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agriculture in the 1990s

strategic choices for asia/near east countries

symposium proceedings

HARVARD INSTITUTE FOR INTERNATIONAL DEVELOPMENT
AND
THE AGENCY FOR INTERNATIONAL DEVELOPMENT (ANE/TR/ARD)
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ANE AGRICULTURE IN THE 1990s STRATEGY SYMPOSIUM
Foreword to the Proceedings

The initiation for the Symposium on Agriculture in the 1990s resulted directly from the ANE Bureau's Agriculture and Rural Development Officers Conference held in Bangkok in February 1987. ANE's ARDOs, as well as a growing number of development practitioners and analysts, had been increasingly seized by the fact that the global environment in which they operated had dramatically changed. The changes manifested themselves at every level: huge stocks of grain on the world market, continuing downward pressure on cereals prices, increased protectionist measures by both developed and developing countries, extreme vulnerability of farmers to exchange rate variations, distorted policy frameworks, decreasing official development assistance relative to private capital flows, pressures on faster growing third world economies to diversify their agriculture, incredible advances in information technology, and alarming degradation of the natural resources base.

As a response to these issues, the theme chosen for the 1987 workshop was "Agriculture under Stress: The Future of Agriculture and Rural Development in Asia and the Near East". One of the principal recommendations of this workshop was that ANE/TR/ARD take the lead in developing a regional-specific adaptation of the recently-adopted Focus Statement on Agriculture and Rural Development (increased income, increased access to food, and maintenance and enhancement of the natural resource base). ARDOs requested that the regional statement elaborate on the broad strategic issues of the income, consumption and natural resource management components but should allow for country and Mission-specific articulation of those issues in light of the tremendous diversity represented by ANE Missions.

To proceed with strategy formulation, ANE/TR/ARD contracted with the Harvard Institute for International Development to coordinate the preparation of a set of subsectoral analyses and to organize a symposium to debate the issues associated with those analyses. The subsectors for analysis were selected by a joint AID-HIID working committee composed of two HIID economists and members from AID's own in-house strategy working group (ANE, S&T, and PPC Bureau representatives). Ultimately, twelve papers were commissioned addressing issues of pricing, inputs, agricultural productivity, employment and income distribution, consumption and nutritional intake, irrigation, institutional sustainability, diversification, trade, and natural resources management. In addition to the HIID contributions, authors for the papers included individuals from Stanford's Food Research Institute, the Yale Growth Center, Rutgers, USDA's Economic Research Service, the University of Maryland, Cornell, and the ANE Bureau's Irrigation Support Project (ISPAN). In addition, ANE/TR/ARD prepared a paper analyzing AID's development assistance funding trends in agriculture.

Authors of each of the papers were urged to orient their respective analyses, to the extent available data and expertise allowed, to issues in both Asian and Near East countries, and to be as forward-looking as possible. Because the analyses were designed to provide the framework for an agricultural and rural development strategy, the Strategy Committee also urged authors to move from analysis to prescription. Attempts to be provocative and to identify new opportunities were strongly encouraged. Finally, authors were instructed not to limit their prescriptions to what AID, as a single donor, could do, but to focus more broadly on what should be done, regardless of actor. Rather than make the results of the papers available via a classical presentation mode, followed by questions and answers, the organizers of the symposium opted for maximizing small group discussion and interaction. Plenary sessions were designed to share small group conclusions and to identify areas of consensus and divergence.

In addition to serving as the basis for the formulation of an agriculture and rural development strategy, the results of these preliminary analyses contribute to a broader debate on the future of development assistance in the 1990s. One week following the Symposium, the Board for International Food & Agricultural Development (BIFAD) organized a major conference, "Getting Ready for the 1990s",

which examined the role of the Title XII universities in responding to the development challenges of the next decade. In early October 1988, AID's PPC Bureau organized an international conference on the future role of agricultural universities in promoting sustained economic growth and development.

Two task forces organized by the AID Administrator were also direct consumers of the outcomes of the Symposium debates. The first, the November Report Task Force, is drafting recommendations for US development assistance in the 1990s and has followed closely ANE's strategy development process. The second, the Food and Agriculture Task Force, is examining several key issues discussed at the ARD Symposium, including the integration of Food Aid (PL 480 and related programs) with development assistance. The S&T Bureau has indicated its desire to integrate Symposium findings with two recently initiated efforts: a review of AID resources allocated to the Agriculture/Rural Development/Nutrition account and agriculture research priorities for the 1990s. Two initiatives aimed at the broader issues of development assistance to the Third World will also absorb the results of the Symposium. First, the Lee Hamilton Sub-Committee (of the House Foreign Relations Committee) is examining the possibility of re-drafting the legislation for the Foreign Assistance Act. Secondly, Michigan State University has sponsored a series of national-level workshops to determine new modalities and priorities for US development assistance. Symposium organizers have established relationships with both of these efforts and have forwarded the preliminary conclusions for consideration in the final report-outs.

It is clear, then, that the timing of the Symposium has importance beyond the strategy formulation issues confronted by ANE ARDOs. The recommendations produced by the Symposium have been, or will be, factored into a wide range of fora responsible for determining the future directions, modalities, and resources of US development assistance. Since agriculture and rural development have been in the past, and will continue to be in the future, intimately related to sustained economic growth and development, the relevance of ANE Symposium conclusions is applicable at multiple levels. In fact, if Symposium findings are correct, the easy distinctions between rural and urban in the 1990s will blur and become part of an integrated process of economic growth.

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October 1988

HIID/USAID
SYMPOSIUM ON AGRICULTURE IN THE 1990S
AGENDA

Tuesday, 6 September 1988:

7:00 p.m.	Reception	
8:00 p.m.	Overview of Symposium	
	Welcome	R. Goldman
	Overview of symposium and discussion of final products	J. Lowenthal
	Discussion of participant responsibilities	J. Poley

Wednesday, 7 September 1988:

8:30 a.m. - 9:30 a.m.	Opening address	
	Agenda for the day	J. Lowenthal
	Introduction of AA/ANE	J. Lowenthal
	Address: The Challenge of Agriculture and Rural Development in the 1990s	J. Bloch
9:30 a.m. - 10:00 a.m.	Asia/Near East Region Structural Introduction	
	Overview of region in terms of the numbers, the past and the trends	R. Goldman
10:00 a.m. - 10:30 a.m.	Break	
10:30 a.m. - 12:00 noon	Analytical Themes Introduction	
	Diversification/Structural Change	P. Timmer
	Employment/Income Distribution	P. Timmer
12:00 noon - 1:30 p.m.	Lunch	
1:30 p.m. - 3:45 p.m.	Breakout Groups	J. Poley
	Topical theme break-out groups meet on Diversification/ Structural Change analytical theme:	
	1. Technical change; 2. Irrigation & water policy; 3. Pricing & stabilization policy; 4. International trade; 5. Natural resource management.	
3:45 p.m. - 4:00 p.m.	Break	
4:00 p.m. - 5:30 p.m.	Cross-cutting Themes	P. Peterson
	Panel moderator	J. Lowenthal
	Facilitating private sector growth	R. Cobb
	Factoring gender into economic development	P. Boyle
	Sustaining institutions as vehicles of change	A. Goldsmith

Thursday, 8 September 1988:

8:30 a.m. - 8:45 a.m.	Agenda for the day	
8:45 a.m. - 10:00 a.m.	Interim Reports and Issues	R. Goldman (chair)
	Topical theme break-out groups give short, interim reports on Diversification/Structural change analytical theme	Rapporteurs
	Synthesis of Diversification/Structural Change Re-direct to Employment/Income Distribution analytical theme	P. Timmer
10:00 a.m. - 10:30 a.m.	Break	
10:30 a.m. - 12:45 p.m.	Breakout Groups	
	Topical theme break-out groups meet on Employment/ Income Distribution	
12:45 p.m. - 2:00 p.m.	Lunch	
2:00 p.m. - 3:45 p.m.	Reports of Topical Theme Break-out Groups	R. Goldman (chair)
	Topical theme break-out groups report back on both Diversification/Structural Change and Employment/ Income Distribution.	Rapporteurs
3:45 p.m. - 4:00 p.m.	Break	
4:00 p.m. - 5:00 p.m.	Proposition Generation	P. Timmer (chair)
5:00 p.m.	Committee on Propositions	
8:00 p.m.	Economists "Get Together"	J. Mellor W. Falcon V. Ruttan R. Evenson

Friday, 9 September 1988:

8:30 a.m. - 8:45 a.m.	Agenda for the day	J. Lowenthal
8:45 a.m. - 10:45 a.m.	Plenary Session	
	Discussion of selected propositions	P. Timmer
10:45 a.m. - 11:15 a.m.	Break	
11:15 a.m. - 12:15 a.m.	Implications for U.S. Development Assistance of a New Strategic Approach to the 1990s	W. Fuller
12:30 p.m.	Close	J. Lowenthal

OPENING REMARKS

By Julia Chang Block

Julia Chang Bloch, Assistant Administrator, Asia/Near East Bureau, opened the symposium with a challenging question: how to initiate a new "Green Revolution" in face of declining foreign assistance for agriculture. Arguing that raising rural incomes was the first step in economic development, Bloch suggested that the Green Revolution had played a substantial role in promoting agricultural growth in the past. Official development assistance, including support for foundations and international research centers, had provided the impetus for the generation and dissemination of the Green Revolution. Poverty was still on the rise, however, affecting in particular a substantial part of Asia. She warned that without a new Green Revolution, the problem of rising poverty could not be confronted. Yet it was clear that official assistance for such endeavors might not be readily available in the future.

She emphasized that global economic and political conditions had substantially changed since the launching of the Green Revolution. Growing international trade, integration of international capital markets, and the breakdown of the Bretton Woods fixed exchanged rate system were highlighted as major economic changes. As a result, agriculture had become more strongly linked to macro-policy and more prone to bear the brunt of macro adjustments and changes in the real exchange rate. In addition, the emergence of Japan as a major player in the donor community, increasing levels of US agricultural exports to developing countries (43 percent of US agricultural exports in 1987, compared to only 19 percent in 1971), and the strengthening of local institutional capacity in many developing countries, were also seen as important factors that would shape international policies in the future.

Referring to changes within AID, Bloch characterized the decline in the aid budget for rural development in the ANE region as a major constraint on future policies. In 1976 the allocation to agriculture within the ANE region was approximately 306 million dollars, while in 1988 it had declined to only 194 million dollars. The substantial decline was attributed to political farm lobbies and overall protectionist sentiments that viewed agricultural growth in developing countries as a direct threat to US agricultural exports.

She emphasized that without further development of the rural sector in developing countries, sustained economic growth and increases in real wages would not be feasible. United States political support for assistance to agriculture, however, has been declining rapidly, strongly suggesting that financing a new Green Revolution might not be feasible in the 1990s. The challenge therefore was to convince US policy makers that growing incomes in developing countries would stimulate US agricultural exports in the long run. Contrary to existing beliefs, third world agricultural development was indeed a marketing opportunity for the US, not a competitive threat. She warned, however, that in the fast changing world of today, the US may have already become less important in the process of spurring agricultural growth in developing countries. Global economic changes, in particular private sector trade, may help mobilize forces within and outside the US to promote a new force in agricultural development.

ANALYTICAL THEMES

Peter Timmer of HIID proposed that the symposium participants should consider two analytical themes for the 1990s, the role of agriculture in employment and income distribution and in economic diversification and structural change. Growth strategies which succeed in achieving employment and income distribution objectives involve policies which raise real wages and increase the average caloric intake of the rural population. Over the past two decades some countries in the ANE region have achieved impressive growth in rural incomes, while others have lagged behind. (See Table I, below, adapted from Timmer's paper on employment and growth). Comparing economic performance among ANE countries reveals contrasting patterns of structural change and economic diversification. Timmer stressed the need for greater understanding of market-led diversification processes and the development of flexible marketing structures to promote and accommodate these changes. He carefully emphasized, however, the need to establish country-specific policies to promote the role of agriculture in achieving these objectives.

Timmer suggested that the twin goals of generating employment and improving income distribution could best be achieved by focusing on development strategies that raise real wages in the rural sector. This approach, however, requires an understanding of both the supply and demand determinants of wage formation in the rural labor market, and how government policies can affect the demand for

TABLE I

Per Capita GDP, 1985

	National Average	Agricultural Sector	Annual % change in per capita agricultural sector income 1965-1985
Malaysia	2000	1000	4.7
Thailand	800	192	1.0
Philippines	580	302	3.1
Indonesia	530	223	1.5
Pakistan	380	173	0.7
Sri Lanka	380	194	3.1
India	270	120	-0.1
Bangladesh	150	100	0.7
Tunisia	1190	578	4.4
Turkey	1080	356	1.0
Egypt	610	265	2.1
Morocco	560	219	2.4

labor. The direct impact of agriculture on the demand for labor can occur through technology and crop choice. The indirect impact works through investments in infrastructure, the development of flexible marketing structures, and the influence of changing patterns of consumption and investment as agricultural incomes change.

Infrastructure investment in the form of irrigation works, communications, electricity, and market facilities, provide the base for an efficient rural economy. Without continued investment in these areas, growth of the rural sector and employment generation will be difficult to sustain over the long run. Without major public sector investments Timmer warned that growth in many ANE countries could not be sustained in the 1990s. He urged aid donors to resume their support of large-scale public infrastructure. He suggested that it may be politically more feasible for USAID to invest resources in rural infrastructure as a way of supporting agriculture in the 1990s, rather than support direct commodity-specific investments.

Timmer called attention to the critical impact of macroeconomic policies on agricultural growth and on real wages and the balance of employment between rural and urban areas. He suggested that trade policy, and in particular exchange rate management, plays a pivotal role in promoting agricultural growth in developing countries. He also stressed that wherever the staple food grain remained an important determinant of farm incomes and the real wage, changes in food grain availability have a roundabout influence on employment and income distribution, by altering the level of macroeconomic activity and the competitiveness of labor-intensive exports, including the primary products. In addition, instability in food prices can alter expectations and patterns of investment, with spillover effects on employment and foreign exchange expenditures.

Timmer stated that increasing real wages in the rural sector is the long-term solution to the alleviation of poverty. Appropriate strategies require enhancing the overall competitiveness and efficiency of the agricultural sector in the developing countries. Timmer raised concerns that even in a rapidly growing rural economy, targeted interventions would be necessary in the short run to increase the food intake of a substantial portion of the rural poor. He noted that a successful implementation of targeted intervention required an understanding of the consumption pattern of the poor and careful planning to avoid general food price subsidies. The latter could undermine policies of sustaining long-term agricultural growth. Finally, Timmer stressed that without policies aimed at stabilizing basic food prices, targeted programs would not be successful.

Richard Goldman from HIID made a presentation characterizing the varied economic performance and policy orientation of the countries in the ANE region. His presentation focused on factors influencing food consumption in ANE countries over the past two decades (see Table II, extracted from Goldman's symposium paper). During that period many countries managed to achieve impressive

TABLE II

DEMAND INFLUENCING FACTORS

	Income Elasticity for Calories	1984 Index (1973 = 100) Real per Capita GDP	Staple Food Prices
Bangladesh	.17	104	88
Egypt	.13	140	51
India	.17	122	88
Indonesia	.16	164	69
Pakistan	.16	130	111
Philippines	.17	123	97
Sri Lanka	.16	137	98
Thailand	.14	154	81
Morocco	.13	123	--
Tunisia	.14	151	--

improvements in average per capita calorie consumption. Goldman acknowledged that the distribution of calorie consumption within countries varied substantially but that the available data made the issue a difficult one to treat in a comprehensive manner. Primary influences on national per capita calorie consumption were population and income growth rates. Population growth has slowed in a number of ANE countries, and real per capita income has risen. Nevertheless, these variables alone account for only part of the record on calorie consumption. Pricing policy and the relative and absolute impact of the growth process on rural incomes are also of key importance, and countries varied greatly with regard to pricing and rural strategies.

Looking to the future, Goldman noted that population dynamics would continue to be of importance in determining the pattern of food consumption. It is important, he pointed out, for those working on food policy to develop reasonable projections of rural population growth under varying assumptions regarding national development strategy. Data from a number of ANE countries supported the notion that diversification of diets is underway. Growth in per capita consumption of staple grains is slowing. Over the past decade a large portion of the increment in per capita calorie consumption came from non-grain sources. Although the sources varied considerably from country to country, he singled out vegetable oil consumption as being the most consistent non-grain contributor to incremental food consumption. Goldman also noted that protein consumption, starting from a low base, is growing rapidly. He focused particularly on animal protein, especially chicken meat and eggs, and in some countries milk, as being strategic sources due to the implications on the demand for non-traditional feeds.

Finally, Goldman observed that while diversification was clearly demand-led in ANE countries, the implications for agricultural production varied depending on the pricing and trade policies of a given country. Some countries in ANE had utilized agricultura production increases as tools for import substitution or export expansion, while others relied heavily o.. domestic production to support impressive increases in per capita consumption. In contrast, some countries achieved substantial improvements in per capita consumption in the face of agricultural stagnation, relying heavily on pricing and trade policies that accommodated large-scale imports.

BREAKOUT GROUP DISCUSSIONS

Following the introductory remarks, participants were organized into sm breakout groups, according to their areas of expertise (see Appendix 2 for breakout group composition). There were five breakout groups as follows:

- Pricing and stabilization policy
- International trade
- Natural resource management
- Irrigation
- Technical Change

These groups discussed their topics at length, attempting to identify important issues for the 1990s. These issues were summarized in a series of propositions which were reported back by the breakout group rapporteurs to the other participants for discussion and clarification during the plenary sessions.

I. PRICING AND STABILIZATION POLICY

Rationale for Food Price Stabilization

During the past decade many countries in the region implemented important reforms in marketing and pricing policies. Participants expected staple food price stabilization to remain as an important area of government concern, however. Properly designed and implemented stabilization programs could have important macro implications, as pointed out in the symposium paper on pricing policy.

The benefits of such policies can be felt through stability of employment and foreign exchange at the macro level, through higher rates of investment by rural and urban producers, and through the enhanced security of food intake of poor consumers. Public policy to stabilize wage good prices can be an important offset to the inadequate capital markets and the lack of futures markets and insurance schemes which characterize most developing countries.

Logistics of Food Price Stabilization

The efficient implementation of wage-good stabilization requires a delicate balance between direct public sector intervention and the promotion of private sector involvement. A government logistics agency would need to be in charge of announcing and defending a floor and ceiling price, using international trade as the balance wheel for stock management. Allowing a sufficient spread to induce private sector participation in marketing activities was also deemed essential to the efficient functioning of a stabilization scheme. In principle, a variable levy could well replace the need for a government logistic agency. In practice, however, undertaking an efficient stabilization scheme without a government agency was considered unfeasible.

Costs of Food Price Stabilization

Participants raised concerns, however, about the level of fiscal costs and budgetary instability that arise from implementing a stabilization policy. It was argued that although an efficient stabilization scheme following world price trends could be self-financing in the long run, many governments were unwilling to allow the year-to-year changes in the price level necessary to achieve this. During any specific year or runs of years, a government could sustain substantial losses. As a result, the logistics agency would need to have an open line of credit to ensure the efficient operation of the stabilization scheme. Cost containment and other management objectives could be facilitated if such funds were allocated as a visible and explicit part of the government budget.

Participants recognized that without a stable international market, the management of a national food price stabilization scheme would be difficult. In September of 1974, for example, Indonesia was unable to acquire its import requirement of rice from world markets, despite having the necessary foreign exchange. Facing such conditions, countries revert to using expensive stock policies to buffer their domestic economies from extreme shocks in the world market. Alternately, the notion of an international buffer stock policy was viewed as too costly. Participants agreed that improving policy design and domestic management capacity for price stabilization, and developing more secure access for developing countries to international markets during times of world market stress, were important tasks for the coming decade.

At some point in the development process price stabilization for staple foods becomes a less important issue. Participants suggested that further research be undertaken to identify key country characteristics that might guide policy makers in determining when wage-good price instability ceases to have important effects on the economy.

Input Pricing

On the input side, with special reference to fertilizer, discussion centered on the notion that physical availability and a competitive marketing structure at the farm level are a prerequisite to efficient input use. Pricing policy, with respect to both price level and price margin policies, could also be used to enhance the private sector role needed to achieve this competitive system. In certain circumstances where fertilizer use is substantially below efficient levels because of new technology, attitudes towards risk, or poor capital markets, a fertilizer price subsidy might enhance efficiency. Considerable concern was expressed, however, that government subsidy schemes were often poorly implemented, and as a result fail to benefit the farmer. Nevertheless, participants agreed that in specific situations, a case for fertilizer subsidy to enhance economic efficiency could be made.

II. INTERNATIONAL TRADE

The focus of discussion in the international trade group centered around four bread themes: linkage between trade policy and agricultural diversification, food security, the role of food-aid, and international trade liberalization. Despite the diversity of views expressed and variety of topics covered, the group felt that trade in the coming years would not necessarily play the role of "engine of growth". Instead, trade was seen more as a by-product of development—the panacea of export-led development was absent from the main thrust of the arguments presented.

Trade Policy and Agricultural Diversification

The group proposed that dynamic comparative advantage should be the guiding principle for resource allocation in a strategy of agricultural diversification. The discussion thus emphasized the importance of allowing diversification to be market-led, recognizing that in larger countries, agricultural diversification was likely to be based on demand shifts in domestic markets through rural-based processing and industry, and not centrally on export opportunities.

Participants in the breakout group considered the idea that an undervalued exchange rate could potentially play a positive role in promoting structural change and diversification in line with dynamic comparative advantage. Some successful countries have followed this course. The logic of this proposal is similar to the familiar "infant industry" rationale for protection, though applied on a more macro level and aimed at institutional capacity. A modestly undervalued exchange rate would generate uniform protection and, by encouraging trade, would promote marketing capacity and flexibility to respond efficiently to changing international market conditions. In addition, an undervalued exchange rate would provide some compensation to the tradeable sector for the uncertainty and risk present in international trade. Ability to increase foreign exchange reserves is an additional benefit of such policies. Concerns were raised, however, that undervalued exchange rates could unduly tax inputs and have other general equilibrium effects that need to be investigated prior to establishing a policy target level for undervaluation.

Food Security and International Trade Liberalization

Food security for developing countries was a recurring theme in various group and plenary discussions. The trade group suggested that it was more cost effective for developing countries to use national and international financial facilities (buffer-funds) rather than physical stocks (buffer-stocks), to achieve national objectives of food security. This approach, however, is predicated on countries having easy access to international financing facilities (e.g., IMF) and on the reliable access of developing countries to physical supplies on the world market during times of world scarcity. Serious doubts were raised about the certainty of these assumptions. Conclusions here reinforce the conclusions of the pricing policy group regarding the need for improved arrangements, both domestically and internationally, to promote domestic price stabilization.

The discussions about the Uruguay Round and international trade liberalization did not lead to any general conclusions regarding their impact on the level or volatility of world prices, and hence on food security in general. It was expected, however, that trade liberalization would have a small impact on world grain prices if supply control instruments were removed in developed countries.

Food Aid

Some participants expected that food aid would increase in the 1990s. The evidence for this was not strong, however. The group felt that food aid could be used as a development resource to enhance food security, stabilization of wage goods, and poverty alleviation. Participants were aware that strategies for using food aid effectively were under review by various committees and study groups. Therefore a relatively small amount of time was allocated to discussing this topic. An aspect that was stressed, however, was the need for more stability and longer term programming of food assistance. The unreliability of food aid availability, particularly when there is world-wide shortage but during normal times as well, was identified as a key factor limiting its effectiveness as a development resource.

III. NATURAL RESOURCE MANAGEMENT

Participants concurred that poverty is the leading cause of environmental degradation in developing countries and that broad-based rural development capable of raising and sustaining real wages was the long-run solution to protecting the resource base. There was agreement that the proper use and management of the natural resource base would enhance the sustainability of agricultural growth itself. (See Figure 1, opposite, from Theo Panayotou's symposium paper).

The group outlined a general agenda for policy analysts working on resource management issues. High on the list of many participants was the need to identify and correct factor and output price distortions that directly affect the stability of the natural resource base. Participants agreed that pricing of resources should be undertaken from an efficiency, or social, point of view. In practice it is often difficult to measure true resource costs and to convince policy makers to reflect them in pricing policy. Participants emphasized, however, that many pricing policies had distorting and environmentally damaging effects that were relatively easy to measure. More work should be done to document these cases and to encouraging policy analysts and decision makers to recognize the implications for policy design and resource utilization. Efforts to enhance programs such as reforestation, terracing, and minimum tillage, were also discussed. Ultimately, however, conditions in the macro economy and the encouragement of policies for generating off-farm employment and out-migration from poor resource regions were identified as being strategic for promoting sustainability of the resource base.

Considerable disagreement was voiced on the role of public management of natural resources. At one level, government intervention was seen as exacerbating the problem in many cases. On the other hand, the public good nature of natural resources, including the presence of various market failures, justified government intervention in market prices to ensure efficient management of the resource base. This dilemma was not resolved, but it was agreed that the analytical capacity to undertake the analysis of such resource management questions needed to be strengthened, both in aid agencies and in developing country institutions. This would enhance the capacity for effective and appropriate public sector interventions in this difficult area of policy management.

The group felt that significant domestic political support could be generated around environmental concerns as a means of promoting agricultural growth. However, there was concern that without additional funds to support the natural resource agenda, governments in developing countries may be reluctant to adopt it as a priority.

IV. IRRIGATION

During the past two decades, expansion of irrigated land has been a strategic source of agricultural growth and a major component of Green Revolution technology. During breakout group discussions, stimulated by the two symposium papers on irrigation, participants voiced a serious concern over the fifty percent drop in the growth of irrigation investment that has occurred in recent years. This apparently reflects a response to lower world grain prices and lower-than-expected returns on donor-funded irrigation investment. Irrigation has been a cornerstone of agricultural growth in the era of Green Revolution technology (see Figure 1). Several group members felt that further serious attention to irrigation investment is required to maintain adequate levels of growth in food grain production and in agriculture in general, and that irrigation investment should be made in terms of long-range food requirements rather than short-run economic conditions.

There was considerable disagreement as to the rate at which new areas should (or could) be brought under irrigation, given the medium- to long-term forecasts of agricultural prices, the rising per-hectare costs for new irrigation investments, and competing demands for water by the urban and rural sectors. A representative from the World Bank stated that the Bank has decreased its levels of irrigation investment because it has obtained low rates of return. This assessment of poor economic performance was vigorously disputed by many symposium participants, who questioned the validity of the premises that led to such conclusions, particularly regarding the limited time horizons used in the analysis. Members of the breakout group felt that substantial gains in crop production could be achieved through improved water management and better operation and maintenance of existing systems. Consensus was achieved by focusing on "effectively irrigated area", which calls for new investment while

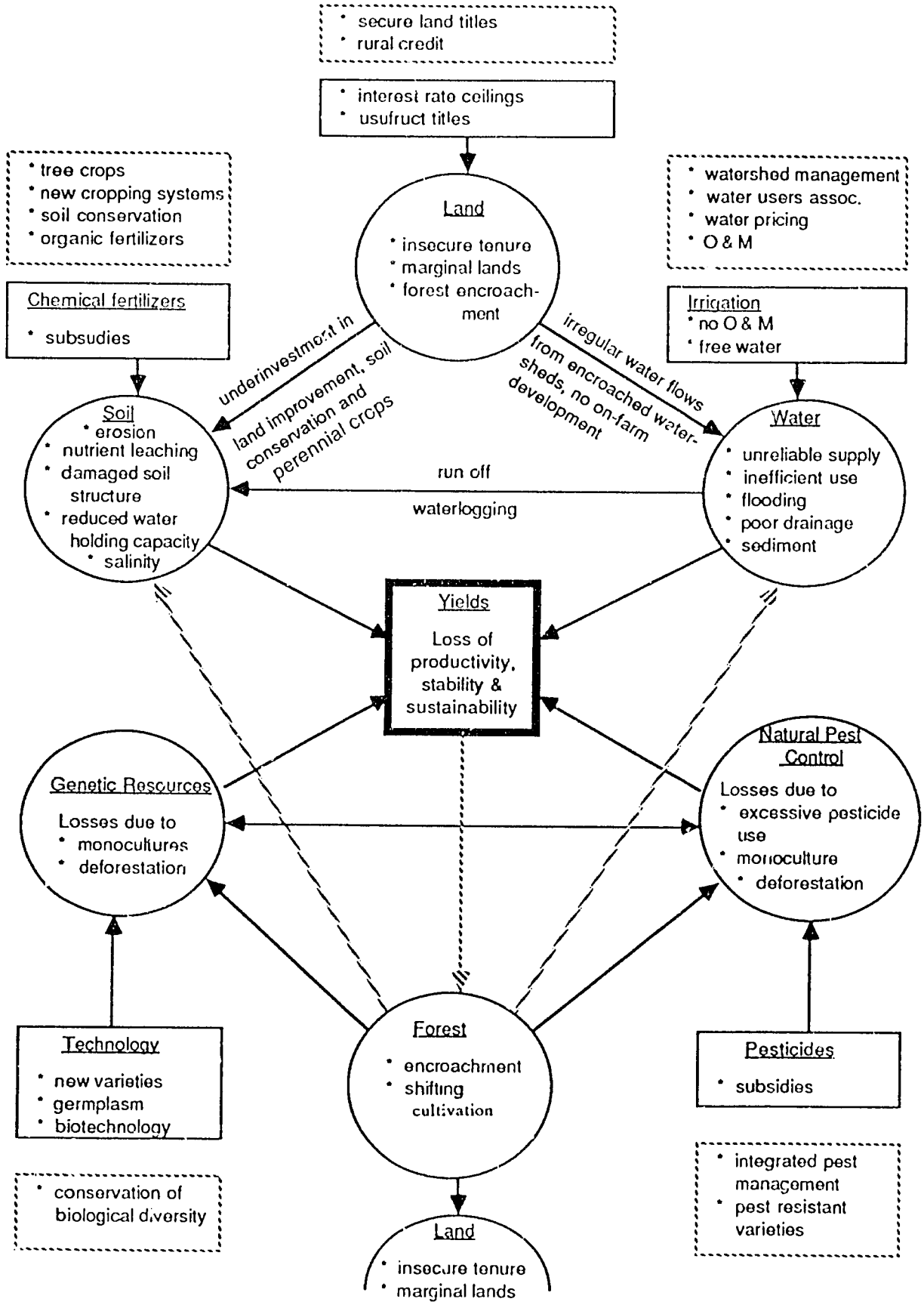
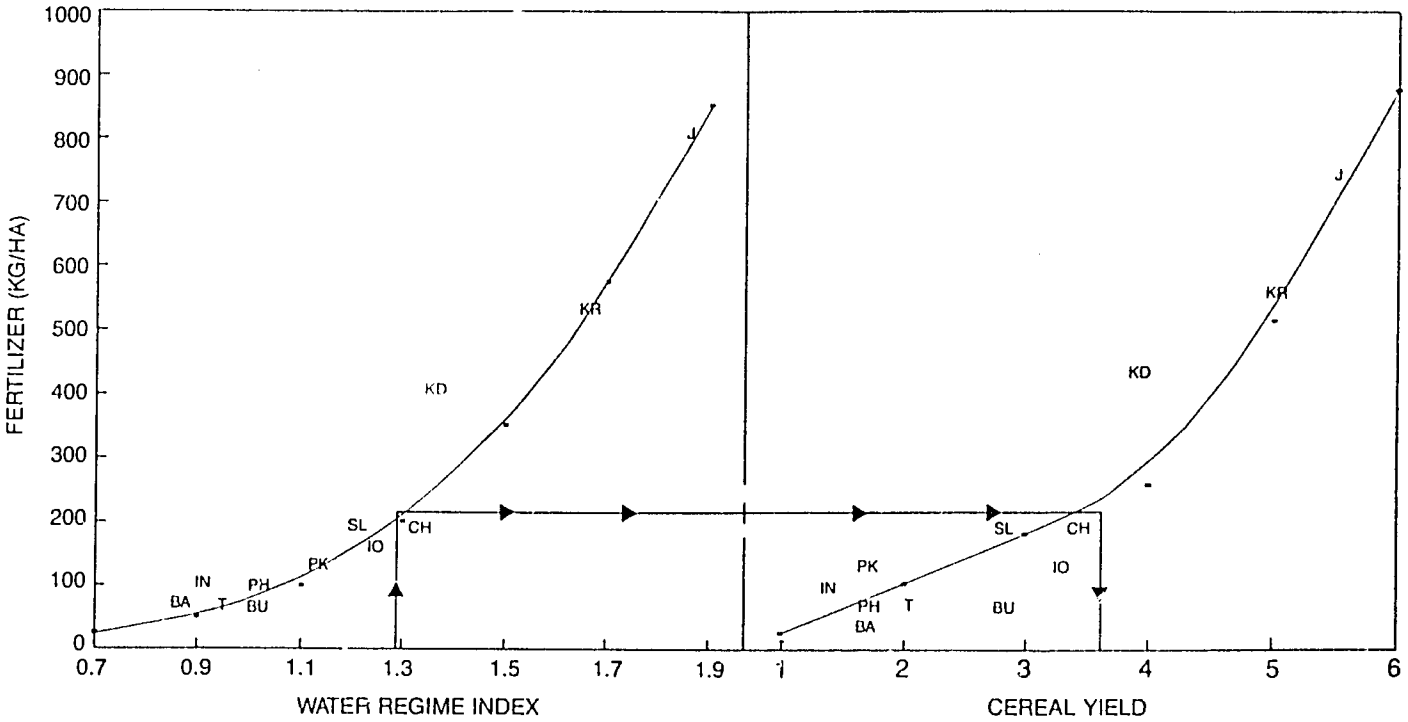


Figure 1: Loss of agricultural growth due to mismanagement of the agricultural resource base. Entries in the solid line rectangles indicate inferior or inadequate management policies. Entries in broken-line rectangles indicate superior or supplementary policies for improved resource management.

Figure 2:

Water Regime & Fertilizer/Ha for Cereals

Fertilizer/Ha & Cereal Yield
1980–85 Cereal Yield



Bangladesh (BA)
India (IN)
Korean Dem Rep (KD)
Philippines (PH)
Thailand (T)
Burma (BU)
Indonesia (IO)
Nepal (N)
Rep. of Korea (KR)
China (CH)
Japan (J)
Pakistan (PK)
Sri Lanka (SL)

simultaneously stressing improved management of water resources at all levels, tied to the generation of improved irrigation data and improved performance indicators. Clearly, however, this source of agricultural growth, which has been so important to past performance, is becoming increasingly difficult to realize through direct investment in structures supported by AID agencies with construction-oriented programs.

Echoing the arguments presented by other groups, the irrigation breakout group felt that while irrigation investments can make an important contribution to economic diversification, in general this process should be market- or demand-led. Within this context, new investments or improvements in existing irrigation systems should be designed for flexible operations, enhancing the capacity of the rural sector to respond efficiently to the process of diversification and structural change.

V. TECHNICAL CHANGE

There was consensus that the decline in growth rates of Asian rice and wheat yields since 1983 was structural and not a transitory phenomenon. While there may be greater potential for genetic improvements in the minor crops, participants felt that investments in those crops should not be at the expense of the major food staples, whose traditional sources of growth, irrigation and new seed technology were in question for the coming decade. There was remarkable consensus among participants that while biotechnology advances in rice and wheat were possible, it was very unlikely that results as dramatic as those supporting the Green Revolution could be achieved in the 1990s. The sources of improved productivity during the 1990s will come primarily from improved management practices. This, however, may prove to be more difficult and costly to achieve than the past genetic improvements. Participants expressed real concern that cereal production would lag behind the growth in demand in the coming decade.

They agreed that the international centers should continue to play a critical role in the preservation and provision of food grain germ plasm. Maintaining technology-related information systems that link national and international centers was also stressed. In addition, continued investment in human capital formation, particularly at the post-graduate level, was seen as a critical component in improving the long-term performance of the national agricultural research centers.

Improvements in the cereal and minor crop varieties for rain-fed areas were recognized as potential sources for improved equity and natural resource management. However, the return to such investments would depend on the level and quality of rural infrastructure. Continued investment in the latter was also advocated. Finally, participants unanimously agreed that the private sector could play a fundamental role, both in generating and disseminating technical knowledge, with particular emphasis on the latter.

VI. CROSS-CUTTING THEMES

During the breakout group and plenary sessions, a number of issues were discussed that were not on the original agenda. Three of these issues arose repeatedly, and appeared to constitute important cross-cutting themes. They are: the necessity for enhanced rural infrastructure; the need for sophisticated analysis of resource allocation issues at the micro and macro levels; and the high pay-off on investments in human resources.

Rural Infrastructure

Although the topic was not the primary theme of any breakout group, the strategic impact of investments in rural infrastructure (other than irrigation, which is covered above) and the need for more donor support in this area was an issue that came up frequently during the symposium and was highlighted in some of the papers. Comparative analysis of ANE countries shows the important role of rural infrastructure, particularly marketing and transport investments, in promoting rural economic growth, enhancing the diffusion of technology, and generating off-farm employment. Particular attention was focused on the contribution of rural infrastructure to lowering marketing costs and facilitating the process of rural diversification. While participants recognized the need, they also expressed concern about the cost and the availability of sufficient donor funds.

Need for Analysis

Agricultural growth in ANE countries has been supported by breakthroughs in agricultural technology and large, donor-supported investments which will be more difficult to secure in the coming decade. In addition, many countries in the region have introduced policy reforms which promote increasing integration with the world economy and a more sophisticated relationship between government and the private sector in the marketplace. These changes place new burdens on and introduce new dimensions to policy management and the management of agricultural services such as irrigation and research. In this context, there is a high premium placed on improved problem identification, and on the measurement of alternative patterns of resource allocation. In order to respond effectively, substantial analytical and managerial capacity is required on both the donor and countryside. Countries in the ANE region can now draw on three or four decades of recent experience with development policies and programs. There is a need for clearer understanding of the results of these policies, with an aim toward developing a more sophisticated approach to dealing with the new challenges of the coming decade.

Human Resources

AID has a long record of investment in human resources. The need to sustain these past investments and to continue building such capacity was identified often by symposium participants in the various breakout groups and plenary sessions. The United States has a strong comparative advantage in supporting this capacity building process.

CLOSING REMARKS

By William Fuller

William Fuller, Deputy Assistant Administrator of the ANE Bureau, provided the closing address to the conference. In introducing his comments and reactions to the agenda proposed by the plenary session, Fuller reflected on the lessons of the development experience in the region. Attempts by countries to achieve self-sufficiency in food production, liberalize their trade regimes, and invest in agricultural research capacity were highlighted as important features of recent development efforts. However, concern was voiced that parts of the region may not have benefitted from the development process, and that the future was uncertain given that many countries reach technology limits or yields, and that knowledge as to how to promote off-farm employment was still relatively undeveloped.

Looking to the future, Fuller was encouraged that past efforts had generated a better understanding about the role of agriculture in the development process. Improved knowledge of markets, in general, and the role of the state and its influence, in particular, could lead to more successful agricultural development in the future. The importance of food security issues and assisting countries in cushioning price instability were also highlighted as important lessons as AID plans its future work in agriculture.

Fuller argued that global economic forces and the macro, trade, and financial policies of individual countries would continue to have a strong effect on the rate and structure of agricultural growth in ANE countries. Given strong linkages with other sectors of the economy, the boundaries of agricultural policy have become blurred. Indeed, the solution to the problems of agriculture, with generation of employment as a top priority, may be addressed more efficiently by policies affecting other sectors of the economy. Finally, in assessing past development efforts, Fuller expressed regret at the propensity of donors to back out of institutions prematurely. The withdrawal of support for agricultural universities or agricultural research institutions by USAID was highlighted as an example of this trend.

In discussing the future role of USAID, Fuller presented a sobering picture of the economic and political constraints likely to prevail in the next decade. The existing national trade and fiscal deficits, national security concerns, other congressional interests, and limited constituencies are critical factors limiting the support for foreign development assistance. Within AID itself, a lack of critical skills in some areas and the inflexibility of bureaucratic regulation were identified as important constraints. Fuller was optimistic that the current examination of the Foreign Assistance Act, the possibility that resource demands of the national security agenda might lessen as regional conflicts are resolved, and global concerns for economic growth, the environment, and international trade could provide the backdrop for AID's development agenda in the 1990s. However, this would require that USAID establish a clear set of priorities, provide a compelling story for its constituencies, and improve its own analytical capacity.

Responding to the propositions generated by the symposium, Fuller was quick to rule out future funding of infrastructure development or large new investment in irrigation, except in those few countries such as Egypt and Pakistan with unusually large infrastructure programs. However, support and maintenance of existing infrastructure systems was deemed feasible. He emphasized AID's continued interest in and capacity for strengthening technical assistance and development of policy research and management capacity, in developing countries as well as within AID. Arguing that policy reforms often break down at the implementation stage, Fuller hoped that AID could contribute to the promotion of innovative methods of policy implementation. He cited the Indonesian tax reform as an example of USAID success in implementation of a policy package. In this context, Fuller suggested that the challenge of the 1990s would be to promote a healthy policy dialogue and a sense of collegiality between USAID and its counterparts in developing countries as they worked toward identification and implementation of the policy reform agenda. In concluding, Fuller suggested that USAID might explore the development of better capital and commodity markets to promote the efficient structural transformation of agriculture.

SOME CHALLENGES FROM THE ANE SYMPOSIUM ON AGRICULTURE IN THE 1990S

The aim of the symposium was to identify strategy issues facing ANE countries in the relationship between their agricultural sectors and the economic growth process in the 1990s. The challenge to AID now is to forge a program which enhances resources and resource utilization while staying within the resource constraints, both human and financial, facing AID itself.

Symposium participants identified a number of themes that would characterize the 1990s:

1. The increasing importance of farm and sector level resource management relative to technical change as a source of agricultural productivity;
2. A continued need for selective investment in irrigation infrastructure/facilities;
3. The requirement for substantial investment in rural infrastructure, particularly in transportation, communication, and marketing facilities;
4. The need for agricultural and economic policies which are consistent with environmental sustainability;
5. An increasing concern for managing price stabilization policies as market liberalization and alignment of domestic and world price levels proceeds;
6. A need for human capital formation to support sustained development, including a broad range of activities from economic policy management to research resource allocation to private sector involvement in the economic development process.

Perhaps the most striking feature of the symposium discussions was the widely-expressed concern about a slowdown in growth of staple grain production in a post-Green Revolution 1990s, and the continued need for large investment in rural infrastructure.

The ANE countries are not homogeneous, and together they represent a variety of economic growth paths and policy configurations. The relative importance of the six key issues will vary among countries. Thus, moving from broad statements about strategy to country-specific programs requires detailed country-level analysis. In addition, comparing the experience of countries within the region may provide a better understanding of the policy formulation process and the impact of alternative policy configurations on overall economic growth, the capacity for employment absorption, and the process of economic diversification. With such understanding, AID may improve its capacity to encourage and facilitate improved policy management in ANE countries.

Participants at the symposium expressed concern about the need to focus AID resources. In part, this was a recognition of diminished resources and AID's lack of comparative advantage in heavy resource using activities, such as electrical power and transportation infrastructure investments. In addition, the concern reflected a skepticism about the proliferation of AID's cross-cutting themes and the tendency for these themes to draw scarce resources out of more traditional, but nevertheless strategic, AID programs.

With increasing scarcity of developmental assistance resources it is important to distinguish between activities which represent commodity aid transfers and those which enhance resource productivity primarily through strengthening human capital formation. Although the relative need will vary among countries, in general AID would seem to have a comparative advantage in developing and supporting programs which enhance resource productivity. This notion would suggest an AID program focused on:

1. Promoting human capital formation in areas relating to resource management and development in the agricultural sector;

2. Enhancing the capacity--in the United States and in the ANE region—for understanding the management of the macroeconomic and food and agricultural policy;
3. Playing a greater role in donor coordination of country programs and in assisting other donors in the design of development programs.

The symposium participants identified a number of areas where foreign assistance resources will be required. Moving from issues of regional development strategy to the level of an AID program strategy, however, calls for consideration of institutional comparative advantage. The above three program areas which would enhance the strategy areas identified at the symposium, seem to be consistent with this approach.

APPENDIX 1

Economists "Get Together"

On Thursday evening the symposium agenda included an informal after dinner session over coffee and desert. In order to start the ball rolling four participants—Vern Ruttan, Wally Falcon, John Mellor, and Bob Evenson—were invited to present their views on any issue or issues which they wished to share with the group for discussion.

Vern Ruttan raised several concerns about the future of development assistance in general. Airing the regret that development assistance has often been the victim of US-Soviet conflicts, he nevertheless felt that future budgetary allocations would not be hindered by security concerns. Yet he predicted a gradual erosion of assistance in real terms. He also speculated that a "sense of common crisis", especially with regard to health and the environment, could help to mobilize resources. Along with external assistance, he felt that policies capable of mobilizing local resources for agriculture should be an important priority. Ruttan also emphasized the need to be more concerned with issues of health and quality of life of people in the rural areas and with the effect of development on environment. He concluded by saying that over time AID and foreign assistance activities had lost important constituencies in the United States. Nevertheless, there was a great need for this type of assistance and a great resource base represented by the community of development specialists throughout the university system and elsewhere. He hoped that this symposium could mark the beginning of more frequent interaction between this community and AID in developing the foreign assistance policy agenda for the next decade.

Echoing the concerns raised by Ruttan, Wally Falcon was not shy in raising his list of doubts about the future. Concerned that water resource management was being neglected by donor agencies, he warned that development efforts would leave behind a substantial portion of the poor people in Asia on marginal land. Doubts were raised whether resources were available to improve the well-being of these people, and that even if resources were available, whether these would support the type of projects suitable to address their problems. Secondly, Dr. Falcon was skeptical about the contribution of economics analysis to public policy formulation in a "second-best world." Finally, the drawbacks of the CGIAR system were elaborated, with doubts raised about whether the system would be capable of addressing the research problems of agriculture in developing countries in the future.

John Mellor addressed the need to increase foreign assistance to promote human capital formation and physical infrastructure. Increasing mass human capital to improve the nutritional, health, and educational status of the rural population, and augmenting general investment to improve the university structure or higher education in developing countries, were equally emphasized. Within physical infrastructure, the need for investment in both higher level "central infrastructure" and mass rural infrastructure was highlighted.

Bob Evenson expressed the concern that donor agencies, AID included, tended to move resources into new theme areas prematurely. His research and observation shows that more traditional investments in agriculture continue to be powerful sources of economic growth. Although equity concerns are important, they are unlikely to be served by a slackening of economic growth. AID's track record on agricultural sector investments is a strong one, he stated. He expressed the hope that AID would continue to build on this experience and place a high priority on growth-producing investments.

In the general discussion that followed many views and concerns were expressed. Some USAID officials regretted that their agency, faced with declining real resources and a diffusion of the AID agenda, lacked a strong sense of purpose and vision. The non-AID participants reflected similar concerns and lamented that capacity in macro-economic and policy analysis, which AID once had, has all but disappeared. There was general agreement that analytical capacity to deal with the macro and sectoral policy issues identified at the symposium needed to be built in-house at AID, in Washington and the field. Creating further links between US academic institutions and USAID was seen as a way to focus on developing the capacity of USAID officials to provide the necessary analytical support for their field-level policy staff. For many participants, even the senior economist, this symposium was the first time in many years that AID had reached out to the development community to solicit views on a broad strategy agenda. Given the upheaval in the economic environment and in the policy agenda of recent years, this was a welcome opportunity. Participants expressed real appreciation and hoped that AID and the community of development policy economists would have more frequent interaction.

APPENDIX 2
Participants by Breakout Group and Affiliation

Irrigation & Water Policy:

Shawi Barghouti	World Bank
Randy Barker	Cornell University
Michael Korin	USAID
Gil Levine	Cornell University
Stan Peabody	USAID
David Seckler	Winrock
Ed Stains	USAID/Cairo

Natural Resource Management:

George Armstrong	AID/ANE
David Bathrick	AID/S&T
Eric Chetwynd	AID/S&T
Richard Grimshaw	World Bank
Theodore Panayotou	Harvard University
Janet Poley	USDA/AES
Rob Thurston	USAID/Katmandu
Charles Uphaus	AID/ANE

Pricing & Stabilization Policy:

Rais uddin Ahmed	IFPRI
Joan Atherton	AID/PPC
Wally Falcon	Stanford University
Martin Hanratty	AID/ANE
Teroyoshi Kumashiro	Japan International Cooperative Agency
Norm Nicholson	AID/ANE
Pat Peterson	USAID/Islamabad
Peter Timmer	Harvard University
Laurian Unnevher	University of Illinois

Technical Change:

Derek Byerlee	CIMMYT
Dick Cobb	AID/ANE
Ralph Cummings	AID/ANE
Bob Evenson	Yale
Bob Herdt	Rockefeller Foundation
Marcus Ingle	University of Maryland
Anamaria Long	AID/ANE
Jim Lowenthal	AID/ANE
Carl Pray	Rutgers University
Vern Ruttan	University of Minnesota

International Trade:

Henry Bruton	Williams College
Richard Goldman	Harvard University
Donald McClelland	AID/PPC
John Mellor	IFPRI
Scott Pearson	Stanford University
Mathew Shane	USDA/ERS
Don Sillers	AID/ANE
Dick Suttor	AID/ANE

Symposium Staff:

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Teri McCoy	Logistical Support
Junaid Kamal Ahmed	Recorder
Kirsten Russell	Recorder
Dennis Weller	Recorder
Paul Novick	Recorder
Lucy Winchester	Recorder

APPENDIX 3
Symposium Papers

Agriculture and Structural Change: Policy Implications of Diversification in Asia and the Near East (Carol F. Timmer)

Agricultural Prices and Stabilization Policy (C. Peter Timmer)

The Role of Agriculture in Employment Generation and Income Distribution in Asia and the Near East (C. Peter Timmer)

Agriculture and Fertilizer Policy (Junaid Kamal Ahmad and Walter Falcon)

Employment and Income Growth in Asia: Some Strategic Issues (Rais uddin Ahmed)

The Impact of Economic Policy and Structure on Patterns of Food Demand in Asia and the Near East (Richard H. Goldman)

Agricultural Research and Technology in the 1990s in Asia and the Near East: Trends and Possible Strategies for Aid (Carl E. Pray)

Irrigation in Asia and the Near East in the 1990s: Problems and Prospects (G. Levine, R. Barker, M. Rosegrant, and M. Svendsen)

The Role of Irrigation in the Agricultural Development of Asia (David Seckler)

Institutional Sustainability and Rural Development: Issues for Asia and the Near East in the 1990s (Arthur A. Goldsmith)

Agriculture and Rural Development in Asia and the Near East: A.I.D. Programs and Strategies (R. Suttor, P. Muscato, L. Winchester, and J. Lee)

Trade and Development: The Complementarity of Agricultural Trade (Mathew D. Shane)

Human Capital and Agricultural Productivity Change (Robert E. Evenson)

APPENDIX 4
Paper Abstracts

Agricultural and Structural Change: Policy Implications of Diversification in Asia and the Near East
Carol F. Timmer and C. Peter Timmer

In the mid-1980s, the rice-based and wheat-based economies of Asia and the Near East began to face the problem of widespread surpluses, which forced down rice and wheat prices in domestic and international markets. The resulting low incomes for farmers who were not protected from price declines caused these farmers to search for alternatives to rice or wheat cultivation. Countries that kept domestic prices above the low prices in the world market often faced large budgetary costs, and these governments sought to diversify their farmers out of the basic food staple. Donor agencies, especially the World Bank and the Asian Development Bank, found their agricultural portfolios heavily invested in rice-specific irrigation systems, with very low economic returns being generated when evaluated at world prices. Rural diversification thus became a vehicle for alleviating the distress caused at three levels—farmers, governments, and donors—by the collapse of world wheat and rice prices under the pressure of large supplies in the mid-1980s.

Designing and implementing new policies and investment strategies to foster rural diversification turned out to be a complicated undertaking, however. Two major trade-offs

surfaced very quickly as governments attempted to respond to the "crisis of success." First, a concern for income distribution—farm incomes were already lower than urban incomes—conflicted fairly directly with efficiency considerations, at least in the short run, and governments found it difficult to choose one or the other or an appropriate balance of the two. Attempts to have more of both created a second important trade-off, between incurring large budgetary costs to stabilize rice or wheat prices and passing on the costs to consumers. The dilemma for these countries, especially the ASEAN-4 countries of Indonesia, Malaysia, the Philippines, and Thailand plus parts of South Asia, is in reconciling their concerns to minimize the adjustment costs to the rural sector of coping with low cereal prices, to keep their budgetary costs under control, and all the while to be sure that future patterns of resource allocation are not badly distorted by the policies and investments initiated to cope with the short-run problem. In principle, the approach in the long run is to let the "pull" factors of higher incomes in the nonagricultural sector attract resources out of agriculture rather than let chronically low prices "push" farmers into urban jobs. Ultimately the process of rural diversification must be consistent with longer-run patterns of structural transformation. Arguably, the most successful countries will find ways to use the diversification process to stimulate this transformation, thus laying the groundwork for more efficient resource allocation and better income distribution.

Agricultural diversification is a much broader process than just finding new crops to grow instead of rice or wheat; it involves the entire rural economy and is a process of broadening and maintaining the sources of incomes of rural households. The process extends from the introduction of new crops into traditional farming systems to the development of off-farm jobs in small-scale rural industries and eventually to the exit of a significant proportion of the rural work force from agriculture as part of the structural transformation of the economy. At this level of generality, rural diversification is a gradual and inevitable process engendering little controversy.

The structural transformation is crucial to sustaining economic growth. Structural change is the ultimate measure of an economy's development because a society has safely managed the transition from a traditional primary-based and extractive economy to one based on technology and knowledge only when the modern industrial and service sectors make up a majority share of economic activity. Only economies based on technology and knowledge can offer sustainable improvements in welfare for a growing population.

Government policy makers in developing countries, however, are faced with a dilemma in managing this transitional process. It is shortsighted to allow farmers to be driven off their land by low prices for agricultural commodities, particularly in response to temporary price declines in world markets. Food security must be maintained and future supplies of the basic food staple guaranteed, whether rice or wheat. Despite the changing patterns of food demand that can be expected in the process of economic development, the large countries of Asia cannot rely on the world market to meet their requirements for the basic food staple; they must grow most of it themselves. Policy makers have to find a balance among the appropriate level of incentives to farmers to grow the basic cereal, policies that encourage some farmers or some agricultural regions to diversify their production and become less dependent on production of a single commodity for their incomes, and policies that encourage resources to flow out of agriculture together.

The first part of this paper describes the process of structural transformation of an economy from an agriculturally based one to a modern industrial and service based economy. The second part looks at structural change in the countries of South and Southeast Asia and the Near East. From this review of the comparative experience of these developing countries, important policy issues emerge. Higher rural incomes do not automatically result from diversifying agricultural production. Many other government policies, both within the agricultural sector and outside, affect the welfare of rural workers. Some countries have ignored their agricultural sectors; others seem to be overwhelmed by the magnitude of the problems of rural poverty, population pressures, and shortages of jobs outside of agriculture. The third part addresses these policy issues in the context of likely trends facing the agricultural sector in the 1990s.

Agricultural Prices and Stabilization Policy

C. Peter Timmer

This paper outlines the analytical underpinnings for the pragmatic approach to agricultural pricing that is so dominant in Asia. In contrast to the free market and structuralist schools of agricultural pricing, this third school of thought is tentatively labeled the "stabilization" school. The main contention of this school is that by following short-run price movements in international markets, an economy incurs significant efficiency losses, but the economy incurs equally significant efficiency losses by *not* following longer-run trends in international opportunity costs (whatever the market processes that determine them). Optimal *efficiency* thus calls for some degree of market intervention to stabilize short-run prices, but there must be sufficient flexibility to allow domestic prices to reflect international price trends. Rent-seeking behavior is constrained, if not eliminated, by using competitive market agents to carry out most marketing activities, but within government-established price bands.

While rejecting the call of free market advocates for no pricing interventions, the stabilization school also rejects the structuralist desires to use agricultural prices primarily as an instrument for redistributing incomes. Further, by encouraging the development of a competitive private marketing sector over time, the role of government price interventions can decline as the role of price stability for the basic foodstuff becomes progressively less important to the economy during the course of economic development. Structuralist- or socialist-inspired stabilization policies that actively seek to displace the private marketing sector have great difficulties when the opportunity (or budgetary need) comes for such a transition.

Neither the underlying analytical foundations nor workable operational procedures have been satisfactorily developed for domestic price-stabilization schemes to be implemented and evaluated with any degree of coherence. The fact that nearly all countries in Asia and the Near East attempt to implement such schemes suggests that the rewards to progress on both fronts—analytical and operational—will be very substantial. This paper is primarily concerned with operational issues of analyzing, designing, and implementing price-stabilization schemes. However, the paper lays out the basic logic of the analytical approaches in order to focus the discussion of operational issues on pricing strategies that are consistent with the theoretical rationale for their design and implementation.

The important analytical question for the stabilization school is not to demonstrate that the pervasive market failures in developing countries lead to non Pareto-optimal

outcomes, but that they are quantitatively significant relative to the cost governments would incur in order to alleviate them. It is already clear that large costs from price instability will not be found in the static, micro-based models that follow the Newbery-Stiglitz tradition. The paper focuses on the impact on investment behavior and on the macro economy as the obvious places to look for more significant benefits from price stabilization, as well as at consumer preferences for price stability in the presence of adjustment costs. No formal model is offered, but the likely ingredients of a model that would capture these effects include the following: displaced investments in physical capital at the farm level, the marketing sector, and the industrial sector; substitution of consumption and leisure for savings and work; biases in investments in human capital for the farm agent and intergenerationally in children; the transactions costs consumers face in reallocating budgets when prices change; the welfare gains from a psychic sense of food security (and voters in rich countries and poor alike place a substantial economic price on this factor); and the feedback from this sense of security to a stable political economy, which reinforces investors' willingness to undertake long-term (and hence risky) commitments.

The benefits from stabilizing the prices of basic foodstuffs, or other agricultural commodities with significant macroeconomic linkages, are considerably larger than those reflected in the models that have been used so far to analyze relative costs and benefits of price-stabilization programs. While little is known empirically about the size of the dynamic and macroeconomic benefits of stability, it is difficult to agree that they should be ignored in the evaluation of such programs. The pervasive, indeed universal, tendency of Asian governments to stabilize their domestic rice prices relative to unstable world market prices for rice suggests that the benefits may be very large. The relatively rapid economic growth in many of these Asian countries argues that the impact of efficiency losses and budgetary costs on growth cannot be too large, at least if the price-stabilization program is well designed and implemented. A focus on these operational issues of design and implementation, which are much better understood than the resulting dynamic and macroeconomic benefits, offers some practical guidelines in judging the efficacy of price-stabilization policies. The guidelines are drawn from countries that have been more successful than others in managing the complex tasks of intervening agricultural price formation without incurring unacceptably large budgetary costs or sacrificing long-run efficient resource allocation.

The operational significance of two basic principles identified in the paper—grain price stabilization both costs public resources and destabilizes either the government budget or the credit market—is quite profound. Failure to face them directly is the most common reason for failure of stabilization programs. Planning of stabilization activities can be based on expected values under normal circumstances, and budgets can be drawn up under these assumptions. But actual operations must be conducted as reality unfolds, and reality is likely to hold surprises with respect to the size of the harvest, level of consumer demand, expectations of the private sector and its participation in storage and transportation, world market prices (in dollars), and the country's exchange rate. For a food logistics agency to cope with these surprises, it must be able to arrange for substantial credit lines on very short notice, often no more than a week or two. Many government agencies have difficulty allocating resources so quickly unless they understand in advance the need and can trust the logistics agency to spend the money, with adequate financial controls, for the intended purposes. It is no wonder that so few countries have been able to carry out this task successfully over a long period of time.

The Role of Agriculture in Employment Generation and Income Distribution in Asia and the Near East

C. Peter Timmer

Policy makers often put the question of agriculture's role in employment generation in a disarmingly simple way: how fast must the agricultural sector grow in order to absorb the new entrants to the labor force that cannot find jobs in other sectors? The notion that agriculture is the "employer of last resort" stems from conceptions of traditional agriculture rooted in dual economy models and "the moral economy of the peasant." If workers remain "behind" in the agricultural sector until they are needed in the modern industrial or service sectors, the answer is fairly simple—the agricultural sector must grow enough to provide food for the rural population to survive until workers migrate to better paying jobs, but beyond that planners will be concerned only with maximizing growth of industrial output. By raising the question, however, policy makers are, at least implicitly, raising a set of deeper and more complicated issues. The welfare levels of the rural labor force are themselves a significant part of the objective function, and welfare extends well beyond physical quantities of food available in the countryside. The real question being asked is "how fast must the agricultural sector grow to absorb the 'residual' labor at constant or rising standards of living?" That is, what agricultural development strategies will raise real wages in rural areas?

The answer to this question requires a broad understanding of both the supply and demand determinants of wage formation in rural labor markets, including the extent to which a supply-demand framework is even helpful in explaining the formation of rural wages. The diversity of experience in Asia and the Near East is truly mind-boggling, and no single model or set of parameters can begin to capture either the static situation or dynamic behavior. The purpose of this paper is much more modest: a review of some basic empirical trends and patterns with respect to agricultural employment and income distribution; a rough summary of the important elements that influence the demand for labor in the rural economy; an analysis of the instruments available to policy makers to manipulate those elements to influence income distribution, primarily through increases in real wages in rural labor markets; and a sketch of the analytical tools available for identifying key trade-offs and opportunities in the likely economic environment in the 1990s. The basic framework for the discussion is long-run equilibrium between trends in labor supply and demand leading to real wage formation in rural labor markets.

No readily available data show trends in real wages for unskilled workers in rural areas for the important countries in Asia and the Near East. Several proxies, however, provide useful glimpses at what must be happening to rural wages and are important indicators in their own right. The following variables are analyzed in the paper to provide insights into the structure and dynamics of the rural economy: the rate of increase in the agricultural labor force relative to the overall labor force; the share of the agricultural sector in GDP relative to the share in the total labor force; implied levels and changes in agricultural per capita incomes relative to

those in the nonagricultural sector; changes in labor productivity in agriculture relative to those in the rest of the economy; and changes in average levels of caloric intake.

At least three relatively discrete topics need to be treated in a discussion of the relationship between the agricultural sector and patterns of employment in a country. The narrowest concern, but possibly the most significant in quantitative terms for many countries, is how many people will find jobs directly in the agricultural sector under alternative growth strategies. For countries somewhat further along in the agricultural transformation, the indirect effect on employment of agricultural growth may be more important. The employment consequences of investments in rural infrastructure (and the second-round impact on agricultural employment when output then expands), of greater volumes of marketed inputs and output processing, and of evolving consumption and investment patterns eventually dominate the direct effects of employment in agriculture. And as commodity and factor markets become well integrated between rural and urban areas, the macroeconomic and general-equilibrium consequences for employment from changes in agriculture, especially changes in important food and agricultural prices, are likely to be the most important of the three factors influencing the relationship between agriculture and employment.

Investment in infrastructure has two important dimensions in employment generation in Asian agriculture. Rural infrastructure, in the form of irrigation and drainage works, roads, ports and waterways, communications, electricity, and market facilities, provides the base on which an efficient rural economy is built. Much of the investment needed to provide this base comes from the public sector, even when the private sector is playing the predominate role in agricultural production and marketing. Without this public investment, rural infrastructure is seriously deficient in stimulating greater production of crops and livestock, and the reduced employment opportunities are obvious. Investment by the private sector is also less profitable in the absence of adequate rural infrastructure, thus further reducing rural dynamism. The main role of investments in infrastructure in agricultural employment is no doubt through this longer-run stimulation of agricultural production.

A second role needs to be stressed as well. The investments in infrastructure themselves can generate substantial rural employment directly, and this potential has not been lost on planners seeking both long-run employment creation and short-run work programs to alleviate rural poverty or even famine conditions. "Food for Work" and "Employment Guarantee" schemes almost always are designed to build rural infrastructure using low-cost or unemployed workers. Large-scale irrigation and road construction projects offer the potential to employ vast numbers of unskilled rural laborers if project designers are sensitive to employment issues in the choice of technique and are willing to address the managerial problems that arise from labor-intensive techniques in construction.

The progressive commercialization of agriculture as more productive inputs are purchased and a greater share of output is marketed is more than just a stimulus to agricultural productivity; it also creates substantial employment in the agriculturally-related industries. In modern economics far more workers are engaged in agribusiness than in farming itself. Unfortunately, relatively few policy instruments are available to stimulate efficient employment in the agribusiness sector. Parastatal and state-owned enterprises have a poor record of commercial viability in most of Asia and the Near East. Their employment record may be "good" in terms of numbers of workers, but labor productivity—value added per worker—tends to be very low. More efficient firms and more productive workers emerge from a competitive private sector, and stimulating the development of such firms is now a high priority of most countries in the region. Because so many impediments to the private sector have existed historically, especially in the agribusiness/marketing field, policy reforms that end barriers to private-sector participation are an important first step. But stimulating private investment while creating a competitive market structure is a delicate task, not one for which most governments have any real experience. Policies that restrict licenses to a limited number of firms in order to guarantee market share might well induce investment, but they produce an oligopolistic market structure. By contrast, an aggressive competition policy might well scare off private investors, especially domestic entrepreneurs, at least initially.

It is fairly apparent that simply "getting prices right" in the agricultural and marketing sectors does not of itself induce the necessary private investments or competitive market structure. Inappropriate price policies are like other barriers to participation by the private sector; removing them might be necessary but not sufficient, in the absence of other institutional and legal reforms, to guarantee greater involvement by the private sector. Economists are woefully ignorant of the basic causes of the "animal spirits" that motivate private investors, but the need for a competitive market structure is compelling to the profession. Businessmen are happy to explain what they need to make a profit; a government-guarantee of that profit would then lead them to invest. Striking the right balance between the two perspectives will take pragmatic experimentation with alternative policies.

The most powerful lessons on the relationship between agricultural change and income distribution are the need to stimulate agricultural productivity and to foster the intersectoral links that contribute directly to agricultural development, employment, and rising real wages. When the industrial and service sectors are growing efficiently and have strong market linkages to the rural economy, an agricultural sector that grows fast enough to raise labor productivity, combined with a price-stabilization policy that assures income gains to farmers and access to food for low-income consumers, will raise rural wages and improve income distribution. There are no tricks here; only a coherent food and agricultural policy maintained for several decades can make a sustainable difference to the poor. Managing short-run price policy to stabilize the real incomes of the poor while protecting long-run investments in the rural sector provides an important guarantee of welfare levels of the most vulnerable with the shortest time horizons. But food price policy cannot solve the problem of hunger any more than it can the problem of agricultural productivity. For both problems, agricultural development that raises real wages is needed.

Most agricultural development policies that influence rural wage formation do so via the demand side of the equation. The main instruments are investments in rural infrastructure, including irrigation with its second-round impact on multiple cropping; new technologies that raise yields, increase labor requirements, shorten the growing season, and permit a second or third crop; adequate price incentives to stimulate on farm savings and investments and roundabout expenditure multipliers; and a favorable environment for vertical diversification, which steadily transfers workers from agriculture to industry and the service sector, even if it leaves them in rural areas (and living on the farm). These are the ingredients of

agricultural development and structural change. Their successful implementation depends on a healthy relationship between the agricultural sector and the rest of the economy, in terms of both market linkages and policy balance.

Agriculture and Fertilizer Policy

Junaid Kamal Ahmed and Walter Falcon

Fertilizer is a unique input. Its large contribution to agricultural production makes fertilizer crucial to any strategy designed to speed the modernization of the rural economy. Its volatile prices in the international market create linkages to the macro economy through the balance of payments and government budget, as well as through instability in food supplies if the international prices are routinely passed through to farmers. A country that chooses to produce its own fertilizer to circumvent instability in world markets faces a technology with increasing returns to scale, large capital costs, and requirements for guaranteed access to low-cost feedstocks. Whether fertilizer is imported or produced domestically, an efficient marketing infrastructure is needed to ensure widespread and timely dissemination and distribution. Farmers must know about the use of fertilizer and be able to afford to buy it in optimal amounts.

These issues must be resolved simultaneously, a daunting task for policy makers seeking to develop a coherent fertilizer policy. In the face of significant market imperfections, the unique features of fertilizer require governments to intervene and establish an efficient fertilizer strategy. This paper emphasizes the importance of pricing policy as the crucial link to the three primary levels of concern: domestic production or imports as a source of supply; the nature of government involvement in marketing and distribution; and the role of government policy in stimulating farm-level demand for fertilizer and a more dynamic agricultural economy. No government will leave all of these concerns to the free market. The key question is which interventions will improve efficiency and set the domestic fertilizer economy on a sustainable path. Given the importance of the industry and the large sums of money involved, the answer must deal with both the economics and the politics of the question.

This paper analyzes different aspects of government intervention in the fertilizer sector. Emphasis is on the effects of the various pricing policies undertaken by governments, their justifications, and long-run impact. Experience of different Asian countries is stressed, and general policy conclusions are put forward based on the lessons learned since the mid-1960s. A case is made that government intervention in the fertilizer sector is not only pervasive, but that some of it has an underlying economic rationale. This paper provides guidance on the types of intervention that are consistent with such a rationale, the feasibility of their implementation, and the economic and fiscal costs likely to be incurred. The types of interventions likely to be counterproductive are also identified. The primary sources of market failures that justify government intervention occur at the supply and demand ends of the fertilizer system. Government interventions in marketing and distribution have often been counterproductive. Designing a fertilizer strategy that copes with the mixed roles of government and the private sector in such circumstances has eluded most countries in Asia and the Near East.

There are only three ways for a country to supply its nutrient requirements for the agricultural sector: import from the world market, produce the fertilizer in a modern domestic plant, or use organic techniques of nutrient recycling. No country has been able to use the latter approach to sustain rapid increases in agricultural output, and most policy makers see the choice of supply as between imports and domestic production. If a decision is made to produce domestically, and this is nearly always a policy decision even if the private sector will own and operate the plants, then issues about timing and sources of investment arise, along with associated issues of domestic producer prices relative to fertilizer prices in the world market. Many developing countries since the mid-1960s have accelerated domestic investment to promote self-sufficiency in fertilizer production. In developing countries, fertilizer production has increased from 13 percent of the world total in 1975 to 32 percent in 1985.

For countries that have the necessary natural resources and a growing internal demand for fertilizer, domestic production can be efficient if the economy's exposure to fertilizer price instability in the world market is reduced and its subsequent macro effects dampened. But such benefits can be negated by improper timing of investment in domestic plant capacity and inefficient producer pricing. Because of increasing returns to scale in fertilizer production, domestic plants that come on-stream substantially before there is adequate growth in domestic demand result in production inefficiencies and capacity under-utilization. If the government subsidizes the export of domestically-produced fertilizer, improper timing of investment can lead to large budgetary outlays. Likewise, if the government's pricing policy is one of setting ex-factory prices that sustain inefficient production, the policy may succeed in buffering the economy from short-run fluctuations in the world market, but at significant economic cost. An efficient and effective fertilizer supply policy thus requires a delicate balance of policies for trade, investment, and producer pricing.

On the demand side, the use of a fertilizer subsidy for farmers has been justified most often to increase agricultural production, particularly in countries in which food self-sufficiency is a major policy objective. Policy makers usually see the fertilizer subsidy as a tool for offsetting the effects of low agricultural prices and for improving income in the rural sector. At the same time, fertilizer subsidies are heavily criticized on the basis of neoclassical models of economic efficiency for their distortions of incentives and adverse impact on income distribution.

In a textbook world of complete and perfect markets, there is no need for taxes or subsidies to promote economic efficiency. In the presence of certain types of market failures, however, a potential case for government intervention can be made. In fertilizer use, policy analysts point to three potential sources of market disequilibrium: risk-averse behavior on the part of farmers, inadequate knowledge about the productivity of fertilizer use, and imperfections in capital markets. As a result, it is argued that farmers will underinvest in fertilizer. A fertilizer subsidy can be used to compensate, at least partially, for these various sources of disequilibrium. A subsidy serves to some extent as a substitute for crop insurance and a rural credit market. It also provides incentives for farmers to experiment with higher levels of fertilizer, thereby speeding the learning process about optimal applications. To the extent that risk aversion, inadequate information, and imperfections in capital markets lead to a departure in fertilizer use from the social optimum, a fertilizer subsidy should *improve* the efficiency of resource allocation.

The actual implementation of fertilizer policy in Asia and the Near East presents a major puzzle to economic analysts. Analytically, the potential for intervention into the fertilizer

sector to improve economic welfare has been demonstrated in country after country. No country has ignored this message. All the countries in Asia and the Near East intervene into their fertilizer sector in one way or another, and most intervene massively. State control of fertilizer imports and exports, state-owned or licensed fertilizer factories, monopoly distribution rights for a government firm or restricted set of semi-private firms, and controls over fertilizer use by farmers are the norm throughout the region. Interventions at the level of farm use are especially popular, with price subsidies, extension workers, model farmers, and village leaders all encouraging farmers to use more fertilizer.

Despite the apparent match between analytical design and policy implementation, the record of the fertilizer sector in these countries is strewn with the wreckage of repeated failures. In virtually every country and in virtually every area of government intervention, the actual results have usually been dramatically worse than promised by the models. If government intervention is necessary to create a modern fertilizer sector in a developing country why do governments in fact do it so badly? The answer must be found in models of political economy and public choice rather than narrower models of project costs and benefits. The two together, however, provide ample insights into why things go wrong so often.

The fertilizer sector is an irresistable source of funds for government officials, off-budget operations, and favored clientele in the private sector. No country can do without fertilizer. *Some* mechanism must be found to supply it to farmers if agricultural output is to grow. Even in relatively small countries where domestic production of fertilizer does not make economic sense, controlling imports provides lucrative opportunities for over-invoicing, side-payments for distribution licenses, and informal taxes throughout the marketing chain. The task for fertilizer policy in the 1990s is to find a path through the minefield of market failures *and* government failures by limiting interventions to those areas where both analytics and potential to control corruption are promising. Experience of the last several decades provides some insights.

First, there are substantial benefits from domestic production of fertilizer if the basic natural resources are available to permit reasonable costs of production. Ownership of the plants is not the key element in determining the efficiency of operation; ex-factory pricing policy is. Aid donors have not always been as helpful in reaching the right decisions in this arena as they might be. Fertilizer factories make marvelous aid projects. They are discrete entities, absorb lots of money, can use Western machinery and technology, and require little donor monitoring. To guarantee a reasonable rate of return on the investment, however, donors often insist on guaranteed ex-factory prices. Such a pricing policy has very negative effects on choice of technique and operating efficiency.

Second, once a country has the domestic capacity to produce fertilizer, beneficial pressures are generated to develop an effective distribution system to deliver it to farmers. One argument for domestic production is the reduced exposure to instability of fertilizer prices in world markets, but the enhanced regularity of supply to farmers because of domestic production is a separate factor. In political terms, the fertilizer producers are an additional weight in the balance between farmers' desires for regular and low-cost supplies as opposed to government officials' desires to control and extract rents. Tipping the balance in favor of farmers by fostering a more effective distribution system has helped avoid fertilizer shortages when foreign exchange crises occur. Farmers who are totally dependent on imports for their supplies do not have this added support for their interests.

Last, "pure" solutions are guaranteed not to work. Total government control of the fertilizer sector has proven very high cost and insufficiently effective in delivering supplies to farmers. The dynamic losses in efficiency are larger than either the allocative or X-efficiency losses, although the latter can be extremely large in some circumstances. A free-market approach solves some of these problems but creates others, including the likelihood that no fertilizer industry at all will emerge from domestic investors. The resulting instability may dampen the entire growth process as well as threaten the political survival of any government that attempts such a strategy. Some combination of market forces and government interventions is needed, with the market providing allocative signals, the government stabilizing them around a market trend, and a competitive private sector delivering the goods at low cost. The challenge is to see if any country can find and sustain this magical combination.

Employment and Income Growth in Asia: Some Strategic Issues

Rais uddin Ahmed

This paper examines the economic progress made during the last two decades (1965–85) by some selected countries of Asia: India, Pakistan, Bangladesh, and Sri Lanka in South Asia; Thailand, Malaysia, Indonesia, and the Philippines in Southeast Asia; Korea and Japan in East Asia.

South Asian countries have realized a very slow growth rate in per capita GNP compared to Southeast and East Asian countries. The per capita GNP of Thailand was about twice that of India in 1965. By 1985, Thailand's per capita GNP was more than three times that of India's. Indonesia had about the same level of per capita GNP as that of India in 1965; now it has twice that of India. South Korea's per capital GNP was about three times that of India in 1965, but South Korea raised that level to make it eight times by 1985. The difference in the pace of growth in per capita GNP within South Asia is less dramatic, but yet noteworthy. Bangladesh's per capita GNP was roughly three-fourths that of India's in 1965, but Bangladesh has slipped down to the per capita GNP that is half that of India's in 1985.

Growth in employment roughly corresponds to the growth in production, but there are considerable diversities among countries in sectoral growths in employment. Moreover, available employment statistics do not reflect the degree of underemployment. The performance in growth rates of average income and production seems to bear only a weak but positive association with the alleviation of poverty.

Simultaneous success in economic growth and alleviation of poverty seems to be quite important in developing countries of Asia. It is argued in the paper that an appropriate development strategy is the key to this success. In the context of emerging agrarian structure of most developing Asian countries, particularly in South Asia, such a development strategy must pinpoint priority to agriculture and rural non-farm employment. Agriculture alone is not sufficient for reducing poverty and accelerating growth. Three factors, namely (a) development of rural infrastructure, (b) generation and spread of modern technology in agriculture, and (c) exploitation of international markets through a number of macropolicy measures, constitute the strategic elements of such a development strategy. Some empirical evidences are presented to buttress these arguments.

The Impact of Economic Policy and Structure on Patterns of Food Demand in Asia and the Near East

Richard H. Goldman

Many countries in the ANE region have achieved impressive growth in per capita consumption of calories in the past couple of decades. Others have been less successful. The rate of population growth has varied widely among these countries. This has helped some countries and hindered others in their attempt to improve per capita availability of food. The countries in this region have relied on a variety of policy instruments to achieve food consumption and other development objectives. Analysis shows, for example, that per capita consumption in some countries has been stimulated largely by pricing policy, while other countries have relied more on income growth, particularly in rural areas. A comparison also reveals that countries relied to varying degrees on production and trade policy to achieve consumption goals. In some countries the entire increment of Green Revolution-induced production was used to enhance per capita availability of cereals, while in others much of the added production was used for import substitution. There is, as well, a group of countries where, despite low agricultural growth, dramatic improvement in per capita food consumption was achieved through expansion of food imports.

In the coming decade, demographic and economic factors suggest that growth in demand for cereal calories will slow down. At the same time, diet diversification, which is already underway, will continue. Part of this process will result in an increasing demand for coarse grains for animal feed to support expanding demand for poultry meat and eggs and other feed-intensive protein sources.

Agricultural Research and Technology in the 1990s in Asia and the Near East: Trends and Possible Strategies for Aid

Carl E. Pray

IMPACT OF AGRICULTURAL R&D IN ANE

Agricultural research has paid off in the past. Recent studies of the major field crops indicate that research by Asian governments, by the International Centers of the CGIAR, and by the international and national research systems working together have consistently produced high rates of return to government investments. A few recent studies suggest that private R&D also produces high social rates of return.

Public research in the basic grains has had a generally favorable impact on income distribution. Much of the benefit from modern varieties have been passed along to consumers in the form of lower prices. Since purchases of basic grains make up a large share of the income of the poor, they benefit much more than the rich, who spend little on grain.

POTENTIAL FUTURE IMPACT

Agricultural research will continue to be a productive investment in the 1990s. There is some evidence that currently available technology and applied research may produce somewhat less growth in the near future. The spread of modern varieties of wheat is approaching 90 percent in Asia, and the spread of modern rice varieties may also be slowing down. Nevertheless, there are many technical opportunities for increased production through crop management research, research to spread modern varieties of coarse grains and oilseeds, and research on some plantation crops.

Biotechnology holds the promise of increasing yield stability through better control of disease and insect pests. This could have an impact on rice production in the next five to ten years, and on other crops later. It is unlikely to have much impact in the yield potential of major field crops in Asia and the Near East until after 2000. To increase yields, national research programs will have to build on the breakthroughs in biotechnology in rice, maize, and other crops in which basic research is currently underway.

TRENDS IN R&D IN ANE

Research systems in most ANE countries grew rapidly between 1960 and 1980. Since 1980, government R&D expenditure has gone up in some ANE countries, but down in others. R&D expenditures in all ANE countries are low relative to the size of agricultural GDP.

Research expenditure by the international agricultural research centers in the CGIAR has leveled off. Within the CG system, emphasis is shifting to sub-Saharan Africa. The number of international centers outside the CG is growing, and the CG is considering accepting some of them as members of the CG. Many of the new centers emphasize resource management rather than plant breeding.

Private sector research in Asia is growing rapidly, but from a very low base. Private research expenditures is now as large as public research only in a few crops such as maize in some ANE countries.

WEAKNESSES OF CURRENT SYSTEMS

NARs spend too little on agricultural research, particularly on the major food grains and subsistence crops. Most NARs in the ANE countries do have fairly strong applied plant breeding programs, but their research to adapt the results of applied research to farmers' needs is weak, and strategic and basic research is almost nonexistent.

Private research expenditures in ANE are much less than public expenditures. It is very applied, and concentrates on hybrid seed development, pesticide research, machinery development, and plantation research. As such, it neglects many of the same areas in which the public sector is weak.

The international centers are strongest in applied research. They are moving into biotechnology research. CG and non-CG centers are starting to work on some important resource management issues, but research on resources and the environment is still one of the most neglected areas of international and national research.

AID R&D PRIORITIES FOR THE 1990s

Countries: AID's R&D priorities should be investments in Burma, the Philippines, and other countries that have low R&D expenditures to Agricultural GDP ratios.

Within countries: Priority should go to the relatively favorable agricultural regions in countries where food production is still an important problem.

Commodities: Basic food grains have priority, especially in South Asia. Food grain self-sufficiency is still fragile in Asia. Production may not keep up with demand in Asia, and will fall further behind than it is today in the Near East. Technical opportunities for productivity growth are available, and countries are currently under-investing in food grain research.

Non-commodity research on resource and environmental issues must be strengthened.

Types of research: Adaptive research that tailors technology to farmers' needs, and strategic research, such as applying biotechnology to breeding stress-resistent crops, should receive the most attention.

Types of institutions: To increase food grain production, public research and CGIAR centers need support. For diversification, AID should support private research and the government agricultural research institutions. For more basic

biotechnology and resource research, LDC agricultural universities and general universities, international centers, and DC universities and private research companies must also receive resources.

STRATEGIES FOR IMPLEMENTING PRIORITIES

To increase the productivity of government research institutions in ANE governments, AID should encourage more participation in R&D priority setting by farmers and agribusiness. AID can provide money to existing farmer groups to fund research by the group or by other institutions. AID can support programs that help organize farmer groups. Finally, AID can encourage government research institutions to work more closely with farmer groups.

AID should also be investing in more basic strategic and basic agricultural research in ANE. This requires more than just scholarships, buildings and equipment. AID must find ways to support joint research, improve communications between scientists within LDCs, and with their colleagues elsewhere.

AID should do more to promote private sector research. It can help remove policy constraints on private research. It can encourage public research projects that will induce more private research, such as the development and release of superior inbred lines. Finally, AID may be able to subsidize private research on certain important topics.

Irrigation in Asia and the Near East in the 1990s: Problems and Prospects

G. Levine, R. Barker, M. Rosegrant, and M. Svendsen

Food grain production has grown at a rate of about three percent per year in Asia and the Near East for the past two decades. At the present time there is a sharp difference of opinion as to what the future holds for agriculture in this region. This difference of opinion is closely linked to uncertainties associated with the development of irrigation, which has played a central role in the achievement of rapid output growth.

TRENDS IN NEW IRRIGATION AND IN IRRIGATION INVESTMENTS

In order to better understand the current situation with respect to irrigation, we assembled data on the rate of change in new areas irrigated and on trends in irrigation investment by major international lenders (World Bank, Asian Development Bank, U.S. Agency for International Development, and the Japanese Overseas Economic Cooperation Fund). New irrigated area grew fairly steadily at a rate of about two percent worldwide, and in from the mid 1960s to 1980, but this growth rate fell to less than one percent in the 1980s.

Following the sharp rise in food grain prices in 1973, investments in irrigation by the major lenders rose sharply in the mid 1970s. But as food grain supplies have increased and prices have fallen in the 1980s, investments in irrigation and agriculture also have declined. Other factors that undoubtedly have contributed to this decline include the large public and foreign debt load carried by most of the agriculturally-based economies in the region, the decline in share of unexploited irrigation development and rising per-hectare costs, and the stiffening political resistance from environmental interests and those displaced or otherwise negatively affected by irrigation development.

The apparent cyclical fluctuation in irrigation investment raises questions about the appropriateness of benefit/cost or internal rate of return as the basis for project justification. The major lenders, dealing on a project-by-project basis, apparently do not see themselves as endogenous actors in the system, capable through their investment decisions of creating cyclical fluctuation in agricultural production. Given the long-term nature of irrigation investments, would it be more appropriate to treat irrigation in the manner of a utility or basic national infrastructure, such as roads and power?

ISSUES RELATED TO THE PERFORMANCE OF EXISTING SYSTEMS

The decline in irrigation investments raises a number of important issues, particularly regarding the performance and potential productivity of existing systems, which we have explored only briefly. First, and perhaps most obvious, as investments in new systems decline and there is a shift toward rehabilitation and qualitative improvements in existing systems, there is a need for more adequate ways to characterize and quantify irrigation services. Failure to develop such standards and techniques will leave us unable to measure the impacts of our investments. Very little information exists at present on the potential for developing new irrigation or for raising the productivity of existing systems.

Developing countries have been accused by international lenders of not properly maintaining their irrigation systems. How can efficiency in the operation of systems be improved? There is growing consensus that farmers should have more direct participation in the design, operation, and maintenance of systems.

Due to the extreme budget constraints that many governments are facing, there is a major interest in devising ways to obtain additional resources from farmers for O&M. The transfer of operation and maintenance responsibility to users, particularly at the tertiary or field channel level, is gaining popularity. There is a feeling, partially supported by research, that water user group operation of portions of the system is more efficient than government operation. Relatively successful techniques for assisting farmers in organizing water user groups have been tested in the Philippines, Sri Lanka, and Nepal.

The relatively low prices for rice and wheat, and the increasing costs for new irrigated land, have stimulated interest in the production of other crops. Diversification implies greater ability to respond to spatial and temporal variations in water need associated with diversified cropping patterns. There is a need to improve our understanding of the requirements of flexibility and of procedures for obtaining it.

IMPLICATIONS FOR USAID POLICY AND PROGAMS

The uncertainties in predicting the future of an important and complex sector makes the identification of appropriate investment activities difficult. Nevertheless, there are indications from past trends and in more recent experience that have implications for USAID's irrigation portfolio. These are summarized as follows:

- There are sufficient differences among countries of the region in terms of both irrigation potential and in the stage of irrigation development that *a single pattern to the development of irrigation activity is unlikely to be appropriate.*
- It is clear that, notwithstanding significant development of understanding of the irrigation sector and irrigation organizations during the past 15 years, there is still much that is not adequately known. Opinions differ widely as to the most appropriate investment strategies in different circumstances. The fact that these differences in opinion exist suggests that *increased study would be not only appropriate but urgent.*
- There is a great need for better data even to define the different qualities of irrigation so that one can access the

impact of investments on productivity. USAID should consider the fostering of increased capability in *data collection and problem analysis* to assist in significant policy, operations, and design decisions.

- There is a need to *examine more carefully the shifts in investment priorities* which have occurred recently within the irrigation sector and *the potential impacts of the downward trends in investments in new area irrigated* documented in this paper.
- One specific component of the sector where there is an obvious need for better understanding is the *role of the private sector* at both the water course and systems levels.
- In most of countries, *increased emphasis on effective farmer participation* in the irrigation sector would be valuable.
- In most countries, *increased attention to the structure and operation of irrigation organizations* would be beneficial.
- We need a *greater understanding of the rehabilitation process and of the tradeoff between rehabilitation and maintenance.*
- We need to understand how systems can be managed more flexibly to *enhance the potentials for crop diversification.*
- While it is anticipated that much of USAID's programs will emphasize the "software" aspects of the irrigation sector, *in countries with significant underdeveloped potential for expansion of irrigated area, support for development of physical infrastructure might be appropriate.*

The foregoing suggests that USAID has significant opportunities for major contributions to irrigation development in the region, but the appropriate country irrigation portfolios are likely to be complex and often different mixes of activities-physical infrastructure development, support of organizational and institutional change, and sponsorship of field studies, research, and training. *This represents a major challenge for USAID.*

The Role of Irrigation in the Agricultural Development of Asia

David Seckler

Throughout Asia, irrigation has been the lead input in growth of cereal yield. In the 13 Asian nations included for analysis, all of the countries appear to lie on virtually the same irrigation/fertilizer/HYV production function. Many observers believe that improved efficiency of water use through improved irrigation management and technology. This expectation may be largely unfulfilled, however, due to a fallacy of composition, since water losses measured on a local basis are often recovered in other parts of the system. Growth in total irrigated area in most Asian countries is declining. Only in India does growth exceed one percent per annum. There is a great need for data on cost of irrigation development and on the economic performance of recent irrigation investments. During the coming years, irrigation investments will have to be made with increasing care in order to maintain irrigation as a cost effective source of agricultural growth.

Institutional Sustainability and Rural Development: Issues for Asia and the Near East in the 1990s

Arthur A. Goldsmith

This paper looks at some of the factors that affect institutional sustainability, making particular (though not exclusive) reference to Asia and the Near East. It focuses (again not exclusively) on two sets of institutions that are central to rural and agricultural development. The first set are colleges or universities that teach agricultural science and related subjects; the second set are public agencies responsible for integrated rural development projects (or what is often now called area or regional development).

The focus on these two sets of institutions is in response to U.S. development strategy, which has given special attention to higher education and area development projects. Higher education, of course, is critical to the processes of technology transfer and agricultural diversification, while area development is central to better natural resource management and employment generation. USAID's experiences, in turn, have generated numerous insights as to how to bolster educational and regional development institutions, and have also stimulated demand from the field for guidance about nourishing these types of institutions in the future.

Institutional sustainability is not always a feasible objective, nor even necessarily a desirable one for some projects. Insurmountable external and internal problems can terminate almost any institution. The odds for sustainability are improved, however, when an organization is able to adapt itself to its environment and to bring its operations in line with its resource endowment. Achieving a "fit" among these internal and external elements is the role of organization strategy.

While AID and other donors devote much energy to international and national strategy issues, they have tended to ignore strategy at the organizational level. The study and training of project management has focused on administrative functions, i.e., on the routine tasks of budgeting, accounting, procurement, and so forth. Relatively little attention has been given to the entrepreneurial dimension of management, i.e., to the non-routine job of strategic planning and implementation.

The entrepreneurial function is well-known in the private sector, but as Schultz (1981) points out, it contributes importantly to the building of agricultural institutions in the public sector, as well. A public entrepreneur is someone who starts or elaborates a public organization and alters significantly the existing pattern of allocation of public resources (Lewis, 1980). It is increasingly evident that creative leadership of this sort is a major ingredient in the development of sustainable institutions.

The development field, to the extent that it deals with public entrepreneurship at all, often misinterprets it as solely a matter of charismatic leadership, and therefore as something unique and non-duplicable. Certainly the more flamboyant, daring aspects of entrepreneurship cannot be taught or repeated. Strategy formulation, on the other hand, is a transferable skill. For AID to increase the probability of institutional sustainability in the 1990s, it needs to rethink its approach to management training and to project design, to put greater emphasis on managerial choice, on developing strategies at the organizational level, on evaluating environmental conditions realistically, on anticipating change, and on not overreaching institutional limits. This would not guarantee institutional sustainability,but might improve the chances that any given project would continue to provide benefits after AID funding runs out.

Agriculture and Rural Development in Asia and the Near East: AID Programs and Strategies

R. Suttor, P. Muscato, L. Winchester, and J. Lee

Active agriculture and rural development (ARD) programs are located in 15 countries in the Asia and Near East (ANE)

region, extending from Morocco in the west to the South Pacific in the east.

The overall AID budget for development is $5.0 billion in the current fiscal year, of which $3.0 billion is managed by the ANE Bureau. Both amounts are considerably lower than levels of three or four years ago.

Funding for ARD projects in the ANE region has increased from about $500 million in the early 1980s to over $600 million in recent years. Over the last ten years there has been a shift in emphasis away from "bricks and mortar" toward "softer" activities such as research, education, training, and management.

The ARD programs in the ANE region are complex and varied. Some representative projects are irrigation construction in Egypt, Pakistan and Sri Lanka; imports of fertilizer in Burma; production credit in Egypt and the Philippines; numerous research, extension and education activities; policy analysis and planning in Sri Lanka, Thailand and Tunisia; and natural resource activities in India, Thailand and Sri Lanka.

Each country mission periodically prepares a Country Development Strategy Statement. As part of the overall strategy, the ARD strategy typically emphasizes relaxing constraints on agricultural productivity, increasing agricultural production by increasing input availability, and encouragement of a policy environment which enhances rural employment and hence rural incomes.

In all but two of the country strategies reviewed, the ARD strategies include development and maintenance of an effective, coordinated and self-sustaining research and educational capacity from which agricultural technologies may be developed and disseminated.

All country strategies examined, with the exception of Burma, included emphasis on policy. About half of them focus on macroeconomic policies affecting the ARD incentive structure, while sectoral policy issues are emphasized in the others.

Trade and Development: The Complementarity of Agricultural Trade

Mathew D. Shane

It has been argued by Lee and Shane (1987) and others that the driving force behind growth in agricultural trade with developing countries is their rapid economic development. In the intermediate stage of development, the dynamics of development drive the dynamics of trade growth. During this stage, large increases in per capita income occur, driven by high income elasticities and demand for a changing composition of diet, from basic staples to food grains to meat. This demand for upgraded diets far outstrips the capacity to increase production domestically. During this period of development, if adequate foreign exchange is available, the excess of demand growth over production growth will be met by increasing imports.

If the above argument is valid, then a very strong case can be made for stimulating development in Third World countries by providing technical and economic assistance. Such assistance, if it is effective in stimulating development, will help create the demand for U.S. agricultural exports.

Since a large share of the economic activities of developing countries involves agriculture, can it be argued that agricultural development as well as general economic development leads to increased import demand for agricultural products? The answer to this issue depends on the degree to which agricultural development is complementary or competitive with U.S. agricultural exports. If agricultural development implies producing more food grains or oilseed, then it is unlikely that the income effect of that development can more than compensate for the increase in supply generated from that development. However, if agricultural development is complementary to U.S. exports by expanding the supply of tropical products, then this could very likely lead to an increased demand for food grain and oilseed imports.

In this report, I investigate the degree to which agricultural trade of the Asia and Near East countries are more complementary with that of the United States than is the rest of the world. There appears to be increased competition for agricultural markets since 1978. However, there also appears to be increasing complementarity of imports over the same period. The simultaneous increase in competition in the export market and growing complementarity in import markets implies growing global specialization.

The degree of complementarity of the countries in Asia and the Near East varies substantially. Thus, while Thailand's exports are highly competitive with those of the United States, many of the countries are highly complementary. These include the North African and Middle Eastern countries, and the South Asian countries of Bangladesh and Sri Lanka.

Thus, the degree to which U.S. agricultural development assistance will facilitate the generation of import markets will vary significantly from country to country. Careful consideration, therefore, needs to be given to the appropriate regions and areas for U.S. agricultural development assistance.

In this report, the concept of complementarity is defined as the degree to which the overall agricultural trade pattern, defined by the composition of agricultural trade, is different from that of the United States.

Human Capital and Agricultural Productivity Change

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Human capital held by farmers, and by extension agents and researchers specializing in the development and diffusion of improved technology, is vital to the achievement of productivity change in agriculture. This paper reviews studies that have sought to associate human capital and agricultural productivity growth. It emphasizes the productivity contributions of research and extension specialists. More than 50 studies covering many developing countries are reviewed. With few exceptions, they measure large productivity impacts and compute relatively high rates of return to public sector investments in research and extension programs.