

# **MSU International Development Working Papers**

## **Confronting the Silent Challenge of Hunger: A Conference Synthesis**

by

**T.S. Jayne, David Tschirley, Lawrence Rubey,**

**MSU International  
Development  
Working Paper No. 51  
1995**



**Department of Agricultural Economics  
Department of Economics  
MICHIGAN STATE UNIVERSITY  
East Lansing, Michigan 48824**

MSU is an affirmative-action/equal-opportunity institution.

## **MSU INTERNATIONAL DEVELOPMENT PAPERS**

Carl Liedholm and Michael T. Weber

Editors

The MSU International Development Paper series is designed to further the comparative analysis of international development activities in Africa, Latin America, Asia, and the Near East. The papers report research findings on historical, as well as contemporary, international development problems. The series includes papers on a wide range of topics, such as alternative rural development strategies; nonfarm employment and small scale industry; housing and construction; farming and marketing systems; food and nutrition policy analysis; economics of rice production in West Africa; technological change, employment, and income distribution; computer techniques for farm and marketing surveys; farming systems and food security research.

The papers are aimed at teachers, researchers, policy makers, donor agencies, and international development practitioners. Selected papers will be translated into French, Spanish, or other languages.

Individuals and institutions in Third World countries may receive single copies free of charge. Requests for copies and for information on available papers may be sent to:

MSU International Development Papers  
Department of Agricultural Economics  
Agriculture Hall  
Michigan State University  
East Lansing, Michigan 48824-1039  
U.S.A.

# **CONFRONTING THE SILENT CHALLENGE OF HUNGER: A CONFERENCE SYNTHESIS**

by

T.S. Jayne, David Tschirley, Lawrence Rubey,  
Thomas Reardon, John M. Staatz, and Michael Weber

February 1995

This paper is published by the Department of Agricultural Economics and the Department of Economics, Michigan State University (MSU). Funding for this research was provided by the Food Security II Cooperative Agreement (AEP-5459-A-00-2041-00) between Michigan State University and the United States Agency for International Development, through the Office of Economic and Institutional Development in the Economic Growth Center of the Global Bureau. Supplemental funding for this research was also provided to the FS II Cooperative Agreement by the African Bureau, through the Food Security and Productivity Unit of the Productive Sector Growth and Environment Division, Office of Sustainable Development (AFR/SD/PSGE/FSP).

Conference entitled "Confronting the Silent Challenge of Hunger," held June 28-29, 1994 at the International Food Policy Research Institute (IFPRI) in Washington D.C. The conference was sponsored by the U.S. Agency for International Development and hosted by IFPRI, with support from Michigan State University's Department of Agricultural Economics (MSU) and U.S. Department of Agriculture. This synthesis was prepared by MSU.

**ISSN 0731-3438**

© All rights reserved by Michigan State University, 1995.

Michigan State University agrees to and does hereby grant to the United States Government a royalty-free, nonexclusive and irrevocable license throughout the world to use, duplicate, disclose, or dispose of this publication in any manner and for any purposes and to permit others to do so.

Published by the Department of Agricultural Economics and the Department of Economics,  
Michigan State University, East Lansing, Michigan 48824-1039, U.S.A.

## CONTENTS

1. INTRODUCTION . . . . .	1
2. GLOBAL FOOD AVAILABILITY . . . . .	2
2.1. Summary of Workshop Discussion . . . . .	2
2.2. MSU/FS II Perspective . . . . .	3
3. CHRONIC FOOD INSECURITY . . . . .	4
3.1. Summary of Workshop Discussions . . . . .	4
3.2. The MSU/FS II Perspective . . . . .	5
4. EMERGENCY FOOD SITUATIONS . . . . .	6
4.1. Summary of Workshop Discussions . . . . .	6
4.2. MSU/FS II Perspective . . . . .	6
5. THE ENVIRONMENT AND FOOD . . . . .	8
5.1. Summary of Workshop Discussion . . . . .	8
5.2. MSU/FS II Perspective . . . . .	9
6. THE ROLE OF FOOD AND AGRICULTURE IN ECONOMIC GROWTH . . . . .	11
6.1. Summary of Workshop Discussions . . . . .	11
6.2. The MSU/FS II Perspective . . . . .	12
7. THE FUTURE OUTLOOK: A 2020 VISION . . . . .	14
7.1. Summary of Workshop Discussion . . . . .	14
7.2. MSU/FS II Perspective . . . . .	15
8. CONCLUSIONS . . . . .	18
8.1. Summary of Workshop Discussion . . . . .	18
8.2. MSU/FS II Perspective . . . . .	19
ANNEX A: CONFERENCE AGENDA . . . . .	23
ANNEX B: LIST OF PARTICIPANTS . . . . .	27
REFERENCES . . . . .	35

## 1. INTRODUCTION

This report is a synthesis of views presented at the USAID Conference "Confronting the Silent Challenge of Hunger," June 28-29, 1994. The purposes of the conference were to provide information to assist AID in defining and articulating its development strategy related to agriculture and food security, to identify issues of consensus for incorporation into future AID strategy, and to identify critical issues of ongoing debate which need to be resolved.

This paper is organized around seven questions posed during the conference:

1. Will there be enough food over the next 25 years to provide adequate diets for the world's growing population?
2. What strategies would be most effective in reducing chronic food insecurity in the world's low-potential and impoverished regions?
3. How can long-run and short-run assistance be designed to address emergency food situations most effectively?
4. How should agricultural development and environmental concerns be integrated?
5. How can agricultural development strategies be designed to accelerate economic transformation?
6. What are the trends that are likely to shape the world's food security and hunger situation over the next quarter-century?
7. What are the main areas of consensus and disagreement, and their implications for USAID programming?

This report summarizes the major points raised in the conference on each of these issues, and then presents the perspective of MSU researchers working on the USAID/MSU Food Security II (FS II) Cooperative Agreement. This perspective draws on the material presented at the conference and on other studies, including research carried out under the FS II Cooperative Agreement and the earlier Food Security in Africa Cooperative Agreement. The report thus represents the reflections of a group of researchers from the Department of Agricultural Economics at Michigan State University, based on discussion at the conference, rather than an official USAID summary of the conference's conclusions.

## 2. GLOBAL FOOD AVAILABILITY

*Projections of the earth's ability to feed its population vary markedly among development planners and researchers. Some believe that in the foreseeable future, the world has the capacity to feed itself, but that poor distribution and lack of effective channels to meet demand may impede achievement of food security. However, other analysts believe there will be a global food crisis unless major technological innovations enable production of sufficient food supplies to sustain rapid population growth.*

### 2.1. Summary of Workshop Discussion

Over the past three decades, growth in world production of staples has outpaced population growth, resulting in steady declines in real prices for all major staples. If the world can maintain the enormous commitment of money and human capital that produced this trend, then aggregate production growth is expected to continue outpacing population growth, and real prices are expected to remain stable or decline (Rosegrant).

Yet this optimistic scenario masks significant regional disparities in growth. Per capita food production since 1960 declined in 75 of the poorest countries in the world. Most of these countries are in Sub-Saharan Africa (Pinstrop-Anderson). The "green revolution" technologies that dramatically raised agricultural productivity and growth in Asia, especially under irrigated conditions, have not fared well in most of Africa, with its dependence on erratic rainfed conditions. Without major gains in food crop technologies appropriate for semi-arid rainfed conditions, it is likely that the gap between food production and population growth will continue to widen in much of Africa.

It was generally agreed that future food production growth must be driven primarily from yield growth on rainfed soils. Prospects for growth in cultivated area are bleak, with the possible exception of rainfed production in Sub-Saharan Africa (Rosegrant). Prospects for growth in irrigable land are particularly limited (Yudelman). Yet yield growth throughout the developing world declined dramatically in the 1980's, with Sub-Saharan Africa achieving the slowest growth (0.68% per year, compared to 1.03% in Asia and 0.96% in Latin America). By 2020, the World Bank estimates that Sub-Saharan Africa (SSA) will have a food shortage of 250 million tons.

Major concerns were raised as to whether the international community had the ability and resolve to maintain its past commitment to technology-driven food production growth. Core funding for the CGIAR system fell 21% in real terms between 1992 and 1994, raising questions about the prospects for achieving future yield growth, or even maintaining past yield gains. It was argued that up to 90% of expenditures on agricultural research are necessary to develop new varieties and farmer practices simply to maintain prior yield gains (Plucknett).

Finally, future price trends appear very sensitive to yield growth projections. A 25% decline in the *rate* of yield growth is projected to raise real prices by an average of nearly 20%

through 2010 (Rosegrant). Without income growth in the currently impoverished regions of the world, such a rise in food prices could bring disastrous consequences to food deficit regions with weak purchasing power. This underscores the importance of a strong commitment by the international community to maintaining yield growth.

## **2.2. MSU/FS II Perspective**

Keeping the world's food production growth ahead of population growth is a necessary but insufficient condition for eliminating chronic hunger. With sustained commitment to agricultural research, there is likely to be enough food – available at some price – to feed the world's population adequately. Therefore, continued commitment to agricultural research is critical for future global food security. But it is equally clear that future food prices under a broad range of conceivable food production scenarios will be too high to overcome hunger in the low-income regions of the world. Despite adequate world food supplies and steadily declining real food prices, world hunger is rising even now because ever-greater numbers of people lack the incomes to purchase enough food. Most of these people are in Sub-Saharan Africa and South Asia. The root cause of this "distributional problem" is low-productivity economic systems that mire large groups of people in poverty. Low prices are an outcome of persistent poverty and weak effective demand as well as increasing food supplies. As stated by conference participants in later sessions (below), since most of the world's poor are engaged primarily in subsistence agriculture, productivity growth in agriculture – appropriate to low-potential semi-arid conditions – is required to raise purchasing power among the poor to enable them to acquire an adequate share of the world's future food supplies.



### 3. CHRONIC FOOD INSECURITY

*There is a lack of consensus on the most effective approach to alleviating chronic hunger. Some experts believe that because chronic hunger is closely linked to poverty, the problem will be most effectively eradicated through efforts to stimulate broad-based economic growth; this implies a strategy to promote investment where the growth potential is highest. However, other experts believe that an economic strategy which targets the poorest geographical regions, occupations, ethnic groups and household members is a more effective approach to the problem of chronic food insecurity.*

#### 3.1. Summary of Workshop Discussions

Workshop discussions yielded no clear agreement on whether to tailor investment for "low potential" or "high potential" zones. Some participants suggest that technology to improve farm productivity in low potential zones is crucial to reduce poverty in those areas and also to minimize pressures to expand to marginal lands. They assert that there are many technologies already available and appropriate to low-potential areas which are not yet being used because of insufficient economic incentives (Pinstrup-Andersen, Byerlee). There was also recognition that agricultural technology generation, while necessary, is insufficient to alleviate hunger in high- or low-potential regions. There are few examples of successful technology diffusion and uptake without viable market infrastructure and conducive government policies (Christiansen). Thus, a strategy focussing on "low-potential" regions must pay attention to technology development for semi-arid regions and institutional and policy innovations to improve food production and access.

Other participants cited evidence suggesting that productivity investments in high potential areas will have the highest payoff in terms of increasing agricultural production (Winkleman). With well-functioning markets, agricultural growth in high-potential areas will reduce the cost of food in food-deficit regions. While this can reduce the hunger problem to some extent, the question remains what will poor households in low-potential areas produce to generate sufficient income to buy food and work their way out of poverty.

In both low- and high- potential regions, there is a wide gap in any village between the most productive farmer and the average farmer, and the variation in productivity between the best countries and others with similar resource endowments is also extremely wide. This wide divergence in performance within and across countries suggests "what could still be achieved with existing technology if the modal group could match the best" (Carruthers). Accomplishing this is not a matter only of improved extension and farm management. These efforts, while necessary, will be fruitless in the absence of a policy and market environment which facilitates the adoption of existing technologies. Furthermore, it is faulty to assume that all smallholders would be adopters of current improved technologies, even with a conducive policy environment. Access to resources, land quality, household demographics and human capital can vary greatly among smallholders in a village. Research, extension, policy reform and market development must go hand-in-hand.

The importance of targeting specific groups within the population was also stressed. A larger proportion of female-headed households in SSA tend to be below the poverty line than male-headed households. In Asia, the proportion of poor female-headed households is substantially higher (Haddad). Yet focusing on issues of importance to women must be distinguished from a focus on women *per se*. Men continue to hold most formal power in most countries, meaning that they need to be incorporated into the attempt to improve the welfare and status of women. More importantly, it may be necessary to take a broader gender oriented approach that examines the effects of policy on women, men, and children and on the social groups within which they interact.

A primary task for donors and future research is to identify the types of public investments and policy strategies that would capture unexploited productivity growth in unique micro-settings throughout Africa, South Asia, and other regions affected by chronic hunger. It is unlikely that generalizations can be made due to specific social, political, and historical conditions of each case. This technological specificity highlights the need to invest in NARS as well as the CGIAR and other international organizations, and to coordinate activities among all these actors.

### **3.2. The MSU/FS II Perspective**

Research conducted under the Food Security II Cooperative Agreement in over a dozen nations in SSA suggests that the dichotomy between investment in high-potential and low-potential areas may be overstated. In some sense, such questions mirror the "growth" versus "equity" debates of the 1970's. MSU research has indicated that labor and land allocations in low-potential regions are often linked to the price of food delivered from high-potential areas, and that strategies to reduce food costs can encourage diversification away from subsistence food production in low-potential areas and foster income growth. There is still a need to identify and exploit non-farm growth opportunities in low-potential areas as well as encourage production and marketing opportunities for crops suitable for semi-arid conditions.

Evidence from MSU work in Mali and Zimbabwe suggest that efforts to improve marketing systems and reduce food prices often entail investments in marketing infrastructure and empirically-based policy reforms. Such investments and reforms ultimately increase the benefits in low-potential zones from productivity gains in high-potential regions, benefiting both areas. Regulations with roots in the colonial-era often explain why such linkages do not emerge spontaneously. Expanding these linkages will facilitate migration from low to high potential zones for wage earning opportunities, and also allow low potential zones to develop local non-farm activities to satisfy demand in the more dynamic high potential areas.

## 4. EMERGENCY FOOD SITUATIONS

*Acute crises of food shortages are typically aggravated, and in some cases caused, by unfavorable political conditions in poor countries. Some analysts recommend prevention and relief activities that focus on improving domestic problems and stabilizing vulnerable economies by strengthening institutions for popular participation. Others accept that foreign donors are constrained to work through existing political structures for short-term relief efforts but are concerned about the outlook for availability for food aid. What trade-offs and complementarities are there between long run prevention and short term relief initiatives?*

### 4.1. Summary of Workshop Discussions

Food emergencies are increasingly tied to political instability and civil strife (Teklu). In addition, in many areas household ability to adjust to a particular crisis has been reduced by past crises. This implies the need for donors and governments to be able to respond more quickly than in the past to food emergencies. Yet the very fact that severe food shortages have become chronic problems in many areas of SSA highlights the need for emergency assistance, and especially food aid, to be redesigned with a focus on market compatibility and long-run development (Weber). Food aid programs must be based on a much more sophisticated understanding of markets in general and how alternative food transfer programs may be designed to foster rather than impede market development.

Changes in the international policy environment brought on by GATT, and in the domestic environment by pending changes in U.S. commodity policy, may make it easier to design market-based approaches to emergency assistance. One important effect may be further reductions in industrial country grain surpluses. Assuming continued commitment by these countries to humanitarian assistance, reductions in surpluses introduces the possibility (and perhaps necessity) of delinking food aid from commodity policy. In other words, it may now be possible for emergency assistance programs to be based on a flexible cash fund not tied to surplus commodity disposal. Relaxing the requirement that emergency assistance monies be used to purchase surplus commodities in donor countries could bring significant benefits to recipient countries through reduction of international transport costs and procurement delays, increased ability of donor and national governments make effective market responses to emergency situations, and reduced disruptions in recipient country markets from poor coordination across commercial and emergency food aid programs.

### 4.2. MSU/FS II Perspective

For several years, researchers from MSU and their African colleagues have been examining links between provision of food aid to address immediate food deficits and longer-term development efforts. In Mozambique, evidence suggests that under certain circumstances food aid can play a key role in the development of food marketing systems. Monetized food aid can both generate local currency that can be reinvested to create longer-term payoffs and

foster private sector trading links where none may have existed before. Targeted interventions to vulnerable groups (child feeding programs, supplementary food distribution to pregnant mothers, the disabled, etc) carried out by government ministries and NGOs do have a critical role. However, monetization of food aid can help ensure that short-term relief efforts do not disrupt the ability of market mechanisms to provide consumers with access to food in the long-run.

The keys to designing emergency interventions with positive effects on market development concern the timing of shipments, the widespread dissemination of market information, and the choice of appropriate channels through which to distribute food. Title III food programs have been found to play a critical emergency role of alleviating food shortages, while simultaneously increasing effective demand, and building the markets that will protect the majority of households from food insecurity over the long run. But greater attention is needed to the design of monetization programs to avoid disrupting food markets. Key factors influencing the effects of monetized food aid include choosing the quantity of aid relative to market demand, and procedures for determining prices to first buyers. Poorly timed arrivals of food aid can depress prices and deter domestic supply responses just as recovery is beginning. Provision of market information to all market participants regarding expected domestic production, imports and market prices can reduce high levels of risk and uncertainty which constrain private sector investment in food distribution, storage and transport activities.

## 5. THE ENVIRONMENT AND FOOD

*Both agricultural intensification and its opposite – extensification – have been suggested as approaches to sustainable food production. Under what conditions should either of these approaches be taken? Can these approaches be modified to mitigate the environmental threats they pose?*

### 5.1. Summary of Workshop Discussion

Productivity growth and environmental sustainability have become major objectives of agricultural development strategy. It has also become clear that these objectives are interlinked (Thrupp, Waggoner, Hazell). The natural resource base cannot be preserved if poor people must exploit it in order to live (Hazell). It is equally clear that a degraded natural resource base will constrain the potential for future food production and income growth.

It is not realistic to expect an emphasis on low-input agricultural technologies to generate yield growth sufficient to match population growth. Agricultural intensification and sustainable use of modern inputs are almost certainly required to achieve a sustained 2-3% annual growth in food yields (Hazell, Reardon). The major question is how to intensify agricultural production in an environmentally-friendly way. Many analysts believe that environmentally sustainable intensification will require important changes for both agricultural research and incentive policies.

Inappropriate policies in the past and rapid population growth have led to environmental degradation under the following conditions:

- (1) intensive, irrigated (Green Revolution) agriculture, in a policy environment which favors over-use of inputs and which does not make those that pollute pay for that pollution, has caused waterlogging, salinization of soils, fertilizer pollution, pesticide poisoning, and destruction of biodiversity; and
- (2) extensive rainfed agriculture in areas of rapid population growth and a policy environment which inhibits the adoption of more intensive cultivation practices, spurs expansion into fragile areas and soil degradation because of reduced fallows and nutrient mining (Hazell).

Ironically, policies which favor over-use of inputs and those that inhibit the adoption of more intensive cultivation practices can coexist in the same country. Large commercial farmers in areas well served by physical infrastructure and with access to secure marketing channels and subsidized inputs, may degrade the environment by excessive input use. At the same time, smallholders in isolated areas where input and output markets are underdeveloped (in part due to poor policy) may have no choice but to expand on to marginal lands, causing erosion, siltation, and other environmental problems. This reduces the land productivity over the long run, and contributes to rural poverty.

There was a consensus that (a) environmental issues should no longer be considered independently of food production issues; (b) the achievement of 2-3% growth in yields in an environmentally-sound way will require agricultural intensification and reliance on modern inputs as well as new management practices; and (c) price, input and output market policies can be changed to create incentives for more sustainable resource management.

## **5.2. MSU/FS II Perspective**

Protecting and enhancing the natural resource base in which rural households operate is the environmental objective relevant to the food security perspective. Degradation of the natural resource base undermines food security of households and regions, by undermining farm productivity and food and fiber output growth. In most areas this is true in the long run, but in areas with fragile environments this holds for the short run too.

MSU research in Africa shows that poor smallholders in moderately to heavily degraded areas have lower yields that have in some cases been reversed through soil conservation investments. Other findings show that farmers try to offset yield losses from degrading soils by planting peanuts more densely, but apply little fertilizer and manure, which often they cannot afford; this mines soils and leads to further degradation and yield loss – a vicious circle (Clay et al., Kelly et al.). Degraded environments can also undermine health – increased time for mothers searching for cooking fuel means less time for household maintenance, erosion and silting can ruin clean water sources. Degraded commons and open access areas can also undermine off-farm income strategies that rely on gathering and livestock husbandry. The poorest are often relatively more dependent on the commons as such activities have low entry barriers and can be undertaken with small means.

Increased farm productivity and agricultural growth, with concomitant increases in food availability and incomes help the environment in the short and the long run. We begin by the converse to establish the point: poor farmers who cannot produce enough food on their lands push their cropping onto fragile margins and the commons to grow more food; this degrades the fragile soils, setting up a cycle of further impoverishment. Poor households are forced off-farm into the commons to gather firewood and overstock livestock to insure their livelihoods – putting pressure on fragile and diverse lands and degrading them. We also find that richer households pursue commons strategies that have an even greater absolute effect because they tend to have larger herds.

It is a stark fact that in many developing regions output of food and fiber simply needs to grow at 3-4 percent a year to keep up with growing demand in rural and urban areas, meet foreign exchange needs, and feed growing populations. Low input farm production systems normally promise only about 1 percent a year of output growth. Moreover, in most areas, even Africa formerly seen as land abundant, the land frontier is closing and future growth will require producing more on present land.

Hence, the bottom line is that low input systems are not a generalizable approach to farming in the tropics, that high growth needs and goals will need to be pursued by intensifying production in areas that can support it physically, mainly the agroclimatically favorable areas, and that such intensification be made sustainable.

MSU productivity research shows that it has been and probably will continue to be difficult to get rapid increases in yields in fragile, unfavorable agroclimatic zones. In these zones there is a need to focus on soil conservation, alternative income sources (to reduce stress on land), and modest sustainable increases in productivity based on low use of external inputs. Moreover, care needs to be taken by program and policy designers that attempts to regulate access of poor villagers to woodfuel and other commons products. This source of income is often important to their food security so alternatives need to be in place before restricting their use of the commons.

MSU research shows, however, that it is possible to get rapid increases in crop yields in zones that are more favored agroclimatically. In the face of rapidly increasing land scarcity, and limits to the effectiveness in the long-run to labor-led intensification, these strategies need to include some elements that usually do not figure on environmentalist agendas but in the long run will be crucial to protecting the environment while promoting food security – large increases in use of fertilizer, seed, and animal traction in conjunction with soil conservation investments (bunds, alley cropping, terraces, etc.), and organic matter application (composting, mulch, manure). This double strategy is at the heart of sustainable intensification.

Policies and programs that enable and encourage farmers and villages to make investments in raising productivity and conserving soils, as well as creating alternative income sources, are critical. Especially important is complementary infrastructure such as wells and culverts that facilitate private household investments.

## 6. THE ROLE OF FOOD AND AGRICULTURE IN ECONOMIC GROWTH

*What is agriculture's role in the economic transformation process? Where do various countries fit within the process and are there policy, institutional and research implications related to a country's position within the transformation process?*

### 6.1. Summary of Workshop Discussions

With the bulk of the population in many poor countries (particularly in SSA and South Asia) engaged in smallholder agriculture or activities directly linked to it, the growth of agricultural production is central to raising incomes of most poor people and one of the key guarantors of access to food. In the long-run, income growth is the only way to confront the silent challenge of hunger successfully. Widespread, sustainable income growth will come only from increases productivity of various factors of production (labor, land, capital), which raise returns to the owners of those factors. Improving intra-household distribution in an insufficient approach to assuring long-term growth and solving chronic hunger (Paarlberg). Alleviating hunger through intra-household redistribution of resources is limited as there is currently little to redistribute. This implies the need to improve income and employment growth to increase the effective demand of the 800-900 million people who have insufficient food entitlements to ensure recommended minimum levels of caloric intake.

The failure of import-substitution industrialization throughout the Third World demonstrates that the engine of growth for increasing real incomes must be based on comparative advantage with respect to international markets. This is due to the small size of the internal market in these countries and the limited growth possibilities implied by satisfying only this market. The tradable sector, then, especially agricultural exports, is crucial to long-term economic growth.

Yet since most SSA economies have a significant non-tradable sector, there are substantial prospects for second round, demand led growth effects. These stem from the re-spending, on local non-tradables, of increased income from exports. Whether these second round effects are realized depends on the elasticity of supply in the non-tradable sector. If this sector has inelastic supply, the increased demand from growth in the tradable sector will bid up prices of non-tradables and reduce second round effects (Delgado).

In addition, because most of these economies have high transport costs, they are only "semi-open", which means that domestic food prices can vary over a wide range before it becomes profitable to import or export certain staples, such as sorghum or millet. There is thus considerable scope for driving down the real price of food to consumers in these economies. If food prices are reduced through cost-reducing technologies throughout the food system (thus maintaining domestic incentives to produce food, rather than through squeezing farmer and trader profits), the lower prices can play a key role in increasing the country's competitiveness in producing tradeable goods.



Because of these important growth linkages between farm and non-farm sectors, income growth may be accelerated by policies that also foster the development of non-farm activities with substantial interactions with the farm sector (Reardon, Delgado). Many of these activities may be in the non-tradable sector. For the rapidly growing urban populations of SSA and South Asia, most of the value-added in food production takes place off the farm. Thus, productivity and technology strategies that look only at the farm level may fail to realize potential levels of growth and competitiveness (Staatz). Food system productivity and increases in competitiveness in an increasingly knowledge-based world economy must be driven by human capital development (Robinson).

With globalization comes the potential for increased wages for skilled and semi-skilled labor. In countries with rising levels of education, conducive economic policies, and political stability, increased wage levels raise the opportunity cost of farm labor, raising off-farm incomes, and inducing a transition from subsistence-oriented production and consumption patterns to increasing specialization and reliance on markets for both inputs and consumption. This process of structural transformation has, historically, been fueled by long-run productivity growth, especially of labor, and is both cause and consequence of increased incomes (Staatz).

## **6.2. The MSU/FS II Perspective**

Agriculture plays a critical role in the transition from subsistence-oriented economies to increasingly specialized and commercialized patterns of production and exchange. Yet structural transformation is not an automatic process of demographic change. Long-run increases in labor productivity require continual improvements in technology and sustained investment in human and physical capital. Low literacy rates, poor infrastructure, restrictions on market access and unstable political systems create disincentives to private investment. The experience of the Western industrial nations demonstrates the role of government in the process of structural transformation through fostering both public and private investment in institutions and technological and human capital development.

In SSA, MSU research on the returns to agricultural research and studies of the institutional pre-requisites to technology development show that increased specialization and technology adoption are often thwarted by the lack of market facilitating institutions. For example, high transaction costs preclude effective coordination among market participants; lack of market information prevents the development of trading networks; poorly functioning legal systems impede the enforcement of contracts; scale economies and capital market constraints deter investors. Because of these constraints, governments must often play a market-facilitating role to spur private-sector investment and ensure growth in the agriculture sector. Case studies examining the causes of impressive economic growth consistently show that strategic public investments have been required to stimulate private investment in farm and off-farm activities.

## 7. THE FUTURE OUTLOOK: A 2020 VISION<sup>1</sup>

*The preceding sessions focused on what is known and what is not known about the extent and nature of hunger and food insecurity in developing countries, with a view to identifying approaches to directly address transitory and chronic hunger. This session will complete the conference by exploring the outlook for major food production and distribution improvements in developing countries over the next 25 years, and how they might change the way we view hunger situations.*

### 7.1. Summary of Workshop Discussion

Sustained investment in agricultural technology is necessary to maintain current yields, let alone increase them at the rate of growth required to match population growth (Plucknett). But agricultural technology research has a very long gestation period. A major question is whether donors will have the resources and political will to continue the level of investment in agricultural technology systems required to sustain this yield growth and avoid an increase in real food prices.

It is generally agreed that low-input agricultural technologies cannot generate the yield growth required to match population growth over the long run. With the closing of the land frontier, yield-increasing inputs and improved management practices have become imperative. It is less clear how to provide farmers with the incentives to use these technologies, even if available, without reliance on subsidies. The functioning of input and financial markets must be improved to reduce the production and transaction costs of acquiring key productivity-enhancing inputs. The CMDT/CFDT experience in cotton and food production in Mali represents one approach which has been successful in solving problems of high-cost or missing markets. This approach relies heavily on vertical integration of extension, input supply, production, and marketing. The role of a high value export crop to drive the system appears to be central. The applicability of this model in other areas of the world, and to other crops, needs to be studied.

Many productive investments to land have mainly long-run payoffs, yet the costs of adoption are largely up-front. This leads to a societal problem: in SSA and South Asia most farmers are smallholders, are on the edge of survival, and therefore are unable to finance socially beneficial long-run investments in land. In the long-run, the solution to this problem is to increase smallholder incomes, thereby reducing their time preference for money and making long-term conservation investments more likely. Yet it is imperative that effective action be taken in the short-run as well. Options include developing conservation enhancing investments, such as agroforestry, that have short-run monetary payoffs to participants.

---

<sup>1</sup>The term "2020 Vision" is drawn from IFPRI's current "2020 project" that is carrying out a prospective analysis of the world food situation over the next 25 years and the challenges it poses for meeting the world's food needs in an environmentally sustainable way. (See Pinstруп-Andersen 1994.)

Sustainable harvesting of indigenous plants (primarily in tropical rainforests) for Western niche markets also holds promise for some areas and needs further research. Finally, if developing country governments have the capacity carefully to target conservation subsidies, these could be cost effective ways of reducing the trade-off between smallholder welfare and resource conservation.

Evenson has grouped countries and their national agricultural research systems (NARS) into two broad categories: those where a withdrawal of external funding for local agricultural research would seriously jeopardize these countries' ability to feed themselves in succeeding decades; and those that could withstand a withdrawal of external funding for their NARS without catastrophic results. In the latter, national agricultural research organizations and related infrastructure are already well developed and they have mechanisms in place to finance themselves from domestic resources. Examples from this group include South Korea, Taiwan, India, and Mexico. Most African and many Asian countries fall into the first category. Technology development to increase incomes of rural smallholders in these countries will continue to depend on strong international support to public research organizations.

It has been asserted that there are many technologies already available and appropriate to low-potential areas which are not yet being used because of insufficient economic incentives (Pinstrup-Andersen, Byerlee). Systems of agricultural technology generation, while necessary, are insufficient to alleviate hunger. There are few examples of successful technology diffusion and uptake without viable market infrastructure and conducive government policies (Christiansen). Historical case studies examining the causes of impressive economic growth consistently show that strategic and cost-effective public investments have been required to stimulate private investment in farm and off-farm activities.<sup>2</sup>

## **7.2. MSU/FS II Perspective**

Shaping the future according to a desired vision of food security requires a strategic planning perspective, which provides a framework to ensure that the agricultural system is designed to promote agricultural transformation. Priority setting is crucial, given limited resources.

The largest share of consumers' expenditures on staple foods in Africa and South Asia is accounted for by marketing activities. Thus, productivity and technology strategies that look only at the farm level may fail to realize potential levels of growth and competitiveness (Staatz). Food system productivity and increases in competitiveness in an increasingly knowledge-based world economy must be driven by human capital development. Computer-based technical and analytical skills might be extremely important for farmers, traders, agro-processors, and importer/exporters to get access to available market information systems that would allow them to compete in a more integrated global economy.

---

<sup>2</sup> For example in China, the USA, Japan, and Taiwan, see Shaffer and Wen; Bonnen; Morris and Adelman; and Streeten.

As discussed above, agricultural growth plays a key role in the structural transformation of the economy. The economy shifts from being based on subsistence-oriented production to providing much higher levels of material well-being through increased specialization and reliance on markets for both inputs and consumption. The transformation, however, is not an automatic process of demographic change. Areas with low literacy rates, policies that stifle private investment incentives, and unstable political systems will not mobilize domestic savings for investment nor attract significant foreign investment, will not pull rural labor into viable non-farm jobs, and will depress future growth in productivity and purchasing power. Specialization and reliance on market exchange are thwarted by high transaction costs, a symptom of weak infrastructure, legal systems, and other investments that require public provisioning. A self-sufficiency pattern of rural economic activity continues to prevail in this case, in which the majority of people continue to eke out a living in semi-subsistence agriculture.

A major source of productivity growth is improved nutrition. While the effect of productivity growth on access to food (and hence, indirectly, on nutrition) has long been asserted, the effect of improved nutrition on productivity has been obscured until recent multi-disciplinary work wedding biometrics with economics. Robert Fogel, in his recent Nobel Address, reported that nutritional improvements were responsible for over 30% of economic growth in England over the past two centuries (Fogel 1994). This adds a further feedback link to Mellor's argument that, because agriculture is the primary occupation of most poor rural households, agricultural productivity growth is required to fuel the poor's access to food.

Regarding emergency hunger situations: Food emergencies are increasingly tied to political instability and civil strife. Famines appear less likely to occur in countries with democratic political systems. Several participants stressed the need to develop new types of early warning systems based on political as well as climate stress. In addition, in many areas household ability to adjust to crises has been reduced by recurrent crisis. This implies the need for donors and governments to be able to respond more quickly than in the past to food emergencies. Yet the very fact that severe food shortages have become chronic problems in many areas of SSA highlights the need for emergency assistance, and especially food aid, to be redesigned with a focus on market compatibility and long-run development (Weber). Food aid programs must be based on a much more sophisticated understanding of markets in general and of the specific market environment in which they operate in each country.

Changes in the international policy environment brought on by GATT, and in the domestic environment by pending changes in U.S. commodity policy, may make it easier to design market-based approaches to emergency assistance. One important effect of these policy changes is likely to be further reductions in industrial country grain surpluses. Assuming continued commitment by these countries to humanitarian assistance, this new policy environment introduces the possibility for more flexible forms of assistance, including cash not tied to surplus commodity disposal.

## 8. CONCLUSIONS

*On which issues is there a consensus? On which issues is there still disagreement, and what is the basis of the disagreement? What are the dimensions of the food security problems that USAID needs to address?*

### 8.1. Summary of Workshop Discussion

In an era of fiscal restraint and increased concern with domestic problems, AID must carefully tailor and explain its vision if support for U.S. foreign assistance for agricultural development is to be maintained. With due consideration of measurement issues and the need for a long-term perspective, "Reducing Hunger" may be the most appropriate focus for the Agency's food and agricultural agenda. This focus embodies a compelling and understandable objective to which all of the Agency's food and agricultural activities can relate, either in the short or long-run (Reintsma). Such a tight focus, however, will require measures to decrease unproductive competition within the Agency for limited budgetary resources (Reintsma). The Agency must focus on ensuring sustainable financing for its activities and must bring in partners to pursue its objectives more cost effectively.

A focus on reducing hunger carries with it the risk that the Agency's mission will be equated with short term relief activities. To avoid this, the Agency must take action to present the issue of hunger in a long-term developmental context and clearly show the necessity of taking a long-term approach to the problem. The challenge for the Agency, then, is to keep its eye on solutions to the complex structural problems that lead to hunger while keeping the simple message of "reducing hunger" in the public eye.

There is widespread consensus on the need for continued funding for agricultural research. But in some cases, more money is not as important as restructured, more productive agricultural research systems, with a more direct match between its research activities and national food system objectives flowing from a well-reasoned strategic plan. There is substantial debate as to whether future programs should be organized along the lines of the highly successful past, emphasizing rice, wheat, and corn in high-potential conditions, or whether objectives and resources need to be revised to reflect the problems of low-potential regions where most of the world's poor reside but where the potential payoffs may be lower. It is a truism that agricultural research systems need to become more demand-driven, i.e. that research priorities need to reflect market opportunities and user needs. But whose demand should drive the system? Private-sector agricultural research systems can respond effectively to demand for high input technology from large commercial farmers. Yet even here, these systems have little incentive to develop biological solutions that undercut sales of these modern inputs; they have no incentives to develop technologies for poor farmers who purchase few inputs (Hazell, Staatz, Byerlee).

Also, there is a general consensus on need for greater attention to environmental concerns, but the extent to which this objective will impose constraints on technology development and yield

growth is not fully understood. It is also agreed that changes in national policies and local institutions (e.g., security of tenure) are also needed to promote farmers' incentives to manage natural resources in an environmentally sustainable way.

There is a broad consensus that a necessary condition for improving food access and alleviating hunger in the short and long-runs is the reduction in the real price of food (Winkelman). This can be accomplished by both productivity growth (reducing food prices relative to nominal wages) and income growth (raising purchasing power relative to nominal food prices). Both income and productivity growth, in the low-resource regions of the world, will be greatly circumscribed by the pace of agricultural development.

A key issue, discussed earlier, and on which there is no firm agreement is how to tailor investment for low potential and high potential zones. All agree that investment in farm technology for high potential zones will have the highest payoff in agricultural production. Yet two problems emerge. First, there are practical difficulties in distinguishing low **potential** areas from low **performance** areas. Second, even if this distinction can be made successfully in practice, consideration of environmental and poverty issues leads to differing conclusions regarding optimal investment patterns. One argument suggests that technology to improve farm productivity in low potential zones is crucial to reduce poverty in those areas and also to minimize pressures to expand to marginal lands. A different line of reasoning argues that scarce resources should focus on high potential zones to maximize food production growth, and that these investments should be complemented by infrastructural investments and policy reform to diffuse the benefits to lower-potential zones. A.I.D needs to continue to explore these arguments and arrive at a policy that strikes a balance between the valid arguments on each side of the issue.

## **8.2. MSU/FS II Perspective**

One of the greatest challenges for donors, governments, and researchers of today is to effectively address the hunger problems in the world's impoverished regions. While increased food availability is a crucial component of the solution, the more intractable part of the solution is how to increase incomes and productivity in these pockets of severe food insecurity, most of which are semi-arid, low-potential rural regions where environmental degradation is becoming increasingly concentrated. Since the majority of the rural poor are primarily engaged in agriculture, one of the most direct means to improve their welfare is to increase agricultural productivity of their primary enterprise. But this will require greater focus on crops, technologies, and distribution systems appropriate to semi-arid environments. While it is commonly asserted that because of a poor resource base, farmers in pockets of poverty should produce something other than food and use their income to buy food or migrate to more productive areas, the reality is that most have neither option in the short- and medium-run. Food production is often their only source of income and food.

To promote the Agency's message of "reducing hunger" it may be useful to define its agenda around four broad themes. These are:

1. continued policy reform ("changing the rules of the game", or "promoting economic opportunity");
2. research to enhance food system productivity and sustainability ("promoting environmentally responsible growth");
3. crisis prevention; and
4. investment in human capital ("investing in people").

These areas of action are based on a set of principles which need to guide the Agency's actions. First, sustainable and equitable economic growth is not possible without rules of the game guaranteeing economic freedom within accepted social norms. Continued policy reform aims to strengthen this economic freedom. Second, environmental sustainability is part and parcel of the Agency's mission. There can be no separate set of activities devoted to environmental issues; rather, all decisions must be informed by a sensitivity to the environmental implications of alternative policies and programs to promote growth. Third, productivity must be approached from a food systems perspective. For urban consumers, productivity increases after the farm gate will generally have more effect on prices than equal increases on the farm. For these same consumers and also for producers, cost reductions off the farm will be most beneficial in the context of a dynamic agriculture able to respond to improved price incentives. Fourth, income growth must be approached from a household economy perspective, recognizing that the relevant opportunity cost for a farmer considering a new crop or technology is often not income from another crop under existing technologies, but rather wage income or earnings from microenterprise activity. Finally, crisis prevention must be driven by an understanding of the long term structural factors generating the crises. Above all, responses to crises once they have occurred must not undermine solutions to these long term problems.

Some observers suggest that many of the marketing problems of the past have been corrected with the wave of structural adjustment and food market reform programs implemented in recent years. But this does not mean that markets have reached their potential contribution to production growth and food security. Agricultural growth strategies need to refocus from concern over market reform to market development. Market development strategies help identify cost-effective public investments and policies that will induce private investment in input delivery and output market activities and consequently give greater incentives to both farmers and consumers.

Productivity growth must be conceptualized from a food systems perspective. The high cost of food marketing in many poor countries means that more than half of value added often comes off the farm. Reducing these marketing costs through improvements in hard and soft infrastructure makes more food available to consumers at lower cost while increasing prices to

producers. Yet productivity growth at the farm level is a crucial component of this process. If farm technology is stagnant, farmers will have less ability to respond to improved price incentives. As a result, fewer of the benefits of reduced marketing costs will reach consumers; for a given decrease in marketing costs, production will increase less, and consumer prices will fall less, than in a technologically dynamic system. Thus, productivity growth on and off the farm must be viewed as essential complements.

Rural income growth must be viewed from a balanced household economy perspective (Reardon) that recognizes the importance of both farm and off-farm activities. The importance of off-farm income in bridging the food gap for deficit producers has been well accepted. Yet in most countries of SSA and South Asia, the majority of poor people obtain the bulk of their incomes from agriculture. This implies that increased farm productivity promotes income growth and access to food among those people relying primarily on agriculture for their income. At the same time, this increased farm income can fuel growth in the off-farm economy, since much of this economy in rural areas is closely linked to (in fact dependent upon) production agriculture. In this way, means to improve the supply-side of the food security equation can also improve the demand-side, both on and off the farm. Improvements in farm technology, broader food system productivity growth, and increased incomes are thus intimately related in the food security equation.

In the long-run, income growth generated by productivity growth is the only way successfully to confront the silent challenge of hunger. Improving intra-household distribution of a very tiny pie is an exceptionally deficient approach to solving chronic hunger. This is an important limitation of research aimed at alleviating hunger through intra-household redistribution of resources. There is currently not much to redistribute. This implies the absolute need to improve income and employment growth to increase the effective demand of the 800-900 million people who have insufficient food entitlements to maintain a minimally acceptable level of nutrition.

In designing programs that promote income growth, AID must focus on the central importance of agricultural production for the income and consumption of most poor people. Food production is one of the poor's key food entitlements.

A.I.D. will require an active research program to support the areas of action laid out in this document. Some of the key questions requiring further empirical investigation include:

1. What should be done about low-potential zones? What is the potential to develop high-valued crop production and marketing systems appropriate for low-rainfall environments (e.g., oilseeds, cotton)? Should agricultural research priorities be shifted to hasten the development of such semi-arid commodity systems?
2. Given that adoption of new technology is sensitive to price, what policy approaches can cost-effectively increase agricultural productivity and food security in an era where massive subsidization of inputs and/or commodities is no longer feasible?



3. What are the linkages between agricultural development and the growth of non-farm rural enterprises in low-potential areas? Is the development of non-farm income and employment growth in low-potential areas contingent on agricultural development in these regions? What can be done to promote viable non-farm growth in low-rainfall region?

Relatedly, what are the most promising sources of employment growth in rural areas, especially in SSA and South Asia? Labor will be released from agriculture if labor productivity increases at a sufficient rate<sup>3</sup>. As this happens, what activities can be expected to absorb this labor? How can government policy and programs be designed to enhance this process of labor absorption?

4. How would progress in democratization affect investment strategies and employment choices at the individual, regional, and national levels? What are the implications for donor assistance?
5. How can emergency food programs be designed to meet their short-run hunger relief objectives as well as contribute to long run development? What will be the effects of GATT and domestic policy liberalization in industrialized nations on the availability of resources for food aid? How can AID better make the case for such aid in a post-cold war world?

---

<sup>3</sup> Note that such productivity increases will occur only as a result of sustained investment in agriculture.

## **ANNEX A: CONFERENCE AGENDA**

### **CONFRONTING THE SILENT CHALLENGE OF HUNGER**

**June 28-29, 1994**

**International Food Policy Research Institute**

**2nd Floor Conference Facility**

**Washington, D.C.**

Sponsoring Institution: U.S. Agency for International Development (USAID)

Hosting Institution: International Food Policy Research Institute (IFPRI)

Supporting Institutions: Michigan State University (MSU)

U.S. Department of Agriculture (USDA)

Objective: To debate issues implicit in the development of strategic priorities to address the challenge of world hunger.

#### **Tuesday, June 28, 1994**

9:00 - 9:15 **Introduction and Overview of the Workshop** - John Lewis (USAID)

Welcome Address - Per Pinstrup-Andersen (IFPRI)

9:15 - 9:30 **Opening Remarks** - Sally Shelton (USAID)

### **I. THE FOOD CRISIS: ISSUES BEHIND THE DEBATE**

9:30 - 11:00 **Session 1. Global Food Availability**

Projections of the earth's ability to feed its population vary markedly among development planners and researchers. Some believe that in the foreseeable future, the world has the capacity to feed itself, but that poor distribution and lack of effective channels to meet demand may impede achievement of food security. However, other analysts believe there will be a global food crisis unless major technological innovations enable production of sufficient food supplies to sustain rapid population growth.

Moderator: Joseph Stepanek (USAID/LAC/DPP)

Presenters: Bob Robinson (USDA/ERS)

Mark Rosegrant (IFPRI)

Montague Yudelman (World Wildlife Fund)

Open Discussion

11:00 - 11:15 **Coffee Break**

11:15 - 12:45 **Session 2. Chronic Food Insecurity**

There is a lack of consensus on the most effective approach to alleviating chronic hunger. Some experts believe that because chronic hunger is closely linked to poverty, the problem will be most effectively eradicated through efforts to stimulate broad-based economic growth; this implies a strategy to promote investment where the growth potential is highest. However, other experts believe that an economic strategy which targets the poorest geographical regions, occupations, ethnic groups and household members is a more effective approach to the problem of chronic food insecurity.

Moderator: Curt Reintsma (USAID)

Presenters: Thomas Reardon (MSU)

Lawrence Haddad (IFPRI)

Robert Paarlberg (Harvard)

Open Discussion

12:45 - 2:30 **Lunch**

Luncheon Speaker - Per Pinstrup-Andersen (IFPRI) – 2020 Vision

2:30 - 4:00 **Session 3. Emergency Food Situations**

Acute crises of food shortages are typically aggravated - and in some cases basically caused - by unfavorable political conditions in poor countries. Some analysts recommend prevention and relief activities that focus on improving domestic problems and stabilizing vulnerable economies by strengthening institutions for popular participation. Others accept that foreign donors are constrained to work through existing political structures for short-term relief efforts but are concerned about the outlook for availability for food aid. What trade-offs and complementarities are there between long run prevention and short term relief initiatives?

Moderator: George Ingram (Foreign Affairs Committee, U.S. Congress)

Presenters: Michael Weber (MSU)

Tesfaye Teklu (IFPRI)

Serge Snrech (Club du Sahel)

Open Discussion

4:00 - 5:30

**Session 4. The Environment and Food**

Both agricultural intensification and its opposite – extensification – have been suggested as approaches to sustainable food production. Under what conditions should either of these approaches be taken? Can these approaches be modified to mitigate the environmental threats they pose?

Moderator: Glenn Prickett (USAID/PPC/POL)

Presenters: Paul Waggoner (Connecticut Agricultural Experiment Station)

Peter Hazell (IFPRI)

Ann Thrupp (World Resource Institute)

Open Discussion

**Wednesday, June 29, 1994**

9:00 - 9:15

**Introduction and Review of Day's Work** - John Lewis (USAID)

**II. AGRICULTURAL TRANSFORMATION: A FRAMEWORK FOR BUILDING A FOOD SECURITY STRATEGY**

9:30 - 11:00

**Session 5. The Role of Food and Agriculture in Economic Growth**

What is agriculture's role in the economic transformation process? Where do the various USAID countries fit within the process and are there policy, institutional and research implications related to a country's position within the transformation process?

Moderator: Elliot Berg (Development Alternatives, Inc.)

Presenters: Overview - John Staatz (MSU)

Asia - John Mellor (John Mellor Assoc.)

Africa - Christopher Delgado (IFPRI)

Open discussion

11:00 - 11:15

**Coffee Break**

11:15 - 12:15

**Session 5 - Continued**

Europe & NIS - Karen Brooks (World Bank)

Latin America - Michael Carter (University of Wisconsin)

Open Discussion

12:15 - 1:45

**Lunch**

Luncheon Speaker – Don Winkelmann (CIMMYT) – CGIAR Perspectives

**III. THE CONCLUSION**

1:45 - 3:15

**Session 6: Prospects for Change: A 2020 Vision**

The preceding sessions focused on what is known and what is not known about the extent and nature of hunger and food insecurity in developing countries, with a view to identifying approaches to directly address transitory and chronic hunger. This session will complete the conference by exploring the outlook for major food production and distribution improvements in developing countries over the next 25 years, and how they might change the way we view hunger issues.

Moderator: Harvey Hortik (USAID/G/EG/AFS)

Presenters: Technology Development -

Donald Plucknett (Agricultural Research and Development International)

Robert Evenson (Yale University)

Policy Reforms - Ousmane Badiane (IFPRI)

Institutional Development and Infrastructural Investment -

Derek Byerlee (World Bank)

Open Discussion

3:15 - 3:30

**Coffee Break**

3:30 - 4:30

**Session 7. Conclusion**

On which issues is there a consensus? On which issues is there still disagreement, and what is the basis of the disagreement? What are the dimensions of the food security problems that USAID needs to address?

Moderator: Bob Kramer (USAID)

Syntheses: Per Pinstруп-Andersen (IFPRI)

Joan Atherton (USAID)

Closing Remarks - Janet Ballantyne (USAID)

4:30 - 4:35

**Remarks from the Workshop Chair - John Lewis (USAID)**

## ANNEX B: LIST OF PARTICIPANTS

### USAID

#### Bureau for Policy and Program Coordination

Fran Carr	PPC/POL/SP, NS 3889
Steven Gale	PPC/CDIE/PME, SA-18, 305-A
Roberta Mahoney	PPC/POL, NS 3957
Donald McClelland	PPC/CDIE/POA, SA-18, 220-C
Glenn Prickett	PPC/POL, NS 3673
Robert Siegel	PPC/POL, NS 3673
Lane Vanderslice	PPC/CDIE/DI, SA-18, 230-D
Carolyn Weiskirch	PPC/POL, NS 3957

#### Bureau for Africa

Joan Atherton	AFR/ARTS, NS 2495
Garland Christopher	AFR/ARTS, 1111 N. 19th St., Rosslyn, Suite 210
Brian D'Silva	AFR/ARTS/FARA, NS 2941
John Gaudet	AFR/ARTS/FARA, NS 2941
Phil Jones	AFR/ARTS/FARA, NS 2744
Mike McGahuey	AFR/ARTS/FARA, 1111 N. 19th St., Rosslyn, Suite 210
Curt Reintsma	AFR/ARTS, NS 2744
Al Smith	AFR/SA1, SA-1, 9th Floor
David Songer	AFR/ARTS/FARA, NS 2744

#### Bureau for Europe & the New Independent States

John Becker	ENI/ED/AG, NS 4440
Jim Snell	ENI/EUR/DR/FS, NS 4440

#### Bureau for Latin America and the Caribbean

Bill Goodwin	LAC/DR/RD, NS 2242
Sher Plunkett	LAC/DR/RD, NS 2242
Joe Stepanek	LAC/DPP, NS 2246
Ron Stryker	LAC/TI, NS 3253
Roberta van Haeften	LAC/DR/RD, NS 2242
Eric Zallman	LAC/DR/RD, NS 2246

Bureau for Asia and the Near East

Tracy Atwood	ANE/ASIA, NS 3214
Gregg Baker	ANE/NE/DP, SA-2, 103
Ken Prussner	ANE/NE/DR, SA-2, 208

Bureau for Humanitarian Response

Kristy Cook	BHR/OFDA, SA-1, 1001
John Grant	BHR/PPE, SA-8, 353
Barry Heyman	BHR/FHA/PPE, SA-8, 363
Bob Kramer	BHR/FFP, SA-8, 337
Tim Lavelle	BHR/FFP, SA-8, 335
Ben Muskovitz	BHR/FFP/ER, SA-8, 341
Francesca Nelson	BHR/PPE, SA-8, 363
Alexis Robles	BHR/OFDA, NS 1262A
Len Rogers	BHR/PPE, SA-8, 206A
Paul Ulrich	BHR/FFP, SA-8, 317

Bureau for Global Programs, Field Support & Research

Janet Ballantyne	G/EG, SA-2
Ken Baum	G/R&D/ENR, SA-18, 611E
Rick Bennett	G/EG/AGR, SA-18, 420D
Robert Bertram	G/EG/AGR, SA-18, 513D
Harvey Blackburn	G/EG/AGR, SA-18, 413F
James Bonner	G/EG/AGR, SA-18, 403D
Judy Chambers	G/EG/AGR, SA-18, 412
Eunyong Chung	G/N, SA-18, 411B
Ralph Cummings	G/EG/AGR, SA-18, 513
Dana Dalrymple	G/EG/AGR, SA-18, 513
Carolyn Gray	G/EG/AGR, SA-18, 406H
Harvey Hortik	G/EG/AGR, SA-18, 409E
Dianne Janczewski	G/EG/AGR, SA-18, 420A
Twig Johnson	G/ENR, SA-18, 509
Carol Levin	G/EG/AGR, SA-18, 513
Carl Mabbs-Zeno	G/EID, SA-18, 608
John Malcolm	G/EG/AGR, SA-18, 406B
Tom Mehen	G/EID, SA-18, 606D
Shirley Pryor	G/EG/AGR, SA-18, 403C
David Schroder	G/EG/AGR, SA-18, 403E
Sally Shelton	AA/G, NS 4942
Charles Sloger	G/EG/AGR, SA-18, 408D
Pamela Stanbury	G/EID, SA-18, 513
Gloria Steele	G/EID, SA-18, 608

Michael Sullivan G/EG/AGR, SA-18, 406G  
Joyce Turk G/EG/AGR, SA-18, 420G  
Phillip Warren G/EG/AGR, SA-18, 420D

USAID/Africa Regional

John Lewis USAID/Paris  
APO AE 09777

USAID/Botswana

Paul Bartel USAID/Gaborone  
Dept. of State  
Washington, D.C. 20521-2170

USAID/Chad

Richard Fraenkel USAID/N'Djamena  
Dept. of State  
Washington, D.C. 20521-2410

USAID/Egypt

Fenton Sands USAID/Cairo  
Unit #64902  
APO AE 09839-4902

U.S. Congress

George Ingram Foreign Affairs Committee  
PHONE 202-225-6360

Will Brackman Subcommittee on Foreign Agriculture & Hunger  
Bruce White 1301 Longworth House Office Building  
Washington, D.C. 20515  
PHONE 202-225-1867  
FAX 202-225-0970

Agricultural Research & Development International

Don Plucknett 7122 Little River Turnpike  
Suite 205A  
Annandale, VA 22003  
PHONE 703-354-5423  
FAX 703-941-1936



Committee on Agricultural Sustainability for Developing Countries

Kristin Schafer  
1709 New York Ave., NW  
Washington, D.C. 20006  
PHONE 202-638-6300  
FAX 202-638-0036

Connecticut Agricultural Experiment Station

Paul Waggoner  
123 Huntington St.  
New Haven, CT 06511  
PHONE 203-789-7826  
FAX 203-789-7232

Club du Sahel

Serge Snrech  
FAX c/o John Lewis  
USAID/Africa Regional at 33-1-4524-7489

Development Alternatives, Inc.

Elliot Berg  
7250 Woodmont Ave.  
Suite 200  
Bethesda, MD 20814  
PHONE 301-718-8203  
FAX 301-718-7968

Harvard University

Robert Paarlberg  
Center for International Affairs  
Cambridge, MA 02138  
PHONE 617-495-4420  
FAX 617-495-8292

International Food Policy & Research Institute

Raisuddin Ahmed  
Ousmane Badiane  
Christopher Delgado  
Lawrence Haddad  
Peter Hazell  
Per Pinstrup-Andersen  
Mark Rosegrant  
1200 17th Street, NW  
Washington, D.C. 20036-3006

Tesfaye Teklu

International Maize & Wheat Improvement Center

Don Winkelman

Lisboa 27

P.O. Box 6-641  
06600 D.F. Mexico  
PHONE 52-5-726-9091  
FAX 52-5-954-1069

John Mellor & Associates

John Mellor

801 Pennsylvania Ave. NW  
Suite PH23  
Washington, DC 20004  
PHONE 202-347-8802  
FAX 202-347-8806

**Michigan State University**

Center for International Programs

Pat Barnes-McConnell

Room 200  
MSU  
East Lansing, MI 48824-1035  
PHONE 517-355-4693  
FAX 517-353-9732

Dept. of Agricultural Economics

Agriculture Hall  
MSU  
East Lansing, MI 48824  
FAX 517-432-1800

T.S. Jayne

Agriculture Hall Rm. 401  
PHONE 517-355 0131

Thomas Reardon

Agriculture Hall Rm. 3  
PHONE 517-355-1521

John Staatz

Agriculture Hall Rm. 202  
PHONE 517-353-1519

David Tschirley

Agriculture Hall Rm. 4  
PHONE 517-432 2170

Michael Weber

Agriculture Hall Rm. 216  
PHONE 517-353-8639

North Carolina State University

Kevin Pond

Animal Science Department  
Box 7621  
Raleigh, NC 27695-7671  
PHONE 919-515-4009  
FAX 916-515-4463

University of Nebraska

John M. Yohe

INTSORMIL  
Room 54, Nebraska Center  
Lincoln, NE 68583-0948  
PHONE 402-472-6032  
FAX 402-472-7978

University of Wisconsin

Michael Carter

405 Taylor Hall  
Dept. of Agricultural Economics  
University of Wisconsin  
Madison, WI 53706  
PHONE 608-263-2478  
FAX 608-262-4376

USDA- Economic Research Service

1301 New York Avenue, NW  
Washington, D.C. 20002

Cheryl Christensen

Rm 1232  
PHONE 202-219-0008  
FAX 202-219-0146

Bob Robinson

Rm 732  
PHONE 202-219-0700  
FAX 202-219-0759

Matthew Shane

Rm 828  
PHONE 202-219-0705  
FAX 202-219-0368

Ron Trostle  
Rm 1024  
PHONE 202-219-0827  
FAX 202-219-0350

USDA- Foreign Agricultural Service

Valdis Mezainis  
Rm 3222  
PHONE 202-690-4872  
FAX 202-690-4872

Arlene Mitchell  
Rm 3219  
PHONE 202-690-1924  
FAX 202-690-0847

World Bank  
1818 H St.  
Washington, D.C. 20433

Karen Brooks  
PHONE 202-473-0420  
FAX 202-334-0513  
Derek Byerlee  
PHONE 202-458-7287  
FAX 202-477-6391

World Resources Institute

Ann Thrupp  
1709 New York Ave., NW  
Suite 700  
Washington, D.C. 20006  
PHONE 202-662-2598  
FAX 202-638-0036

World Wildlife Fund

Montague Yudelman  
1250 24th St. NW  
Washington, DC 20037  
PHONE 202-778-9638  
HOME PHONE 202-965-4642  
FAX 202-293-9211

Yale

Robert Evenson  
Economic Growth Center  
27 Hill House Ave.  
New Haven, CT 06520  
PHONE 203-432-3626  
FAX 203-432-5591



## REFERENCES

- Atherton Joan. 1994. Synthesis Notes during Session 7: Conclusion.
- Bonnen, James. 1990. Agricultural Development: Transforming Human Capital, Technology, and Institutions. In *Agricultural Development in the Third World*, ed. Carl K. Eicher and John M. Staatz. Second Edition. Baltimore and London: The Johns Hopkins University Press.
- Brooks, Karen. 1994. Presentation during Session 5: The Role of Food and Agriculture in Economic Growth: Europe and NIS.
- Byerlee, Derek. 1994. Presentation during Session 6: Prospects for Change: A 2020 Vision, Institutional Development and Infrastructural Investment.
- Carruthers, Ian. 1993. Going, Going, Gone! Tropical Agriculture As We Knew It. First Purseglove Memorial Lecture, UK: Tropical Agriculture Association.
- Carter, Michael. 1994. Presentation during Session 5: The Role of Food and Agriculture in Economic Growth: Latin America.
- Christiansen, Cheryl. 1992. A Retrospective View of A.I.D. Investment in Agricultural Research in Sub-Saharan Africa. Paper presented at the Symposium on the Impact of Technology on Transformation in Africa. Washington, D.C.
- Clay, D., F. Byiringiro, J. Kangasniemi, T. Reardon, B. Sibomana, L. Uwamariya. 1995. Agricultural Productivity in Rwanda: Changing Strategies for Land Management Under Conditions of Population Pressure and Poverty. Submitted to USAID/AFR/SD/PSGE/FSP. E. Lansing, MI: MSU Staff Paper No. 95-08.
- Delgado, Christopher. 1994. Presentation during Session 5: The Role of Food and Agriculture in Economic Growth: Africa.
- Evenson, Robert. 1994. Presentation during Session 6: Prospects for Change: A 2020 Vision, Technology Development.
- Fogel, Robert W. 1994. Economic Growth, Population Theory, and Physiology: The Bearing of Long-Term Processes on the Making of Economic Policy. *The American Economic Review* 84.3: 369-95.
- Haddad, Lawrence. 1994. Presentation during Session 2: Chronic Food Insecurity.
- Hazell, Peter. 1994. Presentation during Session 4: The Environment and Food.

- Kelly, V., B. Diagana, T. Reardon, M. Gaye, E. Crawford. 1995. Cash Crop and Foodgrain Productivity in Senegal: Historical View, New Survey Evidence, and Policy Implications. Submitted to USAID/AFR/SD/PSGE/FSP, MSU Staff Paper No. 95-05.
- Mellor, John. 1994. Presentation during Session 5: The Role of Food and Agriculture in Economic Growth: Asia.
- Morris, C.T., and Adelman. 1986. *Economic Development and Institutional Change in the 19th Century*. California Agricultural Experiment Station Working Paper no. 434. Giannin Foundation.
- Paarlberg, Robert. 1994. Presentation during Session 2: Chronic Food Insecurity.
- Pinstrup-Andersen, Per. 1994. World Food Trends and Future Food Security: Meeting Tomorrow's Food Needs without Exploiting the Environment. IFPRI Food Policy Statement 18. Washington, D.C.: IFPRI.
- Plucknett, Glenn. 1994. Presentation during Session 4: The Environment and Food.
- Reardon, Thomas. 1994. Presentation during Session 2: Chronic Food Insecurity.
- Reintsma, Kurt. Summary Comments during Day 3.
- Robinson, Bob. 1994. Presentation during Session 1: Global Food Availability.
- Rosegrant, Mark. 1994. Presentation during Session 1: Global Food Availability.
- Shaffer, James, and Semei Wen. 1994. Observations from Africa and China on Transition from Poverty Agriculture. Invited paper, 1994 Conference of the International Association of Agricultural Economists, Harare.
- Staatz, John. 1994. Presentation during Session 5: The Role of Food and Agriculture on Economic Growth.
- Stanbury, Pamela. Summary comments during Day 3.
- Streeten, Paul. 1993. Markets and States: Against Minimalism. *World Development* 21.8: 1281-98.
- Teklu, Tesfaye. 1994. Presentation during Session 3: Emergency Food Situations.
- Thrupp, Anne. 1994. Presentation during Session 4: The Environment and Food.
- Waggoner, Paul. 1994. Presentation during Session 4: The Environment and Food.

Weber, Michael. 1994. Presentation during Session 3: Emergency Food Situations.

Winkelman, Don. Comment from the floor.

Yudelman, Monte. 1994. Presentation during Session 1: Global Food Availability.