrictions with tariffs. Again, earlier research had focused explicitly on this issue, which led to rapid progress in the policy dialogue.

By the end of the 1980s the Bank's trade policy work had reached a natural point of consolidation. The World Development Report 1987 brought together much of the accumulated knowledge of the past two decades, and Bank staff produced a policy paper that set out the practical lessons from both research and experience. Many of the statements in that paper look comfortably obvious and predictable from today's vantage point, but they would have looked radical and untested as recently as a decade ago.

We have also learned much from reform episodes that have not achieved their objectives. We now know that macroeconomic instability and institutional barriers can thwart even the best-designed trade liberalization program. The Bank's theories of the 1970s were correct, but their application to real country settings was not quite as simple. As for the future, trade policy research will remain an important element in the Bank's research portfolio (see box 5). The increasing integration of Eastern Europe into the world economy, the role of trade policy in accelerating the return to growth following adjustment, and the need to assimilate the results of the Uruguay Round of trade negotiations into Bank policy guidelines — all these represent significant new challenges to the Bank's trade policy researchers.

Box 4 The first of the comparative studies

Redirecting resources toward new and pressing research needs is a perennial challenge. In the first half of the 1980s, the Bank's research management launched a series of large research projects, each addressing a critical policy area in which fundamental professional disagreements were slowing policy formulation. Each study would draw its findings from detailed analyses of experiences in 15 to 20 countries. The prototype for the program was a study of the Timing and Sequencing of Trade Liberalization which addressed a series of practical questions about the design of trade reform policy. The questions the project set out to answer were large and, at $2.3 million, so was the project.

The trade liberalization study was funded through a grant from the Research Support Budget, managed by a small group of Bank researchers, and carried out almost exclusively by researchers outside the Bank. The project's reliance on external researchers had two important benefits. First, the project finished on time and within budget — in no small part because the external researchers were able to give the project top priority. Second, most of the outside researchers were drawn from the countries being studied, contributing significantly to the growth of local research capacity.

But there were drawbacks as well. The project's reliance on outside researchers, and the prevailing tensions within the Bank on trade issues, created an early perception that this exercise was outside the mainstream of Bank research. The project managers had to work especially hard to bring operational staff into the project's planning, review, and dissemination stages. As the project matured and, perhaps more important, as its managers moved into operations, the payoff to the intensive country-specific work became obvious. An enormous well of information on trade reform episodes now exists for Bank operational staff to draw on. The set of country studies (in six volumes) and the synthesis volume from the project are receiving wide attention.
Technical research

Although the largest part of the Bank's internally managed research portfolio concerns questions of policy design and relies on socioeconomic methods, the Bank does support research on technical issues. The case that follows brings out the challenge of undertaking technical research in-house and the advantages and disadvantages of having such research done by outsiders.

Technical research tends to require substantial resources relative to other aspects of the Bank's research portfolio, and projects sometimes take a decade or more rather than months or years. That is why most technical research supported by the Bank is carried out under some form of consultative arrangement. The work of the Consultative Group on International Agricultural Research is an obvious example, as is the Onchocerciasis Control Program. Although the Bank has important supportive and substantive roles in these research efforts, it does not handle day-to-day details. Technical research actually managed and produced by Bank staff is a rarer commodity. One of the largest examples of such research is the Highway Design and Maintenance Standards (HDM) study. 21

Project support for highways has been a mainstay of Bank lending for decades, but the results of vast outlays of resources have been less enduring than project designers had hoped. Recent Bank estimates put the loss of road infrastructure in 88 developing countries over the past two decades at $45 billion. 22 This loss underscores the importance of the HDM's basic goal: to develop a methodology to address the choice of appropriate standards and technology in the highway sector.

The Bank's initial involvement in this area came in a 1969 collaborative effort with the Massachusetts Institute of Technology (MIT) to develop the first conceptual framework for quantifying the relationships among highway construction, maintenance, and vehicle operating costs. This early work led to a prototype Highway Cost Model and to a major collaboration with the United Kingdom's Transportation and Road Research Laboratory and the Kenya Ministry of Works. The goal of this collaboration was to estimate, for the first time, the effects of road surface conditions on vehicle speeds and vehicle operating costs based on field experience in a developing country.

As the Kenyan project moved forward, the HDM team began to suspect that a large part of the problem lay with the assumptions in project design about the relationship between vehicle operating costs and road conditions. The Kenyan study found clear evidence that improved highway maintenance offered high economic rates of return, and the study team refocused the research to compare the relative benefits and costs of new construction versus increased maintenance. In the next phase, extensive field research was conducted under a Bank-executed UNDP project in Brazil and in complementary studies in India and the Caribbean, yielding greatly expanded data sets, advanced statistical methodologies, and more widely applicable conclusions. A unified Highway Design and Maintenance Standards

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Box 5 The Trade Expansion Program

As a direct outcome of the comparative study on trade liberalization, the Bank launched the Trade Expansion Program (TEP) in 1987, a joint program of technical assistance with the United Nations Development Programme. 20 The TEP's main goal is to design and analyze the trade components of adjustment programs. So far, country studies have been completed for Morocco, Uganda, Mali, Madagascar, Poland, Uruguay, and Guatemala. Other studies are under way for Kenya and in the development stage for Peru and Czechoslovakia.

Poland and Morocco are good examples of how the TEP works. The Poland Trade Expansion Mission of May 1988 involved close collaboration between an eight-member team of Bank operational staff and researchers, and Polish trade officials — with subteams set up to address specific topics and issues. The Morocco mission, launched in 1989, involves trade policy and research not directly connected to a structural adjustment program. Morocco's mission underscores the critical role of local policymakers in promoting policy dialogue. At the time of the project's interim report the Minister of Trade had enough confidence in the team that he suggested that all major players in the policy arena, including Bank and Fund country operations staff, be invited to the discussions as information participants. The resulting exchange was open and productive, providing a much stronger foundation for future agreements than might otherwise have been the case.

The TEP has been highly successful in applying the lessons from past Bank research to specific country settings, due in no small part to the fact that many of the operational staff involved were once researchers, now carrying the methods and lessons from past research with them.
model (HDM-II), incorporating the best features of the MIT model and the Kenyan work, was eventually used as a project appraisal tool in 18 countries. But by this point, concerns about the project's ever-lengthening life cycle were beginning to emerge.

Two factors drove the need to rethink the HDM project: dissatisfaction with the analysis of the Brazilian study data and, more important, the reluctance of operational staff to accept the prototype HDM models. After nearly two decades of waiting for a highway design tool that could be used in the field, operational staff had become impatient with the project. So, the project was brought firmly within the Bank's managerial walls and put on a strict close-out schedule aimed at giving the Operations complex a tool it could use with ease and understanding. The shift from research to an operationally useful product was possible because the Bank internalized the project, moving away from the heavy reliance on external collaboration that had characterized much of the previous 20 years of work. Ironically, those involved in the project referred to this as the "non-research phase" because it was not based on new field research. Yet it was precisely this phase that eventually led to a significant operational payoff.

The outcome of the last phase of the project, the final version of the HDM, was supported entirely by Bank resources and carried out almost exclusively by Bank staff. Development of the third-phase model was completed by 1984, with the help of statistical experts, and was followed by a critical period of validation and refinement. Completed in 1987, the third-generation model was used initially to determine budget priorities for highway investments in Brazil, Indonesia, and Niger — and later as the analytical base for a growing number of highway projects (see box 6). It also became a major building block for the 1988 policy paper on highway maintenance and has had substantial acceptance and influence outside the Bank.

Although the Bank's experience with large-scale technical research is limited, the highway maintenance study suggests some general lessons. Technical research is almost always an expensive proposition and is likely to take a sustained commitment to bring to fruition. These characteristics make it difficult for the Bank to go it alone — hence the tendency for collaborative arrangements and consortia involving other donors and other researchers. Collaborative arrangements have many advantages, among them cost-sharing, providing a mechanism whereby the concerns of an operational organization (the Bank) can be fed into scientific research, and placing the Bank at the cutting edge of technical research, but they do bring serious managerial challenges with them. The location of significant parts of collaborative research outside the Bank means that the interaction of research and operational staff — so important in shaping Bank research outcomes — is much less likely to arise spontaneously. Managers responsible for technical research must provide more than the usual oversight to ensure that projects stay on course both in their operational objectives and in their scheduling. Integrating the findings of technical research into Bank Operations may also demand more of both managers and researchers than does internally produced research. The bottom line: although the Bank needs to think carefully about the managerial challenges of developing technical research projects, such research can have high operational payoffs.

As these cases demonstrate, there is no simple relationship between operations and research, no single life-cycle for research. The patterns of interaction, the flows of information, who leads and who follows — all these can vary considerably from one project to another. But some important common elements show how Bank research is at once similar to and very different from research in other environments. When the Bank sets out to explore a new area, it must be prepared for a considerable period of investment during which the operational payoff may be limited. This phase of Bank research often looks similar to "academic" research outside the Bank as researchers work to adapt theories and methods to a new problem or issue. Its direct payoff is in underscoring the Bank's intellectual leadership in the development research community.

At the end of this initial investment period, both researchers and their work are at a crossroads. The methods and theories are there. But how should they be refined? How can they be made practical? At this stage the road taken often depends on the influence of Bank operations. The enormity of the Bank's challenge and the influence of real world constraints are instrumental and essential in ensuring that applied research becomes policy research. Operations' influence on research can be subtle and indirect, but as every case dis-
Box 6 The Highway Design and Maintenance Standards Model at work

The final versions of the Highway Design and Maintenance Standards Model (HDM-II) and its companion Expenditure Budgeting Model (EBM) are now supporting policy analysis in a variety of country settings. After earlier use in project lending, the new HDM model has been incorporated in regular planning and programming procedures in Chile, Indonesia, and Niger and for federal roads in Brazil. Similar implementation is progressing in Thailand, Yugoslavia, and the 10 countries of the Southern Africa Development Coordination Conference. For Niger’s small low-volume road network, a simplified version was first implemented for annual programming and later supplemented by the full version for policy analysis. In Chile the model was used to develop a comprehensive five-year plan under budget constraints for the entire country as part of consolidating responsibility for construction and maintenance. It also served as the basis for the recent $224 million Bank sector loan to Chile. Elsewhere, the model has been used to evaluate expenditure priorities and maintenance standards in Costa Rica, Ghana, Nigeria, Pakistan, and Yugoslavia, and continues to be used for project evaluation in many countries. It has been used for road transport pricing in Tunisia, and for modernizing truck regulations in India. In industrial countries it has been tested and applied in Canada and the United Kingdom, and elements of the model form the basis of official evaluation methodology in Australia and New Zealand.

One of the clearest indications of the growing popularity of the HDM methodology is the increased demand for training. To date the Bank has either assisted or facilitated both Bank and non-Bank sponsored training in Argentina, Brazil, Chile, China, Kuwait, Mexico, Niger, and Thailand as well as in Finland, Germany, and New Zealand. It has also supported international courses in France, India, the United Kingdom, and Yugoslavia. It is proving a popular tool for policy analysis in regional transportation seminars, including a series of Latin American conferences on highway maintenance, and high-level policy seminars for the road maintenance initiative of the Sub-Saharan Africa Transport Program organized by EDB and the UN Economic Commission for Africa.

The HDM has also been the basis for a pilot program aimed at testing the feasibility of nongovernmental organizations as a vehicle for disseminating the model. McTrans, an affiliate of the University of Florida, is under contract to the Bank for worldwide distribution and user-support of the model. The International Road Federation (in the United States) and PTRC (in the United Kingdom) use the model in their commercial training programs on road management for developing countries.

cussed here demonstrates, it is very real. At their best, Operations staff and researchers work together to discover new solutions to old problems and, not infrequently, a host of new problems as well. This cross-fertilization is what makes Bank research unique.

The cases presented above also carry with them important messages for the management of Bank research beyond the critical role of interactions between researchers and Operations staff. First, research is inherently more uncertain than many other tasks undertaken in the Bank. If research is to yield its maximum payoff neither the process nor the people can be too closely constrained. Second, the need to stay the course during the “investment” period through which most research projects pass implies a need for some degree of institutional separation between research and Operations. Third, operational support is not something that researchers provide solely for the benefit of Operations. It is an essential input into a researcher’s ability to identify new problem areas and to refine ideas and methods as a research project develops.

The need for researchers to function separately — but not too separately — from Operations creates unique organizational and management challenges. Research managers must ensure that their staff are pursuing institutional priorities while at the same time giving them room to explore new avenues and develop new ideas. Operational support must be encouraged — but not just any operation will do. Researchers should not simply augment the staffing in Operations. Instead, they must direct their efforts toward innovative operations in which the types of interactions illustrated above are likely to be greatest. Achieving this balance between direction and flexibility, between operational needs for research support and researchers’ needs for operational experience is the principal role of Bank research managers. While we are constantly learning about what works and what does not work in the Bank’s research program, mechanisms are now in place — for setting the research agenda, for encouraging cross-fertilization, and for translating research findings into operational tools — to ensure that the “creative tension” that research faces in an operational institution is channeled into a productive and unique work program. 16
The term "research" covers a wide range of analytical activities — much wider, in fact, than the range of activities discussed in this report. The Bank has for some time divided its analytical work into three parts: research, policy formulation, and economic and sector work. Research is an investment in knowledge that tends to look at issues and questions with a broad prospective impact on Bank operations — broad in the sense that findings are useful beyond the narrow confines of a specific country or lending operation. Policy formulation is the translation of the findings of research into specific and operationally relevant guidelines. Economic and sector work involves the application of the findings of research and policy work to the needs of specific countries, operations, and projects. While there are no hard and fast lines separating these three activities, each has a distinctive character, and each is a part of the overall production of sound policy and project advice to member countries.

By convention, this report covers only research in the narrow knowledge-building sense of the term, research that amounts to less than a fifth of the Bank's total analytical work (see boxes 7 and 8 overleaf and appendix 1, which contains a fuller explanation of the different aspects of Bank analytical work). The report excludes reviews of project-financed research and research carried out under consortium arrangements, such as that of the Consultative Group for International Agricultural Research or the research components of the Energy Sector Management Assistance Program (see box 9 on page 15).

This part of the report gives an overview of three aspects of the fiscal 1990 research program. It begins with a review of efforts to increase research activities in the three areas identified by the Research and Publications Policy Council for special priority in fiscal 1990 and beyond (the environment, private sector development, and socialist economies). It then provides highlights of research completed in fiscal 1990 and shows how that research serves institutional priorities. The final section discusses continuing efforts to improve the dissemination of Bank research inside and outside the institution's walls — and on the rapidly expanding program to build research capacity in Sub-Saharan Africa.

Research priorities

Last year's annual report on research promised significant progress in establishing research programs in three areas: the environment and forestry, the development of the private sector, and the reform of socialist economies. Below we outline the nature of the ongoing research that grew out of these efforts. Much of the work described here is still at an early stage, so the discussion focuses mainly on research program building and work-in-progress rather than on the findings of completed projects.

The environment and forestry. Research on the environment proceeded along two parallel and complementary strands in fiscal 1990. One strand comprises six research areas in the Sector Policy...
Box 7  Research spending and staff time both up in fiscal 1990

Bank research draws on two major sources of funding (see appendix 1 for details): the Research Support Budget (RSB) and the resources of departments, mainly staff time. The RSB funds research proposals submitted by departments throughout the Bank that are approved by the Research Committee. Although the RSB allocation is about $5 million each year, actual disbursements have tended to lag behind project authorizations. In fiscal 1989, for example, actual disbursements from the RSB totaled only $3.6 million (see box figure 7.1). The shortfall in disbursements reflects the sum of two factors, the lagged effect of the reorganization on research proposal preparations and a tendency for research project supervisors to delay RSB-supported research spending slip in the face of the many competing demands they face. In fiscal 1990 the RSB disbursed a record $6.4 million. This near-doubling of RSB disbursements resulted from two factors: a steady growth in the RSB project portfolio (box x 8); and a major effort launched by the Research Administrator's office to reduce RSB expenditure slippage by imposing tighter budgetary controls on RSB-funded projects. RSB disbursements are expected to return to their long-run level of about $5 million in fiscal 1991.

In contrast to the sharp rise in RSB expenditures in fiscal 1990, staff years devoted to research and research-related activities (preparing research proposals, for example) have risen more steadily since 1987. The nine staff-year increase between fiscal 1989 and fiscal 1990 (from 122 to 131 staff years — see table 4.2 in appendix 4 for details) came almost entirely from an increase in departmentally supported research in the Sector Policy and Research complex, reflecting the increased attention such issues as the environment, women in development, and human resource development are receiving.

<table>
<thead>
<tr>
<th>Year</th>
<th>Staff years</th>
</tr>
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<tbody>
<tr>
<td>1987</td>
<td>180</td>
</tr>
<tr>
<td>1988</td>
<td>192</td>
</tr>
<tr>
<td>1989</td>
<td>200</td>
</tr>
<tr>
<td>1990</td>
<td>210</td>
</tr>
</tbody>
</table>

Research activities during fiscal 1990 represented about 18 percent of the total analytical work undertaken by the Bank in support of its operations, up from about 14 percent in fiscal 1989 (see appendix 4, table 4.1). (Economic and sector work and policy analysis accounted for 54 percent and 28 percent, respectively.) As a share of the Bank's fiscal administrative budget in 1990, research activities accounted for roughly 4.2 percent, compared with 3.5 percent in each of the preceding three fiscal years.

and Research (PRS) wing of PRE. The second involves research by other PRE departments and divisions. (Several regional research programs also emphasize environmental concerns. These are reviewed in part III of this report.) We turn first to research being developed in the Environment Department.

- Natural habitats. This work focuses on reducing the destruction of habitats, especially deforestation and the degradation or conversion of rangelands, and includes issues of biodiversity. A report, *Conserving the World's Biological Diversity*, was published by the Bank jointly with the World Resources Institute, the International Union for the Conservation of Nature and Natural Resources, Conservation International, and the World Wildlife Fund. 27

- Land degradation. This work covers the management of land resources under rainfed conditions. Its main focus is on identifying policy, managerial, and technical failures and proposing remedial measures. Several working papers have been prepared on these issues. The drylands issue, especially for the Sahel, is receiving special
Box 8 The Research Support Budget: more proposals, tighter funding authorizations

The Research Support Budget (RSB) is a bellwether of the Bank’s research program. Requests for RSB funding are a leading indicator both of the health of the research program and of the degree to which departments are seeking additional resources to augment their own allocations to research.

During fiscal 1990, the centrally funded research portfolio contained 160 active projects, up from 134 in fiscal 1989. Of these 160 projects, 79 were new starts (see appendix 4, table 4.6), including 29 research preparation activities. Sixty-five projects were closed during the fiscal year, leaving an active portfolio of 95 projects.

This increase in the RSB portfolio reflects a continuing growth in proposals submitted for RSB funding — the Research Committee reviewed 108 submissions in fiscal 1990, up 25 percent from fiscal 1989 (box figure 8.1). The bulk of these proposals, nearly four fifths, came from PRE with the remaining fifth coming principally from the regions. The Research Committee funded a total of $5.2 million of new research in fiscal 1990 (compared with $3.4 million in fiscal 1989), of which 34 percent went to the Sector Policy and Research complex, 39 percent to Development Economics, and the remaining one quarter to the regions (about half of the RSB funding to the regions went for two capacity building grants to African research institutions administered through the Africa Region’s Chief Economist’s office — see appendix 4, table 4.6 for details).

For the 50 research proposals funded (setting aside the research preparation grants), about one third of approved funds went to projects under $100,000 in total value, a little less than a third to projects in the $100,000 to $300,000 range, and the largest share went to projects above $300,000 (box figure 8.2). A comparison with fiscal 1989 figures shows a significant increase in the amount of funding for larger proposals (no RSB grant exceeded $600,000), a trend consistent with a research program that has progressed from a rebuilding to a mature stage.

The increasing demand for RSB resources and the fixed size of that budget led to a decline in the rate of approval for both proposals and dollars requested. The approval rates for the number of proposals reviewed in fiscal 1990 fell to 76 percent, down from 84 percent in fiscal 1989. The decline in dollar amounts approved as a percentage of dollar amounts requested was even more striking, from 55 percent in fiscal 1989 to 41 percent in fiscal 1990.

To manage this rapid growth in the number of centrally funded research projects, the Research Administrator’s Office is commissioning a research management information system, RAMIS. Once it is fully operational, RAMIS will provide a point-source for information on projects in the RSB portfolio, facilitating initial internal and external review, monitoring, and post-completion evaluation. This system will also be able to track the increased flow of manuscripts for the Bank’s two professional journals.
Box 9 Research with external funding

There currently are 24 externally funded programs in the PRE complex, the most significant of which are the Energy Sector Management Assistance Program and the Water and Sanitation Program. Other large programs include EDI cofinancing and those for urban management, the environment, women in development, Sub-Saharan hydrological assessment, and the Trade Expansion Program. (This report does not cover the inputs and outputs of these programs.) These programs vary in their underlying objectives, but almost all involve some element of research.

ENERGY SECTOR MANAGEMENT ASSISTANCE PROGRAM (ESMAP).
The ESMAP program was launched jointly by the World Bank and UNDP in 1983 as a companion to the Energy Assessment Program, a program established three years earlier to identify the most serious energy problems facing developing countries after the oil price shock. The major objectives of ESMAP are to provide a pre-investment facility to help implement the recommendations of the Energy Assessment Program, and to provide governments advice on energy policy. ESMAP is engaged in energy related pre-investment and pre-feasibility activities in about 60 countries and is providing broad-ranging institutional and policy advice.

The funding and recommendations emerging from individual country-specific ESMAP activities provide governments, donors, and potential investors with information needed to identify sound energy projects and to accelerate their implementation. The program's research and policy activities are developed in conjunction with the Bank's own program, and considerable economies of scale are gained in the process. The ESMAP policy and research work analyzing cross-country trends and issues in specific energy subsectors also complements Bank policy and sector work in energy by highlighting critical problems and suggesting solutions for dealing with them.

WATER AND SANITATION PROGRAM. The UNDP-World Bank Water and Sanitation Program began as a joint effort in 1978. With the launching of the International Drinking Water Supply and Sanitation Decade by the UN in 1980, the program became a key component in the global effort to bring clean water and sanitation to those who need them most. The program's objective is to help participating countries extend water supply, sanitation, and waste management services to low-income rural and periurban populations currently unserved. Several aspects of this poverty alleviation program relate closely to three other Bank special emphasis: environment, women in development, and private sector development/public sector management. The program is undertaking applied research, policy work, and operational activities in 40 countries and at the global level.

• Global commons: The economics of controlling or limiting chlorofluorocarbon (CFC) emissions are being studied, as are methods of improving enforcement of the Montreal Protocol. Policy developments relating to greenhouse gases and global climate change and their relevance are being monitored. Some transnational and regional effects, including acid rain in Asia and ground water depletion in the Mediterranean region, are also being studied. This work provides analytical support for the establishment of a global environmental facility and its future operation.

• Environmental economics and institutional. This cross-cutting work spans the spectrum of environmental issues and will contribute to and draw from the work described above. Particularly important are cost-benefit case studies in several sectors, ecosystem studies (on tropical forests and river basins), environmental-macroeconomic studies (environmental accounting, trade policy, and resource degradation linkages), studies on making the concept of sustainable development an operational goal, and studies on using geographic information to improve economic decisionmaking.

To complement the ongoing work in Sector
Policy and Research, the Development Economics (DEC) vice presidency launched a research program on environmental economics and institutions. The premise that environmental degradation is exacerbated by two types of failure — market failure and policy failure — guides DEC’s research program. Market failures can be corrected through a variety of policy instruments such as taxes and regulations, and work is under way to adapt these instruments to the administrative and economic conditions of developing countries. Correcting policy failure requires understanding how various policies affect and contribute to environmental degradation.

DEC researchers are investigating appropriate tax instruments, the regulatory framework, and the relationship between subsidies and environmental problems. One goal is to develop and apply an analytical framework for evaluating the environmental effects and economic costs of alternative public finance instruments, including second-best instruments for addressing pollution problems.

To help answer the question of whether adjustment policies contribute to or conflict with environmental objectives, a major research project is looking at the impact of trade policy changes on crop mix and soil degradation in Côte d’Ivoire. This work will be expanded to develop a taxonomy linking different aspects of adjustment policy to their environmental effects. Typically, adjustment policy measures increase economic efficiency and, at least in principle, should be environmentally sound. But there is concern that countries may be adjusting through excessive exploitation of natural resources, because of unforeseen externalities or market failures.

Turning to research completed in fiscal 1990, a key finding is that much environmental damage results from short-sighted policies and inadequate information. A growing body of research confirms that sensible policies and actions designed principally to protect the environment can contribute to economic progress. This work also shows that although price signals are important in determining the use of environmental resources, environmental problems may be so location-specific that taxes or other differential pricing methods may be an inefficient or administratively complex means of addressing them. And in some cases the necessary tax on an input or product might be so great as to invite evasion or corruption. Also, especially in industrial cases, the small number of parties involved may make negotiated solutions feasible. Of direct policy relevance, the research shows that developed country approaches to environmental control that depend on "command and control" techniques are not likely to work well in the relatively weak regulatory climate in many developing countries. Operational work in Indonesia, the Philippines, and Nigeria is already building on these findings.

Bank research is also sounding the alarm on the rapidly escalating problem of automotive pollution in the cities of developing countries. By the end of this century, people in nearly 400 cities will be exposed to dangerous levels of air pollution. The most promising solutions appear to involve administratively simple policies that encourage the use of "leaner fuels, the control of vehicle exhaust emissions, and better traffic management — results finding a ready audience among developing country city managers.

PRIVATE SECTOR DEVELOPMENT. The shares of the research budget and PRE staff time for private sector development and public sector management have not changed substantially since 1987. What has changed is the mix between public sector management (which formerly took about three-quarters of the combined research resources) and private sector development (which now will take more than half).

The Private Sector Development Action Program targets several priority areas for policy and research work in the PRE complex, in addition to work on financial development. The conceptual basis for this work program is the premise that we can find a better balance between markets and government, a result that would expand the scope for competition and reduce market failures. Development of the private sector is not an end in itself but a way to increase the responsiveness of the economy to market signals and promote more efficient use of resources.

The first priority area in the action program is the business environment, where work focuses on ways to ensure a rapid and efficient supply response to improvements in the incentive system. Regulatory reform is particularly critical for a supportive environment for private sector development. Research has begun on how to balance deregulation with the assurance of fair market competition, better protection of consumers and the environment, and improvements in the legal and administrative apparatus for enforcement.

Second, research is under way on public sector restructuring. Noteworthy is a forthcoming policy
paper on emerging “best practice” in divestiture of public enterprises.

Third, research on entrepreneurial development is examining the role of government in supporting the emergence and expansion of small and medium-scale enterprises. The lessons of successful initiatives by local governments to promote entrepreneurship and strategic alliances for small trading companies will also be explored.

The fourth area, technology, is the subject of a series of papers on global subsectors, with analyses of the implications for client countries of developments in industrial and information technology and associated changes in industrial structure.

A project just in the development stage is examining the theoretical, empirical, and policy issues involved in the private sector’s provision of social services (health, education, nutrition, and family planning) in developing countries. The project is looking at issues of private finance, private production, the quality of services, policies to encourage private provision of service, regulatory regimes and self-regulation, monitoring by consumers, nonprofit provision of services, philanthropy, and equity and distribution. The project’s aim is to pull together a set of policy-related empirical questions for further study, and, ultimately, to identify and develop a research program in this area.

As to findings, many countries are witnessing a profound shift in property ownership as their economies move from government to private control, with important policy implications. Work on land tenure systems in Africa found that customary land rights systems adjust remarkably well to changes in relative factor prices and in that sense appear to provide adequate tenure security. Nationwide formal land titling and tenure systems do not therefore appear to be warranted in most African countries today. Research on China’s lease-based land tenure system demonstrates that it has done well in maintaining producer incentives so far. The research suggests that forced consolidation be avoided and that legislative and institutional conditions be created to facilitate free-functioning land markets and to allow market-induced consolidation without undermining farmers’ perceptions about tenure security.

**Reform in Socialist Economies.** Research on reform in socialist economies is being carried out in most departments of PRE and the Europe, Middle East, and North Africa (EMENA) region of the Bank. The most visible evidence of the push for more work on socialist economies is the newly created Socialist Economies Reform Unit, set up in the Country Economics Department at the beginning of 1990. The Unit provides a focal point in the Policy and Research complex for research on the transformation from socialism to market-based economies. Because of the wide range of issues encompassed by this process, research remains decentralized. The Unit complements the work of other divisions — coordinating with them and sponsoring many activities jointly — and works on a selected set of its own research initiatives. Work is under way or planned in five areas: macroeconomic management and transitional policies; comparative studies of policies, sequencing, and performance; responses of firms to economic reform; labor-market and social issues; and trade and financial reform.

- **Enterprise reforms in China.** Measured by industrial growth rates, China’s industrial sector has performed remarkably well over the past four decades. Much of the growth is believed to have come from investments rather than intensive development. The Unit is conducting research on various types of enterprises in China, a promising laboratory for the study of reforms because of its major interregional differences.
- **Firms’ behavior in East and Central Europe during economic reform.** Macroeconomic conditions and microeconomic incentives and ownership arrangements are changing rapidly in the reforming countries of Eastern and Central Europe. How firms respond to such changes will significantly influence the success of reform programs. A study in preparation for Czechoslovakia, eastern Germany, Poland, Yugoslavia, and possibly Hungary aims to develop systematic and comparable studies of the responses of firms to changing conditions and incentives.
- **Socialist reform programs.** Because of the lack of clear historical precedent, it will be important to analyze and compare the proposed “blueprints” for reform for various countries, looking particularly at the major differences in reform proposals and sequencing. Initial research and preliminary reports have concentrated on these areas. The next stage involves systematically fitting the various countries into a framework for monitoring their approaches to reform and the evolving outcomes.
- **Comparative data base.** This project aims to compile a limited set of economic and social data for as many socialist countries as possible (includ-
ing nonmember countries), together with a similar number of comparator countries and some comparator groups. The information will be organized by economic performance, external trade and debt, internal finance, and social indicators. Comparing performance and income levels of socialist and other countries is problematic, so the project will also include alternative estimates and methodologies. The product should appeal to a wide audience and offer a focus for statistical work and interaction with other statistics-oriented bodies.

- **Labor markets in transitional socialist countries.** System reform in socialist countries implies enormous changes, especially in the mechanisms for factor allocation and in processes of income generation and distribution. How labor markets and their regulatory environment develop in the transition is therefore important. Major changes are likely in employment and unemployment, labor mobility, and salary systems and structure— with macroeconomic and microeconomic effects.

- **Income distribution, subsidies, and social protection.** Changes in the processes of income generation and distribution in reforming socialist countries will result from changes in the operation of labor markets, and changes in subsidy programs and in the prices of key wage goods that influence income distribution. How will the radical changes that are expected to accompany industrial restructuring affect labor markets, and how can the effect be cushioned without weakening reallocation incentives or creating an insupportable fiscal burden? Work is under way to develop an approach to answering such questions.

- **Housing reform.** Housing reforms are a high-priority issue for several reasons: the large direct impact of housing subsidies on national budgets, the ineffective mobilization of household saving, the significant constraints on labor mobility and industrial location, and the high transport, energy, and overall infrastructure intensity of the urban economy. Work is under way to provide information and adequate analytical tools to guide the transition from centrally planned to market-based housing systems. A proposed research project will collect comparable housing and household data in several countries in cooperation with local institutions. The analysis will focus on the behavior of the highly distorted ratio of housing price to income during the transition, and the feasibility of alternative reform paths through an analysis of winners and losers.

## Serving the Bank's other program objectives

Bank research did produce important results in the three research emphasis areas just discussed, but the main emphasis in these areas during fiscal 1990 was on research program building. For the Bank's remaining areas of operations emphasis, ongoing research programs yielded important payoffs in fiscal 1990. Here, we give examples of how the fiscal 1990 research program served six of the remaining seven areas (research in the seventh catch-all category, "Economic Management," is subsumed under the six) and highlight some of the main policy findings from that research. The outputs and findings presented below are meant not to be comprehensive but to give a flavor of the diversity of issues being addressed and the nature of the policy outcomes. We provide references for those wanting more detailed information, as well as indications of levels of effort in each area (see box 10).

### ADJUSTMENT, TRADE, AND DEBT.

Research for the second report on adjustment lending — Country Economics Department, Adjustment Lending Policies for Sustainable Growth, Policy and Research Series 14 (Washington, D.C.: The World Bank, 1990) — demonstrated that the Bank has much to learn from its own experience in policy-based lending. On adjustment policy, the major lessons are: remove the largest distortions first, give priority to policies aimed at a permanent reduction of the fiscal deficit, and once distortions are under control, move quickly to programs that stimulate a recovery of investment. 35

On trade policy, work is now complete that draws together knowledge accumulated over the past decade. Among the critical messages: substantial reductions in quantitative restrictions and tariffs are often needed to stimulate competition; the effects of trade reforms on the public sector budget and macroeconomic stability must be considered in the broader policy dialogue; and the effects of trade reforms depend on the degree of domestic deregulation and the strength of a country's infrastructure and institutions. Work is also coming to completion on the design and sequencing of trade policy reform. Research shows that trade policy should be designed differently for countries with strong organizational capabilities but limited political flexibility and for countries in which these conditions are reversed. Organizationally strong but politically constrained
Box 10 Changing patterns of research emphasis: 1989 and 1990

To accord with the new categorization of research areas put in place for fiscal 1991 and to give our review a forward-looking thrust, we have organized the discussion of research emphasis, findings, and policy implications by areas of special research priority and by program objectives. Since the reorganization, however, research has been categorized by ten areas of special emphasis (see appendix 4, table 4.3), and funding data for fiscal 1990 retain that structure. In most areas, correspondence between the two systems is easy to identify.

As would be expected, the areas singled out for special priority registered increases in their shares of research funds (see box figure 10.1), but, equally important, absolute levels of resources going into these areas rose sharply.

- Research on the environment and forestry increased overall by 30 percent with a fourfold increase in funding from the Research Support Budget (RSB expenditures are a leading indicator of future research directions).
- Private sector research increased by 81 percent from fiscal 1989 to fiscal 1990, and RSB expenditures more than doubled.
- Although comparable figures do not exist for fiscal 1989, the presence of the Socialist Economies Reform Unit attests to the very significant increase in research on transforming socialist economics.

Changing patterns of research emphasis are reflected in changing patterns of resource allocation in other areas as well:

- During fiscal 1990, 18 percent of the Research Support Budget was devoted to work on adjustment, trade, and debt, down substantially from 28 percent in 1989, although the percentage of PRE staff time devoted to this research rose. This pattern of declining RSB funding and increasing staff time is typical of research that is entering a more mature phase and being internalized in the work programs of departments.
- Human resource development accounted for 11 percent of the Research Support Budget, up from 8.6 percent in 1989, with RSB research on women in development increasing nearly fourfold.
- In apparent contrast, roughly 13 percent of the Research Support Budget and 17 percent of PRE staff cost for research went to research on poverty reduction and food security, down somewhat from 17 percent and 25 percent in 1989. Much of this change is attributable to the World Development Report 1990, which absorbed a large fraction of PRE's work on poverty in fiscal 1990. WDR-related research is not included in the statistics on research.

Box figure 10.1 Research on the Bank’s special emphasis areas

| Debt restructuring and adjustment |      |      |      |
| Financial intermediation           |      |      |      |
| Food security                      |      |      |      |
| Poverty alleviation                |      |      |      |
| Environment                        |      |      |      |
| Human resources                    |      |      |      |
| Women in development               |      |      |      |
| AIDS                               |      |      |      |
| Public sector management           |      |      |      |
| Private sector development         |      |      |      |
| Other research                     |      |      |      |
| Coordination, publication, and dissemination |      |      |      |

<table>
<thead>
<tr>
<th>Staff years</th>
<th>Research Support Budget expenditures</th>
</tr>
</thead>
<tbody>
<tr>
<td>FY 1989</td>
<td>FY 1990</td>
</tr>
<tr>
<td>(percent)</td>
<td>(percent)</td>
</tr>
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</table>
countries should start with indirect but administratively intensive reforms as a way of building a constituency for subsequent liberalization — promoting exports by setting up bonded export facilities and duty and tax drawback systems, for example, before trying to liberalize imports. By contrast, countries with good political flexibility or weak organizational capabilities — including many in Sub-Saharan Africa — should avoid such roundabout measures. 56

Research on real exchange rates is finding that devaluations have been more successful for countries exporting manufactured goods than for those exporting primary goods (mostly low-income African countries). Most adjustment in countries exporting primary goods has taken the form of reduced spending rather than increased supply of exports. As a result, countries dependent on primary goods exports have not grown as expected after devaluations. The prospects for exporters of manufactured goods are much brighter. Countries that depend on exports of manufactured goods tend to show improvements in efficiency and show less decline in investment following a devaluation than do exporters of primary goods. 55

Studies of the quality of published trade statistics have led to serious questioning of the usefulness of African trade statistics. Perhaps more revealing, these studies have also raised serious questions about the prices that African countries pay for imports of iron and steel from industrial countries. This concern has led to the development of a research project to investigate the value of preshipment inspection activities in Sub-Saharan countries for lowering the unit cost of imports and reducing capital flight and customs avoidance. A pilot project in one country is suggesting that unit costs of capital import items can be reduced by as much as 30-40 percent by introducing preshipment inspection services. 57

Other research on trade statistics shows that a shift from the commonly used c.i.f. tariff valuation to an f.o.b. valuation by developing countries would substantially liberalize tariffs and remove a significant source of bias against trade among developing countries. 58 The results of this study are being used in developing trade-reform packages to be put in place with the Bank's assistance.

Information generated by a study of nontariff barriers is being used by developing countries in the GATT Uruguay Round negotiations. 59 Also extensively used by developing countries in the Round is the microcomputer-based software SMART (Software for Market Analysis and Restrictions on Trade), developed jointly with UNCTAD and with UNDP funding to study the impact of reduced barriers on trade. 60 The package can also be used in a "market development" mode to identify opportunities for exporting in a post-Uruguay Round world, when barriers will — we hope — have been reduced. To date, the software has been installed in nearly 40 developing countries, and training in its use has begun for the Bank's operational staff. Plans are also under way to extend the SMART modeling package to other types of analysis such as proposals for a freetrade area between the United States and Latin American countries.

Recent research on debt highlights the conditions under which voluntary commercial bank debt and debt service reduction operations are likely to benefit debtor countries. One important finding is that requiring new lending (instead of alternative debt-reduction options) is likely to benefit the debtor country. New money has two effects: it penalizes potential free riders (the new money acts like a tax on their exposure), and it increases the amount of money available for debt reduction. 41

Research on future prospects for external financing in the Sub-Saharan African region finds that the bulk of that financing will come as official development assistance (ODA). But the project also shows that the growth in ODA, even under optimistic assumptions, is not likely to be sufficient to provide external assistance consistent with per capita GDP growth. While policy measures in recipient countries can add to the flow of private sources of external financing, including foreign direct investment and capital reflows (the study estimates that the stock of private capital held abroad by Africans is about $40 billion), these private financing sources will remain relatively small players. The conclusion: policy measures to enhance the quality of ODA resources and the effectiveness of their use are crucial for Africa. 41

On the saving side, recent research confirms that the most important way for government policies to boost national and domestic saving is to reduce the public sector deficit, usually through reform of state-owned enterprises, local government finances, and the central government budget. Deficit reduction, in addition to having a direct impact on public saving, reduces inflation, improves economic stability, and encourages private investment. Increasing the rate of private saving usually takes longer and depends also on
increasing the economy's growth rate since pri-

Most developing countries require a credible and comprehensive program of public sector re-

The forthcoming policy paper on taxation has cap-

tured several important policy implications: a value-added tax is the tax instrument of choice for developing countries; a broadening of tax bases should accompany tax administration reforms; and tax systems should not be used to further nonrevenue objectives.  

Land taxes have also been the topic of recent research. A study based on the experiences of Argentina, Bangladesh, and Uruguay drew five conclusions. First, the land tax is not necessarily more efficient at raising revenue than other types of taxes. Second, most land tax systems have foundered because they could not be adminis-
tered, especially those with progressive tax rates based on land holdings. Third, land taxes have not been effective in attaining nonrevenue goals. Fourth, strong political support is necessary for a successful land tax. And fifth, the most likely future role for land taxation is in local government financing or earmarked local projects.  

Poverty reduction and food security. The 1990 World Development Report provided a major focal point in fiscal 1990 for work on poverty, drawing together past work and setting the priorities for future research. 

Research in fiscal 1990 showed that countries rarely have precise information on who is poor to target programs directly for the poor. This is particularly evident when attempting to reach the poor in underdeveloped rural sectors. Much more cost-effective are schemes that combine direct targeting with some degree of self-selection by the poor — findings that are currently influencing project and policy design in Brazil, Indonesia, and Nepal. Ongoing research is establishing the potential for self-selection using work requirements, as in the rural public works schemes in Bangladesh, India, and elsewhere. Schemes of this sort are now being considered in a number of countries in Sub-Saharan Africa and Latin America. Research will aim to establish guidelines for policy design and evaluation.  

Research on Indonesia demonstrated that even a program of rapid macroeconomic adjustment can help rather than hinder poverty reduction efforts. The keys to the Indonesian program's success were a heavy emphasis on rural income growth and a clear policy of protecting poverty-oriented public expenditures during the adjustment process, policies fully consistent with the message of the 1990 WDR.  

Human resources. Work on the human capital aspects of development reflects links among the five elements of human resources: health, education, nutrition, population, and women in development (see box 11).  

Recent work on the public provision of voca-
tional education demonstrates that such training can be made substantially more efficient and responsive to unpredictable changes in labor market demand by diversifying the delivery of training services. Diversification can be achieved  

Box 11 Women in development  
The Bank's efforts to bring issues of women in development (WID) front and center are beginning to pay off in terms of both operational impact and new research. In its early days the WID program launched a two-pronged attack designed to place WID issues at the forefront of Bank thinking. In the first instance WID staff worked with operational staff to develop better statistical pictures of women's conditions and contributions in developing countries and to create greater awareness of and demand for information on women in development issues among operational staff. Based on this new information, practical country-level approaches were developed for integrating women more firmly into the development picture. At the same time a series of parallel research activities was launched, aimed at developing a conceptual framework for analyzing WID policy issues. The payoff to WID's early emphasis on operational activities is evident in the production of four country WID strategy papers, three of which (Bangladesh, Kenya, and Pakistan) have been published in red cover. On the research side the conceptual base built into WID's first phase of operation is now underpinning research for a major paper covering three critical areas: the consequences of women's productivity for economic efficiency, family welfare, and population trends; the determinants of women's productivity in the wage labor force, as farmers, as entrepreneurs, and as casual laborers; the improvement of women's access to productivity-enhancing public services such as health, nutrition, family planning, agricultural extension, and credit.
through direct contract financing by employers and by decentralizing authority to local institutions. These findings are shaping sector and project work in Bangladesh, India, Madagascar, Mauritius, and Zimbabwe. 43

This theme of diversity also appears in findings on teacher training. Good teachers are the mainstay of an effective educational system, but recent research questions whether current teacher training practices are the most cost-effective. Findings show that substituting additional general secondary education for lengthy pedagogical training lowers teacher training costs and increases student learning. These findings have already influenced educational sector work related to teacher training in China and Zimbabwe. 43

Research on student learning is shaping policy and sector work in two ways. First, research on the determinants of learning achievement is focusing education operations on financing cost-effective inputs — learning materials, educated teachers, well-designed curricula, more instructional time — while providing justification for avoiding less promising inputs. Second, the emphasis on measuring learning achievement is influencing countries (such as Ghana, Pakistan, Philippines, Turkey, Indonesia, Malawi, Morocco, Lesotho, Algeria, El Salvador, and Mozambique) to explore methods for undertaking national assessments of achievement. In recent years, research components in education projects have doubled their emphasis on measuring learning outcomes. 43

Good health is both a basic component of welfare and a requisite for a productive labor force. Research on priorities for disease control and health promotion shows that governments and donors must maintain efforts to improve the health of children and the poor. The unfinished agenda is long, and there is scope for the wider application of a number of cost-effective interventions for immunization, family planning, nutrition, and high-risk pregnancies. On the growing burden of adult ill-health, controlling tobacco use is among the most cost-effective measures to generate substantial health benefits. 44

Research is under way to determine women’s use of public services (such as extension, credit, education, health, piped water) and how this access affects their participation and productivity in various economic activities and how it affects their children’s welfare. Preliminary analysis suggests that if public expenditures in education were made neutral with respect to gender in Kenya (rather than discriminating against girls, as they currently do), additional resources would be available for families, who now appear to invest more in private education for boys. Women’s increased cash income increases household spending on food and clothing but reduces spending on alcohol and cigarettes. These preliminary findings suggest some of the benefits from improving women’s access to public services as a means of increasing women’s cash income. 45

FINANCIAL INTERMEDIATION. Research on banking systems and banking failures shows that macroeconomic factors, while a precipitant of disruptions and crises, are never the sole cause and seldom the primary cause of individual or systematic bank failures. Generally, banking failures can be attributed to inadequate supervision and regulation and to internal management deficiencies — that is, to inadequate capital, inadequate risk assessment, poor loan quality, loan concentration or overexposure to single borrowers or sectors, and ultimately, fraud. 42

Rural credit has long been viewed as a major constraint to agricultural investment and productivity. A study on rural credit markets and agricultural investment in four areas in China indicates, however, that credit is not necessarily an important constraint on agricultural production and investment of households. More critical seems to be input availability, which has a major impact on investment: where input supplies are limited, additional credit is shifted to consumption or nonagricultural production. Projects based on the provision of agricultural credit need to determine whether credit is a major constraint on agricultural productivity and to consider the fungibility of credit in projecting output gains. The methodology developed in this study for estimating the effect of credit on productivity is replicable and can be used to assess the probable efficacy of credit projects elsewhere. 4

NATURAL RESOURCES. Recent research on natural resources has focused on its interrelationships with other key policy areas. One such area is the effect of adjustment and liberalization on commodity prices and commodity exporters. For example, as liberalization and trade reform proceed and economic activities shift from public to private agents, private agents need access to the full range of market-based risk management in-
Instruments. But government regulations on exchange rates, capital movements, or speculative activity impede the development and use of such instruments. In addition, opening economies exposes producers and consumers to greater variability in commodity prices, which leads directly to the issue of whether the government should do anything to stabilize commodity prices — and if so, what. For a country heavily dependent on primary commodity exports, there are interrelationships between hedging commodity price risks and macroeconomic management. If terms-of-trade shocks — from commodity exports or from important commodity imports such as crude oil — can be reduced through risk management, macroeconomic management becomes much easier.

For many of the Bank’s member countries, economic development is synonymous with agricultural and natural resource development. But the development of agriculture and the optimal exploitation of natural resources depend critically on future paths of commodity prices. Although we can neither eliminate nor accurately predict future commodity price changes, research is showing that we can offset the effects of risk and uncertainty. Developing countries exposed to primary commodity price risks and related exchange rate risks can do much to manage these risks by using market-based financial instruments. Such hedging of price risks — both short- and long-term — can be done by both producers and governments. Several long-standing research projects drew to a close in fiscal 1990. Recently completed work on commodity risk management is now yielding specific guidelines for countries dependent on commodity exports. The findings from recently completed studies of commodity price, exchange rate, and interest rate risks in Costa Rica and Papua New Guinea are already being incorporated in similar projects in other countries.

Bank research is also yielding recommendations on another key area of risk management: crop diversification. The frontline for research on agricultural diversification is Asia. With production concentrated in rice, policymakers in Asia are interested in the costs and benefits of more diversified crop production systems, especially in how to move from specialized to diversified agricultural systems. Researchers are looking at the effects of diversification on rural incomes and the ways for governments to encourage crop diversification. Early work established clearly that a well-diversified and flexible agricultural economy is the key to more stable rural incomes when commodity prices are highly unstable. Work now being completed is building a base for specific operational recommendations by assessing how farmers in different ecological zones adjust to changing economic, financial, and incentive conditions — and by exploring the responses of agricultural institutions (research, extension, credit, marketing) to changes in demands from farmers (see the earlier discussion of financial intermediation). The emerging messages are these: Lending for agriculture should be broadly based, not commodity-specific, and it should focus on improving farmers’ ability to respond to changes in markets and technologies.

Basic Infrastructure and Urban Development.

Research is continuing on user taxes for roads in Sub-Saharan Africa, on the reform of trucking in Poland and Hungary, and on labor redundancy in the transport sector. In urban development, research projects are analyzing the sequencing of housing reform in Eastern Europe, the impact of structural adjustment on urban households, and the impact of public investments on private investment. A major initiative is investigating the causes of the infrastructure crisis, work closely tied to the preparation of strategy papers on infrastructure and urban management and development. Studies are also under way on issues of pricing urban services and managing urban housing.

The continuing flow of migrants to cities is pressuring already overworked urban infrastructures. How can the Bank convince member countries that the neglect of urban infrastructure costs much in efficiency and growth? Research in the Infrastructure and Urban Development Department has developed a methodology for quantifying the losses to business and the economy from deficiencies in urban infrastructure. Knowing the numbers is essential for setting priorities in times of tight public budgets. Applied to Nigeria, this method showed that firms incur very heavy costs as they try to compensate for inadequacies in publicly provided infrastructure. Moreover, the burden of failing infrastructure falls more heavily on smaller firms that are less able and less willing to pay for reliable services. These findings have been incorporated in a recent Nigeria Industrial Sector Report and are beginning to influence the
policy debate more generally. 47

The developing world is increasingly driven by the need for cost recovery. When possible, it makes sense from the standpoint of equity and efficiency to charge those who benefit from services. But pricing is more problematic for some services, such as water and sanitation, than for others. The Infrastructure and Urban Development Department recently completed a project, jointly funded by the UNDP, on users' willingness to pay for rural water in Brazil, India, Pakistan, Nigeria, Tanzania, and Zimbabwe. Each country study showed that rural people's willingness to pay is strongly affected by the quality and level of services being offered, by the alternatives available to publicly provided water, and by the characteristics of the recipient households. In most cases, relatively high levels of service were called for—yard taps, for example—and much higher levels of cost recovery were achievable than had been thought. In contrast, urban households were unwilling to pay for elaborate sewage systems, indicating satisfaction with simple on-site sewage disposal systems. These findings are influencing water and sanitation project design in Brazil, Ghana, India, and Nigeria. 47

A long and fruitful history of research documents the costs to renters and owners from distortions introduced into the urban housing market by rent control and other urban land and housing regulations. Applications of methods developed through this research—to Korea, Malaysia, and Thailand—indicate that aggregate annual costs to these economies of such overregulation can run to 3 percent of GNP. This work is finding new value in several missions to Bulgaria, Czechoslovakia, Hungary, and Poland led by the Infrastructure and Urban Development Department. Related research on housing finance is showing how correctly designed mortgage instruments can substitute for government subsidies in the housing market, reducing the drain on government coffers, adding to the mobilization of financial resources, and increasing the affordability of housing. 48

Findings on international freight costs contradict the popular belief that Caribbean exporters pay higher shipping freight costs than necessary. This information was an important input into policy discussion in the countries involved and led to cancellation of a multi-million-dollar study on the need for investment in ports and other shipping infrastructure in the region. 40

Dissemination and outreach

The Bank's researchers communicate with their audiences—in the Bank, in developing countries, in academic institutions, and in the general public—through a variety of mechanisms. Publications are the most obvious—the Bank's journals, books, policy papers, and the like. No less important are the interactions at the many conferences and seminars on development economics, notably the Annual World Bank Conference on Development Economics each spring. Other mechanisms include our program for building research capacity in Sub-Saharan Africa and the Visiting Research Fellow Program.

Publications. At last year's Board discussion on the annual research report, concern was expressed about delays in issuing the Economic Review and the Research Observer. Under the guidance of a new editor, production backlogs that had accumulated for the Research Observer were eliminated by the end of the fiscal year, and those for the Economic Review were reduced considerably. Both journals now have extended pipelines of articles approved by the journals' editorial boards. These pipelines will make it easier to strengthen the mix of articles in each issue—and to come out with special issues, such as the Economic Review issue on poverty planned for May 1991. The two journals are now well established, with 5,700 subscribers to the Observer and 13,000 to the Review. During fiscal 1991, the role and distribution of the journals will be examined to see how they can be further improved.

Bank researchers were also prolific publishers during the fiscal year through other outlets, including 44 articles in other leading journals, 15 books, 51 technical and discussion papers, and more than 300 working papers and discussion papers (see appendix 6). The country and synthesis volumes for the comparative study on trade liberalization came out in 1990, as did a summary piece for policymakers and operational staff. Most of the country volumes for the comparative study on agricultural pricing policies are now also published, with the synthesis volume set for release in fiscal 1991.

The Policy and Research Series moved into its second year with nine issues on such topics as competition policies, industrial restructuring, and agricultural diversification. The PRE Working Paper Series, now in its third year and heading...
toward number 600 — with 230 papers published during fiscal 1990 — continues to release quickly the findings of work in progress, to other researchers and staff in the Operations complex. The Policy Research Bulletin, successor to Research News, was launched in January 1990 to provide the policy research and development community with up-to-date information on the Bank's research program. Distributed to 21,000 researchers, policymakers, and business people, the Bulletin's circulation is three times that of the old Research News, informing readers not just of research findings but also of new research starts, conference proceedings, and recent publications. In addition, each department produces its own papers and newsletters (see box 12).

**ANNUAL WORLD BANK CONFERENCE ON DEVELOPMENT ECONOMICS.** The World Bank started the series of annual conferences on development economics in 1989 to provide a forum for discussion and debate of different approaches to economic development. The conferences bring together Bank staff, outside researchers, policymakers, and development practitioners to focus on issues chosen for their topical relevance, potential, and the need for new work in the area. The conferences signal academic and policy communities in member countries that the Bank is willing to listen to them in its attempts to find innovative solutions to conceptual and practical problems facing developing countries. Discussions at the conferences are intended to inform the Bank's own policy and operational work and to enable it to maintain a leading role in development policy analysis and formulation. Managed by the Research Administrator's office, the conference series also has the important objective of interacting with developing country scholars who are invited to the conference. Conference papers are published in the *Proceedings of the Annual Conference on Development Economics*, issued as a special joint supplement to the *World Bank Economic Review* and the *World Bank Research Observer*. The proceedings are distributed free to all

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**Box 12 Departmental publications**

Several Bank departments and divisions produce their own papers and newsletters to disseminate research to specialized audiences. The following is a partial list of series that are issued regularly.

**Country Economics Department (CEQ)**
- Transition (N)
- Trade Expansion Program Country Reports
- Trade Expansion Program Occasional Papers
- MADIA Discussion Papers

**Economic Development Institute (EDI)**
- EDI Review (N)
- EDI Working Paper Series

**Industry and Energy Department (IEN)**
- IEN Working Papers, Energy Series and Industry Series
- Energy Views and News (N)
- Industrial Frontiers (N)

**Population and Human Resources Department (PHR)**
- New and Noteworthy in Nutrition
- PHREE Background Paper Series
- PHN Notes
- New and Noteworthy in Health (N)
- New and Noteworthy in Population (N)
- LSMS Notes
- LSMS Working Papers
- Safe Motherhood News (N)

**Latin America Region (LAC)**
- Views of LATHR (N)
- Views from ... (occasional summaries of papers from other organizations)
- LAT Connection

Water and Sanitation Report Series
Water and Sanitation Discussion Paper Series
Water and Sanitation Update
INUWS Feedback (N)
Water and Sanitation Publications Catalog

**(N): Newsletter**
developing-country subscribers to either of the two journals, thereby considerably expanding the reach of the annual conferences.

The Annual World Bank Conference on Development Economics for 1990 was held at the end of April. The keynote address was by Vaclav Klaus, finance minister of Czechoslovakia, who spoke about the unfolding transition to market economies in Eastern Europe. Klaus delineated the fine line that economic policy measures have to tread in managing this transition and anticipated the complex problems that lie ahead in the move to a market economy. The speech was widely reported in the media and in several Bank publications.

The four topics discussed at the 1990 Conference dealt with appropriate policy responses for moving from stabilization to growth, sustainable development and the environment, the role of population growth in development, and a reexamination of project evaluation. Outside scholars and Bank researchers presented 10 papers to an audience comprising Bank staff and more than 50 invited participants from outside the Bank. The Conference ended with a roundtable discussion on "Development Strategies: The Roles of the State and the Private Sector," in anticipation of the review of development economics that will be the subject of the World Development Report 1991.

The conference series has been well received in the Bank and in the research and policy communities. A measure of its impact is the influential role some of the papers are beginning to play in mainstream Bank work. For example, the paper by James A. Mirrlees and Ian D. Little on "Project Appraisal and Planning: Twenty Years On" has become widely regarded as the authoritative reexamination of the field and of Bank practice in this important area. In conjunction with other internal reviews already under way on this topic, this effort is likely to lead to a systematic revision of the Bank's project evaluation guidelines, its implementation procedures, and the intellectual climate for project analysis in the Bank.

The third annual conference will be held in April 1991. The themes chosen for the conference again span a broad array of policy issues relating to development, some of direct operational relevance to the Bank and some anticipating new or emerging concerns for development policy. The 1991 themes are: urbanization, the outlook for transition in socialist economies, the role of governance in development, and the role of military expenditures in development. Authors will survey each field, provide insights on the major policy concerns for the Bank and its member countries, and guide thinking on the research needed to improve our understanding of these issues.

Research capacity in Sub-Saharan Africa. Peer review and scholarly debate are the time-honored mechanisms researchers use to test the validity of their research, to communicate their findings, and to shed new and often unexpected light on the problems under scrutiny. These processes take place spontaneously when a critical mass of scholarship is already in place, but they need to be carefully fostered when research capacities are still fragile and scholarship is dispersed as is the case throughout much of Sub-Saharan Africa.

Against this background the Bank has pursued an active program of capacity-building in Africa. As previous annual research reports have noted, the Bank, through a contribution from the RSB, was a founding member of the African Economic Research Consortium (AERC), one of the most successful capacity-building efforts now under way in Sub-Saharan Africa. It has also underwritten a smaller parallel effort in West Africa to develop research capacity in francophone countries (the Network on Industrial Policies and Sectoral Incentives in Francophone Africa located in Dakar). The Research Committee approved a second grant to the AERC to solidify its position as a leader in the African economic research community and to allow for continued expansion of its activities. The AERC and the francophone network were originally supported by the Research Committee to demonstrate how the development of a professional environment for research in Africa could yield high payoffs through improved policy research outputs. These activities are expected to feed into the Bank's larger capacity-building efforts through the Africa Region's African Capacity Building Initiative.

The Bank's interest in fostering economic research capacity in Africa also led a working group sponsored by DEC and AFR to propose a series of research conferences in Africa to assist African research capacity-building through professional interaction and peer review of the work of the best African scholars. These conferences also provide a mechanism to disseminate recent Bank research on Africa and to foster more effective collaboration between Bank staff and African researchers. The first conference dealt with general African
Box 13 The Africa economic issues conference

With major funding from the Research Support Budget, a conference on African economic issues was organized in June 1990 in Nairobi. To maximize its impact and African attendance, the conference was planned back-to-back with the semi-annual meeting of the Africa Economic Research Consortium and the meetings of the West Africa Economic Association and the Eastern and Southern Africa Economic Association in Nairobi. As a result of this arrangement, 52 African researchers from both anglophone and francophone Africa attended the conference, in addition to 16 participants from OECD countries and 34 Bank staff members.

Of the 23 conference papers, Bank staff presented 10, African researchers seven, and OECD authors six. The discussions focused on questions of methodology, policy relevance, data quality, and the political economy implications of the issues being discussed. There was much evidence of networking and professional interaction outside the conference sessions, a part of the value added of the conference. Selected papers from the conference will be published as a proceedings volume.

Participants at the Nairobi conference endorsed the idea of a follow-on conference in 1992 to be jointly sponsored by the two African Economic Associations and the World Bank. The second conference will differ from the Nairobi conference in that it will have more diversified funding and much larger organizational inputs from the African Associations. The Research Committee has already provided the seed money to start preparations for the second conference.

The medium-term goal is to make this a stand-alone biennial research conference that would be primarily organized by the two African associations through funds they raise from bilateral and international aid donors.

Economic issues, and the second will deal with the external financing needs of Africa in the 1990s (see box 13).

Visiting Research Fellow Program. The visiting Research Fellow Program, funded by the Research Support Budget, brings eminent outside scholars to Bank divisions for three to six months. The objective is to provide visiting fellows with an opportunity to gain first-hand knowledge and experience of the Bank’s operational, policy, and research work and to give them access to the rich stock of policy experience in the Bank. On the one side of the equation, Bank divisions in PRE, Operations, and the other complexes benefit from the insights and expertise of visiting research fellows, who serve as independent sources of review and advice, particularly on research activities. The goal of the program is to deepen and broaden development research, both in the Bank and in the outside policy and research communities.

During fiscal 1990, the Bank hosted 13 research fellows, nine in PRE and six in the Operations complex. These fellows focused on a variety of areas, including the political economy of structural adjustment (Stephan Haggard), the importance of non-tariff barriers in trade agreements (Kala Krishna), poverty alleviation and income distribution issues in the context of structural adjustment (François Bourguignon), and urban land and management problems in Sub-Saharan Africa (A.L. Mabogunje). Fellows actively participated in seminars, policy review meetings, and sectoral briefings, and in most instances either collaborated on or developed research proposals in their areas of interest and expertise.

As the program has become better known in the Bank, the demand for visiting fellows has increased, and the Research Committee is moving to a more competitive selection process in fiscal 1991. The new procedures will permit better advance planning by nominating divisions, and will allow the committee to balance selection criteria, including such considerations as the applicant’s potential contribution to research and policy work, the importance of the proposed work program to research priorities, and the expected complementarity with the sponsoring division’s work program.

Evaluation of completed research

During fiscal 1990 the Research Administrator’s office embarked on the evaluation of completed projects funded by the central Research Support Budget. The initial focus of the exercise is on the backlog of completed projects. It is expected that this process will be completed during fiscal 1991. Ultimately, project success has to be assessed in terms of its influence on Bank policy and implementation procedures and its contributions to the development policy community at large. Success at this level is difficult to measure. But a substantive and administrative evaluation — and an assessment of what research questions were asked, how, and with what success — can provide helpful
indicators of the broader achievements of the project. The current procedures call for grouping projects by themes, with each theme reviewed by an eminent outside expert. Reviewers are afforded an opportunity to visit the Bank to discuss the report and to gain a better understanding of current work in their particular area of research.

External reviews are under way on four themes: education, infrastructure, macroeconomic adjustment and growth, and poverty and income distribution. Other themes to be addressed relate to industry studies, public economics, international trade, international finance, labor markets and employment, agriculture and rural development, and population and health. In addition, two of the four comparative studies and the project on managing agricultural development in Africa (MADIA) are scheduled for evaluation this fiscal year.
Part III

The Bank’s research strategy for the early 1990s

After a decade of adjustment a new set of concerns is shaping the Bank’s research strategy: the revival of long-run growth, the alleviation of poverty, and the protection of the environment. The accompanying volume of abstracts for research projects now in progress or completed in fiscal 1990 gives a picture of the research program’s evolution in recent years. It does not, however, tell us about the future, about the evolving priorities of Bank departments and the adjustments to the research program being made to accommodate them. We begin this section by describing how each PRE department is setting its course for the first part of the 1990s — and move on to the research priorities for each of the Bank’s regions.

The overarching goal of the Bank’s research and operations is to reduce poverty. To achieve this goal, the institution is directing its research and policy work to understanding more about what is needed to improve nutrition, reduce sickness, raise life expectancy, and increase the access to education — and about what is needed to boost the rate of economic growth and ensure that developmental policies and practices are socially, politically, and environmentally sustainable.

In meeting this goal the need for additional research is greatest in the four program areas — the environment, private sector development, human resources, debt and adjustment — which, along with poverty reduction, now make up the Bank’s areas of special emphasis for its programs. The Bank will continue to produce research in these priority areas on a broad front (see table 4.1 in appendix 4 for RSB-supported research in priority areas, and the various departmental work programs for fuller statements). But departments and regions also face issues and problems specific to their areas of responsibility. The remainder of this section gives, for each PRE department and each region, a sense of the specific concerns that will guide their research in the 1990s.

PRE priorities

AGRICULTURE AND RURAL DEVELOPMENT. AGR’s research strategy for agriculture and rural development takes as its starting point the recognition that many of the most pressing issues are outside economics and in the realm of technology — and more than that, at the nexus of several disciplines. One major thrust is therefore in influencing technological change. AGR staff will continue to conduct research on economic issues, where we know the problems and where we know how to bring our findings to the policy table. But we will also do more in technology assessments — to draw lessons about the process of technological change, to bolster the technical packages in investment projects, and to strengthen the policy dialogue with national authorities. In addition, AGR will continue to be a catalyst in influencing the research agenda in the Bank and the world. An example is our contribution to establishing a mechanism for technical research by the International Program for Research on Irrigation and Drainage. (Irrigation and drainage techniques have changed little since the early 20th century, except for drip irrigation, which has vastly different
factor proportions.) In addition to this catalytic role, AGR will continue to conduct research on issues that are central to keeping our staff at the forefront of agricultural technology.

The multidisciplinary side of the Bank’s research on agriculture and natural resources is newer, more complicated, and less tractable than subsectoral work. In several key development areas the Bank is the principal player rather than a catalyst, for example, in land, water, and fisheries resource management. We have begun to tackle these areas, especially the difficult issue of designing a research strategy comprehensive enough to give solid guidance to our colleagues in operations and to policymakers and practitioners in developing countries. The issues go far beyond engineering aspects, and into public sector management and the larger issue of governance.

**Industry and Energy.** The research strategy for energy, like that for natural resources, is moving beyond engineering issues to questions of governance. What happens when governments no longer manage the enterprises that run utilities and large manufacturing operations? Do these enterprises face the right incentives and the right regulatory framework? What should the new rules be, and what are the best ways of putting the new rules in place? It is on these issues — issues of revising the social contract among governments, enterprises, and consumers — that IEN is directing its efforts. Part of this involves reviewing the situation today — to show how things are not working. And part involves providing guidelines for putting in place mechanisms for making tough decisions and for ensuring public accountability. At the core, however, is the need to develop capital markets that will allow private ownership of public utilities when and where such ownership is seen as the key to establishing a competitive environment to promote efficiency.

The research strategy for industry embraces the issues of privatization, capital market development, and competition policy, but it extends to the overriding question of competing in the global marketplace. Globalization is a fact of life in manufacturing today. The pace of technical change is accelerating, and the international division of labor is changing rapidly. To help countries compete in this environment, we will address the importance of foreign private investment in the transfer of technology, the development of domestic capital markets to accommodate the needs of firms for working capital and foreign exchange, and the transport and communications infrastructure to move goods to markets and speed transactions.

**Infrastructure and Urban Development.** The research strategy for infrastructure is driven by the assessment that government responses to the increasing demand for infrastructure services have been inadequate — and that these inadequacies seriously constrain productivity growth, not only in the low-income countries of Africa but in Latin America and the fast-growing Asian countries. Deteriorating services, inefficient public enterprises and institutions, and overregulated markets for water, housing, transport, and waste disposal dictate three priority areas for our analytical work. The first is on the fiscal, financial, and real sector links between urban economics and macroeconomic performance. The second is on the political, institutional, regulatory, and financial constraints to productivity. The third is on what individual policy changes mean for the productivity of firms and households, for the welfare of the poor, and for the environment.

- **The urban economy and macroeconomic aggregates.** The performance of the urban economy can significantly affect not only economic growth but also macroeconomic stability. Research will focus on urban infrastructure investment and its contribution to growth, on the role of housing finance in macroeconomic stability in the short run and its potential contribution to saving and resource mobilization in the long run, and on local government finance and its contribution to the fiscal performance of the national government.

There is also a need to understand the functioning of large cities as the interactions among different agents (households, firms, and public agencies) become more complex and the probable impacts of policy interventions more difficult to predict. Research will focus on the internal efficiencies of cities on a variety of levels, such as the functioning of urban markets, and on regulatory and institutional constraints, and on the impact of public infrastructure and private investments on urban growth patterns and residential and employment location.

- **Constraints to productivity.** The maintenance and delivery of urban services are seriously constrained by national and local governments’ lack of financial resources. New areas of research will examine local government participation in financial markets, deregulation and private sector participation in the supply of infrastructure ser-
vices, and the complementarity between public and private investments.

- **Firms and households, the poor, and the environment.** The efficient functioning of urban markets and the productivity of individual households and firms are affected by the political structure, the institutional arrangements, and the locus of decision-making within the structure. A better understanding of the tensions within the existing structure will improve prospects for achieving broad-based institutional reforms. An immediate research task is to develop such a framework for institutional reform in Eastern Europe.

On the urban poor and the informal sector: Limited urban services and amenities in the informal sector constrain the productivity of low-income urban-dwelling families. Research will identify ways of mitigating the constraints to improve the productivity of the poor and assess alternative approaches to the delivery of basic services. A more challenging task is to understand the contributions of community-based productive activities.

On the urban environment: The high density of economic activity in cities generates positive externalities. But it also generates negative externalities, such as traffic congestion and pollution, which seriously affect the health and productivity of urban dwellers. Little is known about the balance between these two outcomes, and research on improved zoning and on pollution and congestion taxes will help elucidate the linkages.

**Population and human resources.** The research strategy for population and human resources in the 1990s has three main thrusts. The first concerns the assessment of poverty and the impact of policy on household consumption and human resource investments. The second is on human resources and economic productivity, with special attention to women's economic productivity and to the formation and use of skills. The third is on the management of human resource development — especially economic management but also technical and institutional management. These emphases relate to the second of the two-pronged attack on poverty articulated in *World Development Report 1990*: the development of human resources to enable people to take advantage of expanded economic opportunities to use their labor productively. Improving the delivery of health, education, family planning, and nutrition services to the poor is one of the most powerful ways to reduce poverty — both in the long run, by increasing people's productivity, and in the short run, by directly addressing some of the major consequences of poverty: hunger, disease, and premature death.

The first concentration — poverty assessment and impact — relies on the analysis of household data to gauge the effects of economic policies on the poor. Understanding the causes and consequences of poverty is key to formulating strategies for poverty reduction, especially as they concern effects on demand for social services. PHR staff will examine household behavior changes in human resource consumption and investment in response to economic policy changes. This knowledge will permit the design and validation of policies that benefit the poor, and the introduction of these into the policy dialogue of structural adjustment programs. Our focus will be on enabling more countries to use the Living Standards Measurement Survey (LSMS) methodology to assess and predict the effects of policies on the poor.

Poverty alleviation depends not only on the development of human resources but also on their productive use in an increasingly complex and competitive world economy. This requires better understanding of how labor markets function in using human resources, and more efficient investments in education and training. We will also increase our attention to the contributions of higher education to economic and social development, to training labor for technology-intensive investments, and to building applied research and policy analysis capabilities. While efforts are under way to ensure good primary education and health for ever-larger portions of the population, attention must also be given to the role of secondary and tertiary investments in increasing human productivity. Toward these ends, we will emphasize research on improving instruction in science and technology — and the quality of higher education.

To improve women's economic productivity, PHR is launching a research program with three components. The first is on the consequences of improvements in women's productivity for economic efficiency, family welfare, and population trends — the household economic model with broader macroeconomic and environmental implications. The second is on the determinants of women's productivity in the wage labor force, as farmers, as entrepreneurs, and in the informal sector. The third is on how to improve women's access to the "determinants" — to education, health, nutrition, family planning, agricultural
extension, credit, and labor markets. We are also planning more research on the influences on women's labor force participation and earnings, what influences poor women entrepreneurs' earnings, and how to educate girls in difficult environments.

PHR will support new analysis on the effects of high fertility on household income and expenditures, probing whether reductions in fertility are directly related to improvements in family income and well-being. We plan work also on the environmental consequences of rapid population growth, including the macroeconomic implications of this relationship.

Improving the technical, economic, and organizational management of human resources is the principal means of ensuring that resources for human capital development are used effectively, efficiently, and equitably. Better economic management of human resources hinges on the ability to mobilize and allocate resources and to manage economic incentives that affect the supply of, and demand for, social services. We need to understand better the impact of prices and other factors on demand and the influence of demand on the quality of services provided, and vice-versa. We also need to consider social returns to human capital investments and, hence, demand at the macro level. Of related concern are the effects of social investments on the labor force. Work on these cross-cutting issues in the economic management of social sectors will be a focus of our efforts in fiscal 1992 and beyond.

Better technical and organizational management is linked to capacity to improve the quality of service delivery. This implies greater internal efficiency — more cost-effective mixes of resources to improve health, education, nutrition, and contraceptive practice, for example — and the organizational capacity for managing it. Much of our work has focused on sector-specific knowledge and practice, such as Improving Primary Education in Developing Countries (Washington, D.C.: The World Bank, forthcoming). The concern has been with issues of quality and effectiveness: what inputs, structures, and processes are most cost-effective for a sector or subsector? Although a great deal is known about what inputs are needed, especially at the primary levels of schooling and health care, substantial work remains on the measurement of effects or outcomes within sectors. Knowledge is also needed about the cross-sectoral areas where investments are linked in important ways, producing beneficial externalities for human development.

Good management must increasingly concern accountability, through the better tracking of outcomes — and equity, by reducing the constraints on demand by females and the poor. We need to get a handle on how to manage human resource development within the political economy, in institutionally weak sectors (education, health) and in institutionally weak countries (much of Africa). This involves policy issues in managing change, processes for making institutions cost-effective, strategies for building consensus, and information and evaluation systems.

Expanding the evidence on interactions across the social sectors will enable more informed decisions about spending on human capital. Studying the human resource sectors together also permits attention to the aggregate effects of the ability to pay for services and the effects of service quality on demand. Moreover, an integrated framework for research will prompt interaction among sectors and result in a more cohesive foundation for policy dialogue.

**Environment.** The overriding priority for the Bank's work on the environment is to encourage the integration of environmental strategy into our activities — and to strengthen research on the underlying causes of environmental degradation and the feasibility of appropriate policy interventions. Because of the need for quick action in supporting operational work, the Environment Department has focused on highly relevant applied research in five areas: destruction of natural habitats, land degradation, degradation and depletion of fresh water resources, urban, industrial and agricultural pollution, and the degradation of the global commons.

The emphasis has been on the application of basic economic principles to operations. With operational work increasingly on track, ENV is refining its thinking and deepening its research, mainly on public policy issues (see the discussion in part II). With environmental action plans now mandatory, we will work more on cost-benefit analysis that incorporates global externalities. Another line of research will investigate the links among poverty, population, and the environment.

**Country Economics.** The Bank's research on country economics addresses macroeconomic and cross-sectoral issues rather than specific sectoral issues. It also covers such cross-cutting issues as poverty, private sector development, environ-
mental protection, and political economy. CEC's research covers all developing economies, with special attention given to Sub-Saharan Africa. Our strategy for country economics in the 1990s is embodied in the changes being set in motion this fiscal year:

* From adjustment to long-term growth. Much of the Bank's operational and research concern in the 1980s was with facilitating adjustment to external shocks in the short and medium run. Although shocks remain a major issue, the question for the 1990s is how to generate better long-run growth in stagnating and declining economies. New research is thus under way on the determinants of long-run growth and on institutional development in the public and private sectors, especially those that mobilize private savings and support efficient investment. As part of this focus on long-run growth, we are also addressing ways of making the concept of environmentally sustainable growth a part of Bank operations.

* Private sector development. Our efforts in institutional development have in the past centered on making public institutions more effective. We are now building up our research on reforms that will support private sector development in such areas as deregulation, entrepreneurial development, private provision of public services, and the strengthening of private financial intermediaries. All this ties in closely with the research on industry, energy, infrastructure, and social services in the Sector Policy and Research vice presidency.

* Environmental protection. Country policies have a significant effect on the environment through their economywide incentives and disincentives. To understand these effects we are building up research on the environmental impact of trade and fiscal policy reforms.

Comparative case studies are examining the impact of various institutional arrangements on environmental degradation. What, for example, is the appropriate institutional and regulatory framework for forestry management in Indonesia and Thailand? Another project is investigating the role of property rights in protecting the environment. In addition, two research projects are examining the potential impact on developing countries and on energy markets of international proposals to control greenhouse gas emissions. And yet another project will review the use of carbon taxes and permits to control emissions — drawing implications for trade, industrial relocation, and resource transfers across countries. The goal is to provide developing countries and international agencies with guidelines for possible international negotiations.

“Sustainability” has numerous dimensions — economic and noneconomic. Among the economic issues are local sustainability, country sustainability, and global sustainability. Discussions with operational colleagues suggest that we may need to develop the tools and methods to define better and make operational the economic tradeoffs behind this concept.

* Poverty reduction. Given the agenda in World Development Report 1990, CEC is initiating research on the impact of tax policy and public spending on the poor, particularly through targeted spending programs. And with labor markets and employment as major determinants of the returns to labor — the main asset of the poor — we will resume research on labor market and employment questions, research largely neglected since the Bank's reorganization in 1987.

* Reforms in socialist economies. In addition to policy issues, the far-reaching reforms in Eastern Europe raise a host of fundamental research questions. These questions, though applicable to all countries, have special dimensions in economies in transition. To explore these dimensions we are building up our research on price reform, enterprise reform, and social safety nets, among other issues.

INTERNATIONAL ECONOMICS. IEC's research on international economics takes a global perspective — on the long-term prospects for developing countries, on the management of debt, and on the likely developments in major commodities markets. The major coordinating vehicle for research on international prospects is the ongoing work on the long-term outlook, which will provide a focus for deepening the research content of our forecasting.

One major area for research on international economics, like that on country economics, concerns the determinants of long-run productivity and economic growth — to find out more about why some countries have not shared in the buoyant world economy and about how investments in human and physical capital affect long-term growth. A second priority area will be the development of the next generation of global models needed to analyze the interactions and links among developed and developing countries, with refinements that will incorporate Eastern Europe's joining the world market economy. Exchange rate and interest rate linkages to debt, growth, and the
balance of payments will be a focus of this model, which will also be useful for research planned on agricultural trade. And with the Uruguay Round coming to a close, we will continue to evaluate the multilateral trade agreements for their effect on developing economies. A third priority area will be to assess the effects of global commodity shocks, like the 1990 oil shock, on individual economies — and to evaluate the policy responses to those shocks.

Finally, international economics research will explore the contribution of external finance to growth. The work will analyze why some countries are able to support much higher relative levels of indebtedness than others and the causes of private capital outflows and reflows. It will attempt to isolate the impact of foreign savings, using techniques from the emerging literature on exogenous growth. The research will also address the attributes of alternative forms of external development finance, including foreign direct investment, bond financing, collateralized instruments and leasing, and management of the risks associated with external finance. Much of the existing literature ignores sovereign risk and has yet to take into account potentially useful research findings from the corporate finance literature.

Because roughly 60 percent of the future increase in hydrocarbon consumption will be in developing countries, IEC will also investigate how strategies to control greenhouse emissions will affect the international prices for energy, the trade in energy-intensive commodities, and the growth of the global economy. Planned research will assess the likely benefits and costs of improving the efficiency of energy production, transformation, and use in the developing countries. It will also evaluate the effectiveness of various international funding mechanisms in preserving the environment and influencing the substitution of alternative fuels.

Regional priorities

AFRICA. For the Bank's Africa region, the long-term perspective study — Sub-Saharan Africa: From Crisis to Sustainable Growth (Washington, DC: The World Bank, 1989) — defines the research agenda for the foreseeable future. 49 For some of the issues identified by that three-year study, work is already under way and will be strengthened. In population, we are studying the determinants of fertility to find out why it remains so high in Africa. We are also devoting more effort to the nexus of population, agriculture, and environment — to understand better how to reverse the vicious circle of rapid population growth, slow agricultural growth, and deteriorating natural resources. And on the social dimensions of adjustment, AFR is moving from conceptual development to putting systems in place — for more comprehensive statistical data bases, for stronger policy analysis, and for better design and followup for the social policies and poverty alleviation programs that will be a part of future structural adjustment operations. Work on the government's role in promoting the informal sector's development is also being launched.

Although Sub-Saharan Africa has the highest fertility rates of any major region, there are a few cases (Kenya and Zimbabwe) where fertility has begun to decline, and their lessons about fertility decline are proving useful for Africa as a whole. A major question about the Zimbabwean situation is how much the family planning program has stimulated declining fertility and how much of the decline has resulted from favorable socioeconomic preconditions. This issue is being addressed by examining the current constraints on expanded contraceptive use and fertility decline and the extent to which the relative importance of these constraints differs among socioeconomic groups and across regions. 50

Under the Bank's Africa research initiative — a collaborative effort of the Africa region and the Policy, Research, and External Affairs complex — work is continuing on foreign exchange markets, adjustments to external shocks, the pace of reform, and the impact of wage and nonwage costs on manufacturing exports. New work is being launched on the experience with trade reform (for which there is startlingly little quantitative documentation for Africa), on what regional integration means for trade strategies, on the mobility of labor under adjustment, and on policies for export development. These efforts will help inform the program of regional studies on a range of sectors and themes — such as population, financial sector reform, the opportunities from regional integration, efficient management of external finance, and alternatives for dealing with debt difficulties.

To support policy-focused research by Africans, AFR will continue to sponsor the work of the African Economic Research Consortium, a highly successful collaborative effort to which the Bank contributes (see box 13 on page 27).
The focus of research for the Asia region has moved beyond the problems of measuring poverty — for these are now well documented — to identifying the practical policy levers for improving the access of the poor to public services, especially for education and health. Exploratory work is under way in the Philippines to find out what governments can do to reduce school dropout rates and improve learning outcomes. These efforts will serve as prototypes for similar work in India, where the problem is enormous — only 60 percent of urban boys are still in school after five years of primary education, and only 16 percent of rural girls. The region will also study the determinants of demand for health services — and the links among epidemiological patterns, the financing of health services, and the equity of access to these services. The program of research in this priority area will emerge from and complement the region's sector work.

The region will also conduct a major study of the links between poverty and population, analyzing how governments can best intervene. Also planned is an in-depth analysis of data on public services for health, education, and family planning. And because the region has a mix of poor and middle-income countries, research will delve into the policies for higher education — before these policies become ossified. Finally, as part of the Bankwide forestry initiative, the region will support a major effort to consolidate thinking on environmental issues. As part of this effort, a visiting research fellow will start work in January 1991 to set out the research agenda for the first years of the decade.

Europe, Middle East, and North Africa. EMENA's immediate research concern is not only the transformation of centrally planned economies but their changing links with the Soviet Union in this era of glasnost. Interest in this topic goes beyond Eastern Europe to such countries as Iran and Algeria, which have had long relationships with the Soviet Union and are in the first stages of reform. The big research issues concern the transformation of enterprises — efforts to make public firms private, to restructure policies and institutions, and above all to introduce competition. Also of considerable importance are questions about the evolving trading relationships — with the European Community, with the Soviet Union, and with the other countries of the region and world — and the extent to which existing external debt will affect potential investors' attitudes toward foreign direct investment and other capital inflows.

Another broad area of continuing inquiry is the environment, an issue that deeply affects welfare throughout the region. Acknowledging that much of the work on the environment is applying what we already know, we see that our greatest concern in research may be finding the right mix of incentives and regulations to abate urban, industrial, and agricultural pollution. And as part of the rising conflict between resource use and sustainable development, we are giving priority to water and its management. Much of the region is desert, and put simply, the arid countries are running out of water. EMENA research will explore approaches for pricing and regulation that will translate theory into practical application.

Latin America and the Caribbean. Latin America's massive structural reforms and reassessments of the public sector are influencing the areas of inquiry for research in the region. Comparative analysis of the size of governments, reform in civil services, and fiscal decentralization will be important areas of work. The region is also drawing lessons from private sector responses to reform programs during the last years, particularly those for trade. The possibility of a free trade agreement between the United States and Mexico and other Latin American countries is driving research on how best to make the transition to a free trade area.

The use of social investment funds associated with adjustment operations has raised questions about the appropriate design of safety nets and the relative merits of employment programs and of targeted interventions in the provision of social services. Studies of these questions will improve the design of such projects by drawing lessons from experience. In the women in development area, a study will assess the human capital characteristics and the labor market constraints that inhibit women from realizing their full productive potential.

For research on the environment, the region will be evaluating policies that reduce pollution through changes in relative prices and policies that regulate pollution through administrative controls. Work is starting on global environment issues in Latin America and the proper allocation of the costs of interventions between the country and the international community, work to be carried out in cooperation with the research pro-
gram on the economics of global environment sponsored by PRE's Country Economics Department.

Other research

The International Finance Corporation (IFC) will continue its research focus on the opportunities for doing business and the mechanisms for promoting foreign investment in individual sectors in the developing countries. It will also explore patterns of corporate finance, the development of capital markets, and the transfer of technology in the context of intellectual property rights. In addition, the IFC will be studying what the technological changes in industrial processes in the developed countries mean for the developing countries. The Finance complex has traditionally done little formal research, but it is now developing a small, focused program. It expects to have several proposals before the research committee before the year is out. The Legal department is planning research on the effect of legal systems on population growth, the status of women, and the compliance with and efficiency of laws and regulations.

These departmental and regional research plans add up to a challenging agenda driven by problems that are technically complex and often politically sensitive. Many of the underlying issues cut across divisional, departmental, and vice presidential boundaries, underscoring the need for effective management and coordination. To improve coordination within its own complex and to further coordination throughout the Bank, PRE is developing a new system that will act as a clearing house and institutional focal point for cross-cutting issues.
Endnotes

1. Land Titling Project (LTP); Agriculture Operations Division, Country Department II, Asia Regional Office.


4. Second Land Titling Project; Agriculture Operations Division, Country Department II, Asia Regional Office.


6. Agricultural Policies Division, Agriculture and Rural Development Department.

7. Welfare and Human Resources Division, Population and Human Resources Department.


9. Social Dimensions of Adjustment Unit, Technical Department, Africa Regional Office.


16. To be completed in May 1991; Public Economics Division, Country Economics Department.


20. Executed by the Trade Policy Division, Country Economics Department.


23. Financed by the government of Brazil and the United Nations Environment Programme, executed in collaboration with GEIPOT (Empresa Brasileira de Planejamento de Transportes) and the Texas Research and Development Foundation.

24. Executed by the Central Road Research Institute (CRRI-New Delhi).

25. In collaboration with the Transportation and Road Research Laboratory (TRRL).

26. For a more detailed discussion of the setting of research priorities see “Setting Research Priorities at the World Bank,” a note prepared by the staff of the Research Administrator’s office, July 1990.


31. Public Economics Division, Country Economics Department.

32. Transport Division, Infrastructure and Urban Development Department.

33. Public Sector Management and Private Sector Development Division, Country Economics Department.

34. The Role of the Private Sector in Providing Social Services, Ref. No. 676-02. Supervisors: Jacques van der Gaag, Welfare and Human Resources Division, Population and Human Resources Department, and Nancy Birdsall, Environment Division, Technical Department, Latin America and the Caribbean Regional Office.

35. Macroeconomic Adjustment and Growth Division, Country Economics Department.

36. Trade Policy Division, Country Economics Department.


40. International Trade Division, International Economics Department.

41. Debt and International Finance Division, International Economics Department.

42. Public Economics Division, Country Economics Department.

43. Education and Employment Division, Population and Human Resources Department.

44. Population, Health, and Nutrition Division, Population and Human Resources Department.

45. Women in Development Division, Population and Human Resources Department.


47. Water and Sanitation Division, Infrastructure and Urban Development Department.

48. Urban Development Division, Infrastructure and Urban Development Department.

49. For work in this and other regions, contact the relevant Regional Chief Economist’s Office for details.
Appendices

Appendix 1 Research at the World Bank

The term "research," in its broadest definition, encompasses a wide spectrum of Bank activities. Much economic and sector work — analytical work to support operations — generates new knowledge about member countries. Outside the Bank, this work might well be seen as research. By convention, however, Bank research is defined more narrowly to include only analytical work designed to produce results with relatively wide applicability. Although clearly motivated by policy concerns, Bank research is usually driven not by the immediate needs of a particular Bank lending operation or a particular country or sector report — but by longer term concerns. Bank research is an investment that will add to our understanding of development thereby improving the intellectual foundation for future lending operations and policy advice. In contrast, economic and sector work takes the product of research and adapt it to specific project or country settings. Both activities are critical to the design of successful projects and effective policy.

In its effort to expand our understanding of the development process, Bank research does not always yield specific and immediate operational advice or guidance. Work in this area tends to focus on basic issues — for example, improving estimates of agricultural supply responses, increasing understanding of labor markets in developing countries, predicting the responses of households and individuals to policy-induced changes in their environment, studying the root causes of poverty, and working on the political economy of adjustment. Bank work distinguishes itself from academic research in that it is clearly directed toward a recognized policy issue in a way that will eventually yield better policy advice.

When the Bank's research program was formalized in 1971, it had four basic goals:

* To support all aspects of the Bank's operations, including the assessment of development progress in member countries.
* To broaden understanding of the development process.
* To improve the Bank's capacity to provide advice to member countries.
* To assist in developing indigenous research capacity in member countries.

While these basic goals remain intact to this day, they provide only broad guidelines for Bank researchers. Within these guidelines the Research and Publications Policy Council (RPPC) chaired by the Senior Vice President, PRE, sets priority guidelines for all Bank-supported research. RPPC members are drawn from the ranks of Bank senior managers, mainly vice presidents.

Bank research is funded through two sources: departmental resources, mainly staff time, and the Research Support Budget. The RSB also supports several activities that, while not properly research projects, add to the value of Bank research and enhance the Bank's image as an intellectual leader in the field of development research. The Annual Bank Conference on Development Economics, the Visiting Research Fellow Program, and the Bank's research journals are examples.
The RSB is also the source of funding for the Bank's direct contributions to research capacity building in its member countries, providing support for several research networks in Sub-Saharan Africa and Latin America.

Appendix 2 shows the current membership of the Research and Publications Policy Council and the Research Committee. Appendix 3 reproduces the Operational Directive governing the review of proposals submitted for RSB funding.

Departmental inputs into Bank research are determined initially by department directors and their staff, and reviewed and revised through work program reviews at vice presidential and senior vice presidential levels. Research projects that are funded only by departmental resources make up about half of the Bank's overall research program and take place mainly in the Policy, Research, and External Affairs complex.

The Research Support Budget (RSB) is a unique effort on the part of Bank management to introduce flexibility, competitiveness, and openness into the research process. The RSB is administered by the Research Committee which is chaired by the Bank's Chief Economist and Vice President, Development Economics. Members of the Research Committee (see appendix 2) serve in their individual capacities but are selected to provide representation from throughout the Bank, especially the Operations complex. The Committee's main tasks are to ensure that RSB-funded research serves institutional priorities as established by the President and the RPPC and is technically sound. It does this through its own deliberations and by passing proposals through an anonymous review process which draws on experts in and outside the Bank.

To be considered by the Committee, proposals must be sponsored by a Bank department (the RSB does not support free-standing external research) and are generally expected to be part of the department's larger research program. RSB funds go mainly for the support of researchers outside the Bank (the RSB cannot be used to support Bank staff salaries) and departments, especially those in PRE, are expected to contribute staff time to RSB-funded proposals. The RSB supports research managed in PRE, Operations, and Finance, Legal, and the IFC. Although all RSB-funded research must be relevant to Bank operations, the Research Committee is careful to ensure that these funds go mainly for longer term research with relatively broad implications for the institution.
Appendix 2 Research-related Bank committees

Research and Publications Policy Council members

The Research and Publications Policy Council (RPPC) is the Bank’s policy-setting body for both research and publications. It is chaired by the Senior Vice President for Policy, Research, and External Affairs, with members drawn from senior managers throughout the Bank and the IFC. The RPPC establishes the broad agenda and makes recommendations for Bank research and publication activities. It meets twice a year, more often if necessary.

Wilfried Thalwitz, Chairman
Senior Vice President, Policy, Research, and External Affairs

Dennis de Tray
Research Administrator, Policy, Research, and External Affairs (Research Secretariat)

Chassan El-Rifai
Vice President, Policy and Advisory Services (M.I.G.A.)

James Feather
Director, Publications, External Affairs Department (Publications Secretariat)

Paul Isenman
Director, Policy and Review Department

Wilfried E. Kaffenberger
Vice President, Portfolio and Advisory Operations (IFC)

Attila Karaosmanoglu
Vice President, Asia Regional Office

Robert Picciotto
Vice President, Corporate Planning and Budget

Johannes Linn
Director, Country Economics Department

Guy Pfeffermann
Director, Chief Economic Advisor Economics Department (IFC)

Visvanathan Rajagopalan
Vice President, Sector Policy and Research

Alexander Shakow
Director, External Affairs

Ibrahim F. I. Shihata
Vice President and General Counsel, Legal Department

Timothy T. Thahane
Vice President and Secretary, Secretary’s Department

Willi A. Wagers
Vice President, Europe, Middle East, and North Africa Regional Office

Joseph Wood
Vice President, Financial Policy and Risk Management

Research Committee members
(as of December 1990)

The Research Committee is made up of senior staff, usually division chiefs and department directors, drawn from throughout the Bank. It reviews proposals submitted for Research Support Budget funding to assess their technical standards and how well they serve institutional priorities.

Dennis de Tray, Acting Chairman
Research Administrator, Policy, Research, and External Affairs

Nancy Birdsall
Chief, Environment Division, Technical Department, Latin America and the Caribbean Regional Office

Wilfred Candler
Principal Evaluation Officer, Operations Evaluation Department

Anthony Churchill
Director, Industry and Energy Department

Vittorio Corbo
Chief, Macroeconomic Adjustment and Growth Division, Country Economics Department

Jessica Einhorn
Director, Financial Operations Department

Amnon Golan
Director, Economic Development Institute

Ravi Kanbur
Editor, World Bank Research Observer and World Bank Economic Review

Michel J. Pett
Director, Agriculture and Rural Development Department
Inderjit Singh
Principal Economist, Socialist Economies Reform Unit, Country Economics Department

Lyn Squire
Chief, Country Operations Division (Mexico), Country Department II, Latin America and the Caribbean Regional Office

Everardus Stoutjesdijk
Director, Risk Management and Financial Policy Department

Sweder van Wijnbergen
Lead Economist, Country Operations Division (Mexico), Country Department II, Latin America and the Caribbean Regional Office

Oktay Yenal
Chief Economist, Office of the Regional Vice President, Asia Regional Office
Procedures for Review of Research Proposals

Introduction

1. This directive outlines the rules, procedures, and responsibilities for the review of research proposals by the Research Committee (hereinafter referred to as the Committee). The Committee was established by the Research and Publications Policy Council (RPPC) in January 1988. The functions, responsibilities and membership of the RPPC and the Committee are set out in Annexes A and B, respectively. The Committee establishes overall research priorities (set out in the Bank’s annual Reports on the World Bank’s Research Program), and evaluates and makes recommendations on individual research proposals submitted for funding from the Research Support Budget. The Vice President, Development Economics and Chief Economist, and the Research Administrator are ex-officio Committee Chairman and Deputy Chairman, respectively. The other members are appointed by the Chairman of the RPPC on the advice of RPPC members.

2. The main objectives of the research proposal review process are the following:

(a) to ensure that proposals conform to the research priorities laid down by the Committee under the guidance of the RPPC, and to place responsibility with line managers for the substance and operational relevance of the proposals;

(b) to ensure the technical quality of research proposals; and

(c) to expedite the research proposal review process.

Institutional Relevance of Proposals

3. Line managers should consult widely within the Bank to ensure that research proposals have institutional relevance and conform to the research priorities laid down by the Committee. Department directors whose staff are planning to submit major research proposals are strongly encouraged to organize a workshop to inform interested staff of these plans early in the process. The workshop should be scheduled when the basic approach, data sources, focus (global, institutional, sector, or country) and methodology have been thought through, but before researchers are fully committed to a particular design.

Regional Coordination and Support

4. Sponsoring departments should coordinate studies involving specific countries or Regions with the appropriate Regional units in Operations. After the studies have been formally submitted to the Committee, the Secretary will arrange for their review by the appropriate chief economist(s) to assess the extent of Regional support and commitment.

Submissions of Research Proposals

5. Proposals may be submitted at any time to the Secretary of the Committee: (a) for proposals below $20,000, 5 copies should be submitted; (b) for those between $20,000 and $100,000, 15 copies; and (c) for those above $100,000, 30 copies. Form 1699 (Request for Research Support Budget Funding) should be attached to every proposal. The form is available upon request from the Committee’s Secretary.

Duration of Research Projects

6. The Committee will normally consider research projects with planned completion dates of within three years. It will report exceptions to the RPPC.

Research Preparation Funds

7. The Committee will fund preparatory work on research proposals where necessary, but such funding will not guarantee favorable consideration of the research proposal that follows. Acceptance of research preparation funds constitutes an agreement on the part of the sponsoring department to submit a research proposal to the Committee within six months. Decisions on requests for research preparation funds are made by the Deputy Chairman who may consult other Committee members before reaching a decision.
Review and Decision Procedures

8. Requests for funding from the Research Support Budget are subject to the following procedures:

(a) For requests below $20,000, the Deputy Chairman will decide.

(b) For requests between $20,000 and $100,000, the Deputy Chairman will decide, in consultation with an ad hoc subcommittee which he appoints, and with at least one reviewer outside the Bank. He may also seek other internal reviews from staff with relevant expertise.

(c) For requests above $100,000, the proposal will be reviewed by at least two external reviewers and, if necessary, other Bank staff with relevant expertise, and then by an ad hoc subcommittee appointed by the Deputy Chairman. The subcommittee will report on the proposal to the full Committee, which will discuss it and make a recommendation to the Chairman, who will take the final decision.

9. All reviewers, internal and external, will be anonymous. External reviewers will be chosen from an international roster maintained by the Committee. Before formal consideration of research proposals by the Committee or its subcommittees, the sponsors shall receive copies of all reviewers' reports, and may send written responses to the Secretary for submission to the Committee within seven days of receiving the reviews.

10. When a decision is made on a proposal, a Committee memorandum outlining the basis for it will be sent to the sponsors. A synopsis of decisions made on all requests shall be circulated at regular intervals to the Committee and the RPPC.

Appeal and Resubmission Procedures

11. Decisions on requests for under $20,000 are final. Adverse decisions on requests for $20,000-$100,000 may be appealed, with documented justification to the full Committee, whose decision will be final. For funding requests above $100,000, appeals may be made to the Chairman of the RPPC. An appeal must be made within one month of receiving the Committee's decision memorandum. A final decision on the appeal will normally be communicated to the sponsor within a month (two months for complex proposals).

Supplementary Funding

13. Only under exceptional circumstances will the Committee consider requests for supplementary funding of work previously authorized in an ongoing research project. Requests for supplementary funds to finance research additional to that in the original proposal will be subject to the same review and decision processes as new research proposals.

Closure of Projects and Completion Reports

14. The Committee will close a project six months after the authorized completion date (as shown in the original proposal), unless the Committee agrees in writing to a request for an extension for a specified period. Sponsors are required to file completion reports on their projects no later than the date of their closure. Completion report forms are available upon request from the Committee's Secretary.

Quorum

15. The Committee will have a quorum of at least seven members.

Chairmanship

16. In the Chairman's absence, the Deputy Chairman will act on his behalf. When the Deputy Chairman is absent, the Chairman will designate in writing another Committee member to act as Deputy Chairman. When both are likely to be absent, the Chairman will, in advance, designate in writing another Committee member to act as Chairman or Deputy Chairman, as circumstances require.

Conflict of Interest

17. No Committee member with direct involvement or with a substantive interest in a proposal under review shall be involved in any way in the review or decision process. Members of an ad hoc subcommittee
set up to review a research proposal should not include staff from the department(s) of the proposal's sponsor(s), nor the chief economist(s) if the sponsor is from the chief economist's office. No person having any substantive interest or direct involvement in a proposal shall be appointed as an internal or external reviewer.
### Appendix 4

#### Table 4.1 Bank research in relation to other Bank analytical work and the administrative budget, FY 1987 to FY 1990

<table>
<thead>
<tr>
<th></th>
<th>FY 1987</th>
<th>Percentage of total</th>
<th>FY 1988 a/</th>
<th>Percentage of total</th>
<th>FY 1989 b/</th>
<th>Percentage of total</th>
<th>FY 1990</th>
<th>Percentage of total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Research</td>
<td>17.5</td>
<td>16.9</td>
<td>17.3</td>
<td>15.0</td>
<td>17.6</td>
<td>14.2</td>
<td>23.7</td>
<td>17.5</td>
</tr>
<tr>
<td>Economic and sector work</td>
<td>56.7</td>
<td>54.9</td>
<td>67.8</td>
<td>59.0</td>
<td>73.6</td>
<td>59.3</td>
<td>72.9</td>
<td>54.0</td>
</tr>
<tr>
<td>Policy work</td>
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<td>28.2</td>
<td>29.9</td>
<td>26.0</td>
<td>32.9</td>
<td>26.5</td>
<td>38.4</td>
<td>28.5</td>
</tr>
<tr>
<td>Total analytical work</td>
<td>103.3</td>
<td>100.0</td>
<td>115.0</td>
<td>100.0</td>
<td>124.1</td>
<td>100.0</td>
<td>134.9</td>
<td>100.0</td>
</tr>
</tbody>
</table>

**Memo items:**
- Research as a percentage of Bank administrative expenses: 3.5, 3.5, 3.5, 4.2
- Research expenditure in constant 1990 dollars: 19.8, 19.2, 19.0, 23.7

*a.* All FY88 figures include prorated reorganization transition costs.

*b.* FY89 research figures exclude the $2.2 million in funds approved but not committed during the fiscal year.

**Source:** Planning and Budgeting Department.
Table 4.2 Resources devoted to research by department, FY 1990

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<tr>
<th>Department</th>
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<th>Total research costs</th>
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<td>Budget expenditure</td>
<td>Staff cost</td>
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<td>(thousands of dollars)</td>
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<tr>
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<td>time (years)</td>
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Sources: Planning and Budgeting Department and Research Administration.
Table 4.3 Resources devoted to research by special emphasis, FY 1990

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<td>(years)</td>
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Source: Planning and Budgeting Department and Research Administration.
### Table 4.4 RSB-funded research starts by fiscal year, 1985-90

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Source: Research Administration.

### Table 4.5 RSB-funded research starts (excluding research preparation) by fiscal year, 1985-90

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Source: Research Administration.
### Table 4.6 RSB-funded research starts in fiscal 1990

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<th>Project code</th>
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<th>Principal supervisor</th>
<th>Department responsible</th>
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<th>Project duration (months)</th>
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**People and the development process**

- Improved accounting of natural resources and the environment for more sustainable resource management
- Reform dilemmas and strategies in agriculture in socialist countries
- Use of geographic information in natural resource management
- The effects of a new mine development on the local community in Papua New Guinea
- Economic valuation of environmental impacts
- Urban interfuel substitution - phase I
- The relative health impacts of urban environment deterioration
- Energy use and global greenhouse issues
- The Montreal Protocol on reducing CFC emissions - implications for developing countries
- WIDER program - the environment and emerging development issues
- International and macroeconomic policies in the agricultural development of Mexico
- Implications of agricultural policy reform for developing countries

**Subtotal**

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Table 4.7 Fiscal 1990 RSB-funded research (cont.)

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<th>Remaining authorization</th>
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<td>in Southern Malawi</td>
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**Technology, productivity, and development**

| Agricultural research in Africa and Asia: comparative lessons from rice in Sierra Leone, Sri Lanka and elsewhere | 67429        | R                       | AFR                              | 144.8         | 19.8                   | 0.0                  |
| Industrial competition, productive efficiency and their relationship to the trade regime | 67446        | R                       | CEC                              | 262.5         | 150.9                  | 25.5                 |
| New technologies, location, and trade: an empirical analysis                   | 67469        | R                       | IEN                              | 190.0         | 88.7                   | 0.0                  |
| Electric power utility efficiency study - phase I                              | 67506        | R                       | IEN                              | 75.0          | 36.9                   | 0.0                  |
| Heavy and chemical industry policy in large NICs                               | 67541        | R                       | IEN                              | 13.0          | 13.0                   | 0.0                  |
| Productivity, competitiveness and economic policy                              | 67558        | R                       | IEN                              | 19.9          | 19.9                   | 0.0                  |
| Constraints on the development and use of environmentally sound technologies  | 67562        | P                       | PRS                              | 15.0          | 17.4                   | 0.0                  |
| Equipment prices and policies for developing country export industries         | 67578        | P                       | CEC                              | 7.0           | 4.0                    | 3.0                  |
| **Subtotal**                                                                   |              |                         |                                  | 727.2         | 350.6                  | 28.5                 |

**Providing basic infrastructure services**

| Demand for rural water supply                                                  | 67435        | R                       | INU                              | 100.0         | 19.7                   | 0.0                  |
| Transportation and agricultural supply responses in Africa                     | 67475        | R                       | INU                              | 50.5          | 29.1                   | 0.0                  |
| Rental housing markets in Southern Africa                                       | 67479        | P                       | AF6                              | 6.5           | -                      | 0.0                  |
| Tunis and Rabat water demand study                                             | 67540        | R                       | INU                              | 19.9          | 19.8                   | 0.0                  |
| Long-term sustainability of irrigation systems                                 | 67544        | P                       | AGR                              | 8.0           | 7.8                    | 0.0                  |
| Agricultural technology generation, diffusion and implementation in developing countries | 67553        | P                       | AGR                              | 6.0           | 6.9                    | 0.0                  |
| Research symposium on military expenditures                                    | 67601        | R                       | PRD                              | 72.5          | 16.1                   | 45.9                 |
| Implications of carbon tax schemes for developing countries                    | 67610        | P                       | CEC                              | 8.0           | -                      | 8.0                  |
| **Subtotal**                                                                   |              |                         |                                  | 271.4         | 99.4                   | 53.9                 |

**Coordination, publication, and dissemination**

| Research review and evaluation                                                 | 67228        | O                       | RAD                              | 1,075.1       | 52.2                   | 0.0                  |
| World Bank Economic Review                                                     | 67357        | O                       | RAD                              | 386.4         | 115.4                  | 0.0                  |
| Research Observer                                                              | 67361        | O                       | RAD                              | 148.0         | 30.2                   | 0.0                  |
| Research News                                                                  | 67371        | O                       | RAD                              | 103.5         | 11.2                   | 0.0                  |
| Visiting research fellow program                                               | 67462        | O                       | RAD                              | 551.9         | 317.5                  | 0.0                  |
| Annual conference on development economics                                     | 67482        | O                       | RAD                              | 415.4         | 293.3                  | 0.0                  |
| French translation of MADIA papers                                             | 67565        | C                       | AFT                              | 15.7          | 15.7                   | 0.0                  |
| African economic research consortium - phase II                                | 67604        | R                       | AFR                              | 600.0         | 600.0                  | 0.0                  |
| **Subtotal**                                                                   |              |                         |                                  | 3,296.0       | 1,435.5                | 0.0                  |

**Total**                                                                       |              |                         |                                  | 21,596.8      | 6,078.5                | 3,680.5              |

**Note:** This table includes all research projects approved by the Research Committee and funded from the RSB that were active or started during FY 1990. Five projects in this list were closed in FY 1989 but had expenditures in FY 1990. They are listed here but are excluded from the total number of projects for 1990. Negative numbers represent RPO accrual reversals from FY 1989 to FY 1990. Data may not add to totals because of rounding.

a. These amounts represent Research Committee authorizations as of June 30, 1990, and do not include contributions from outside sources.

b. Includes disbursements and outstanding commitments as of June 30, 1990.

**Key:** R = research project, P = research preparation, O = ongoing, and C = closed during the fiscal year.
### Appendix 5 Visiting Research Fellow Program: Research Fellows at the Bank during FY90

<table>
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<tr>
<th>Name</th>
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<th>Duration</th>
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<td>Leonardo Auernheimer</td>
<td>Texas A &amp; M University College Station</td>
<td>LACVP</td>
<td>Macroeconomic policies In Latin America</td>
<td>Jun. 1, 1989 to Dec. 31, 1989</td>
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<tr>
<td>Oded Stark</td>
<td>Harvard University</td>
<td>PHRWH</td>
<td>The interaction of rural-urban migration and poverty, and possible policy implications</td>
<td>Jul. 1, 1989 to Sep. 30, 1989</td>
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<td>Stephan Haggard</td>
<td>Harvard University</td>
<td>CECMG</td>
<td>The political economy of inflation and stabilization in middle-income countries</td>
<td>Jan. 1, 1990 to Aug. 31, 1990</td>
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<td>Yair Mundlak</td>
<td>University of Chicago</td>
<td>LA1DR</td>
<td>The role of agriculture in economic growth: an empirical model for policy analysis</td>
<td>Jan. 1, 1990 to Mar. 31, 1990</td>
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<td>Peter J. Bohm</td>
<td>University of Stockholm</td>
<td>PRSVP</td>
<td>Global environmental issues and North-South interaction on global environmental protection</td>
<td>Jan. 14, 1990 to Jul. 31, 1990</td>
</tr>
<tr>
<td>Luis J. Guasch</td>
<td>University of California at San Diego</td>
<td>AGRAP</td>
<td>(1) Cooperatives and credit groups in Africa; (2) the timing and extent of agricultural reforms in socialist economies</td>
<td>Mar. 15, 1990 to Jul. 15, 1990</td>
</tr>
<tr>
<td>R.K. Pachauri</td>
<td>Tata Energy Research Institute, New Delhi</td>
<td>IENED</td>
<td>The environmental impact of energy investments and technology choices</td>
<td>Jun. 6, 1990 to Sep. 5, 1990</td>
</tr>
<tr>
<td>Duane Chapman</td>
<td>Cornell University</td>
<td>ENVPR</td>
<td>A Bank-wide agenda for research on environmental policy, particularly the sustainable use of land, water, and air resources and global environmental problems</td>
<td>Jun. 15, 1990 to Dec. 15, 1990</td>
</tr>
<tr>
<td>Kala Krishna</td>
<td>Harvard University</td>
<td>IECIT</td>
<td>(1) Non-tariff barriers under imperfect competition: the Multi-Fibre Agreement; (2) microeconomic foundations and empirical problems of key economic concepts, such as openness, competitiveness, and export-orientation</td>
<td>Jun. 15, 1990 to Sep. 15, 1990</td>
</tr>
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</table>
Appendix 6 Bank research output, fiscal 1990

This appendix lists various types of research output arising from research and policy review activities at the Bank. In order to provide maximum coverage of such output, research is defined for the purposes of this appendix in a broader rather than a narrower sense.

The following types of Fiscal 1990 research output are listed:

A. Research-oriented books written by Bank staff and published either by the Bank or by other publishers. This list also includes periodic data publications, such as the World Debt Tables, that feed subsequent research.

B. Research by Bank staff published as part of collected volumes of research papers.

C. Articles appearing in the Bank's two economics journals, the World Bank Economic Review and World Bank Research Observer.

D. Articles related to Bank research and published in non-Bank professional journals.

E. Policy and Research Series, a formal series for dissemination of PRE policy and research work of professional quality, with a strong policy orientation, and of interest to a relatively wide audience.

F. World Bank Discussion Papers, Technical Papers, and other Bank papers series:

World Bank Discussion Papers. This series provides an outlet in the public domain for a broad range of Bank output that provides detailed results of interest to development practitioners — from work on narrow research topics or country-specific studies. The series undergoes relevant departmental review, and a subsequent review by RAD (possibly including external reviews).

World Bank Technical Papers. This series provides an outlet in the public domain for research and studies that are highly technical and aimed at a narrower audience. The clearance procedure is the same as for the World Bank Discussion Papers.

Other published series. Papers in such series as the LSMS, EDI, and SDA Series typically focus on a specialized topic and are designed to give prominence to Bank work on that topic or to work by a particular Bank unit. For series originating within PRE, such as the LSMS Series and the Commodity Working Paper Series, clearance procedures are the same as for the World Bank Discussion Papers. EDI Seminar Series are cleared by EDI.

G. PRE Working Papers. These working papers are a vehicle for quick dissemination, sometimes in an incompletely polished format, of findings of work under way in the PRE complex. Clearance of PRE Working Papers is done at the departmental level, and by the DECVF office in the case of DEC. The primary audience is Bank staff, though some copies are circulated to interested researchers outside the Bank.

H. Departmental working papers. These papers are produced and distributed by PRE departments and some divisions. They disseminate quickly findings of departmental research and are targeted primarily to specialists in the Bank. The papers are cleared at the departmental level.

A. Books by Bank researchers published in fiscal 1990


Thomas, Vinod, and Ajay Chhibber, eds. 1989.
B. Articles by Bank researchers in books published in fiscal 1990


C. Articles published in the World Bank Economic Review and World Bank Research Observer in fiscal 1990


D. Articles related to Bank research and published in non-Bank professional journals in fiscal 1990


Cohen, Michael A. 1990. “Macroeconomic Adjustment and the City.” Cities 7(1).


Krueger, Anne. *Messerlin, Patrick.*
Little, I.M.D., and Vijay Joshi. *Ravillion, Martin.*


E. Policy and Research Series papers published in fiscal 1990


F. World Bank Discussion Papers, Technical Papers, and other Bank series papers published in fiscal 1990


Lele, Uma. 1990. Structural Adjustment, Agricul-


Office of the Vice President, Development Economics, Washington, DC.


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van Wijnbergen, Sweder, Roberta Rocha, and Ritu Anand. 1989. “Inflation, External Debt and


H. Departmental working papers published in fiscal 1990

Country Economics Department


Economic Development Institute


**Environment Department**


World Bank, Washington, DC.

Industry and Energy Department


Infrastructure and Urban Development Department

tor." Infrastructure and Urban Development Department Issues Paper. World Bank, Washington, DC.


Population and Human Resources Department


and Quality in Developing Countries.” PHREE Background Paper Series 89/20. World Bank, Washington, DC.


Strategic Planning and Review Department


