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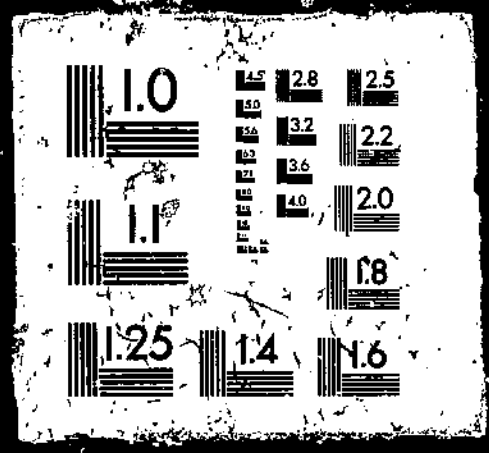
PB83-134700

FAFR-143 INTERNATIONAL FOOD POLICY ISSUES: A PROCEEDINGS, / JOSEPH
W. WILLET ECONOMIC RESEARCH SERVICE, WASHINGTON, DC. FOREIGN DEMAN
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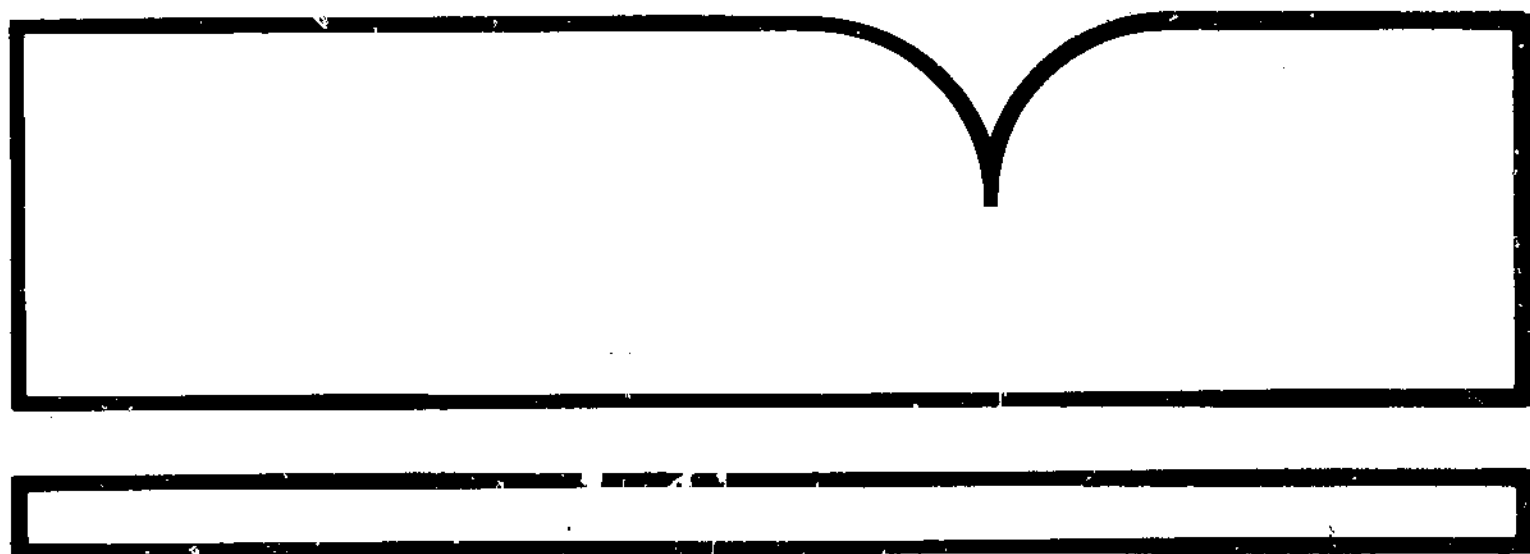


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International Food Policy Issues: A Proceedings

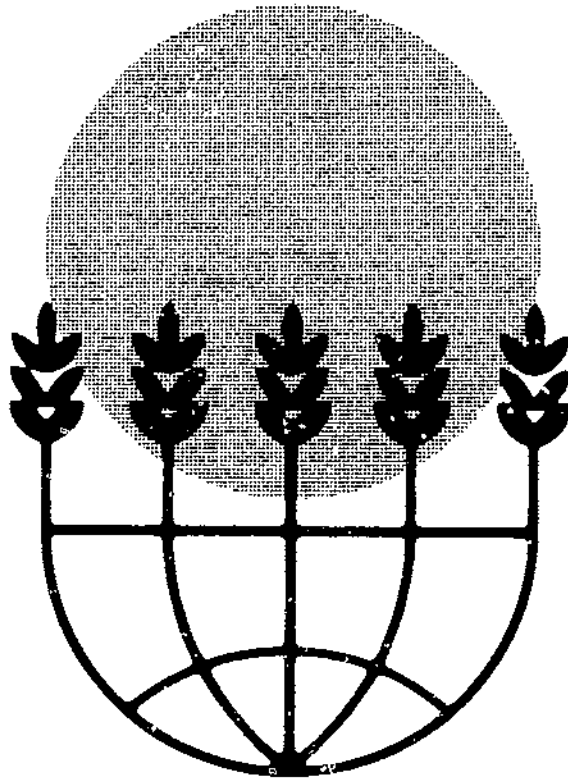
(U.S.) Economic Research Service
Washington, DC

Jan 78



U.S. Department of Commerce
National Technical Information Service
NTIS

PB83-134700



INTERNATIONAL FOOD POLICY ISSUES, A PROCEEDINGS

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U.S. DEPARTMENT OF COMMERCE
SPRINGFIELD, VA. 22161

Economics, Statistics, and Cooperatives Service
U.S. Department of Agriculture
Foreign Agricultural Economic Report No. 143

REPORT DOCUMENTATION PAGE	1. REPORT NO. FAER-143	2.	3. Recipient's Accession No. PB83 134700
4. Title and Subtitle International Food Policy Issues, A Proceedings		5. Report Date January 1978	
7. Author(s) Joseph W. Willett		8. Performing Organization Rept. No. FAER-143	
9. Performing Organization Name and Address Foreign Demand and Competition Division Economic Research Service U.S. Department of Agriculture Washington, D.C. 20250		10. Project/Task/Work Unit No.	
12. Sponsoring Organization Name and Address		11. Contract(C) or Grant(G) No. (C) (G)	
15. Supplementary Notes		13. Type of Report & Period Covered	
16. Abstract (Limit: 200 words) This document contains 10 pages and commentary presented at the Conference on International Food Policies Issues, held in Washington, D.C., April 28 and 29, 1977. The conference focused on important international trade and development issues under discussion in such international fora as the World Food Council, the Multilateral Trade Negotiations, the United Nations Conference on Trade and Development, and the International Wheat Council. Issues surrounding international food security, food needs of developing countries, and food aid and malnutrition are delineated and alternative solutions to problems are suggested. The Conference was sponsored by the U.S. Department of Agriculture. Economic Research Service. The opinions and conclusions of the speakers do not necessarily represent those of the sponsoring agency.		14.	
17. Document Analysis a. Descriptors			
Developing countries		Malnutrition	
Documents		Problem solving	
Food		Statistical analysis	
International trade			
b. Identifiers/Open-Ended Terms			
Agricultural trade		Food aid	
Alternative solutions		Food needs	
Development issues		Food security	
Delineated		Policy issues	
c. COSATI Field/Group 02-B, 05-C		Prices as of 1/1/82: Paper: Fiche: Cost codes are: for Paper and A01 for Fiche	
18. Availability Statement: National Technical Information Service 5285 Port Royal Road, Springfield, VA 22161		19. Security Class (This Report) Unclassified	21. No. of Pages
		20. Security Class (This Page) Unclassified	22. Price See box 17

ABSTRACT

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KEY WORDS: Agricultural trade; Developing countries; Food aid; Food self-sufficiency; Grain reserves; International food policy ; Malnutrition; World food problems.

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PREFACE

Joseph W. Willett
Director
Foreign Demand and Competition Division

In 1972 and 1973, the world food situation quickly changed from relatively low and stable prices and a concern with surplus agricultural products, to rapidly rising and fluctuating prices and a concern with shortages. At present there are some indications that the changes in 1972 and 1973 were mainly temporary deviations from long-term trends. Most farm commodity prices have declined greatly from the highs of a couple of years ago and now, in real terms, are not much higher than they were in 1972. Stocks of grains, the main food commodities traded internationally, have been rebuilt; and with good harvests this year, the stocks may rise to levels similar to those before 1972.

Recovery from the "crisis" situation of recent years should not lull us into the impression that world food problems have been solved. Fundamental problems had existed long before 1972, and the return to a more normal, pre-1972 situation in international food markets says little about the soundness of the world food system.

Basic problems remain. The food system remains unstable, with the world vulnerable to rapid changes from gluts to shortages and volatile prices. World food production is presently organized in an uneconomic geographic pattern, with too much being produced in some places and too little in others. And there are probably just as many, and possibly more, hungry people in the world now than there were in 1973 and 1974.

World food problems are enormously complex. Everyone is a consumer of food. Hundreds of millions of people are engaged in the production, processing, and transportation of food. The problems often involve conflicting interests, as well as mixtures of longrun and short-run issues brought about by intertwined political and economic forces that are increasingly internationalized by world trade. Many of the problems arise from the fact that agricultural and food systems are continually being changed by economic development which transforms rural, farm-oriented societies to urban, industrialized societies. Data for evaluating world food problems are poor, and tend to be poorest where the problems are greatest.

The United States is necessarily involved in the issues surrounding world food problems. The United States cannot alone solve all of the problems, but as the largest international trader in food products, and the largest donor of food aid and other international assistance, it has an important influence on whether the world food situation improves or deteriorates.

The proceedings of a Conference on International Food Policy Issues, held in Washington, D.C., in late April 1977, follow. They reflect the ideas of people who have thought deeply about the many

complex issues. We hope that this exchange of ideas will provide practical insights into policies and programs the United States might undertake to alleviate present miseries and help solve fundamental world food problems.

The opinions expressed by the guest speakers at the Conference were their own, and not necessarily representative of policies and programs of the U.S. Department of Agriculture. This proceeding is thus being published to stimulate discussion and exchange of ideas, and not as an endorsement of particular policies.

BACKGROUND NOTE ON THE AUTHORS

Walter Falcon, presently Director of the Stanford Food Research Institute and formerly Associate Director of the Harvard Development Advisory Service, has worked extensively in the area of agricultural planning, economic development, American agricultural policy, and world food issues. His work on the "green revolution" was awarded the 1971 American Journal of Agricultural Economics award. He serves as a consultant to the Ford Foundation, the World Bank, the Agency for International Development, and the National Academy of Sciences. His publications include books and articles on Asia, particularly Pakistan where he has first-hand experience, the "green revolution," international agricultural training, public health, and pest control. He has also written about Taiwan and is currently working on the political economy of rice in West Africa. Since 1971 Walter Falcon has made an active and involved contribution to a cause he values in his work as Trustee of the Agricultural Development Council.

Nathan Koffsky has had an impact on U.S. agricultural policy since 1934 in his various positions in the Department of Agriculture, notably as Administrator of the Economic Research Service, 1961-65, and Director of Agricultural Economics, 1965-66, and received the USDA Distinguished Service Award. He has served as consultant to the Ford Foundation, Robert R. Nathan Associates, the World Bank, and the United Nations for the World Food Conference. As Senior Economist for the World Bank, 1971-75, he headed Agricultural Sector Missions to Thailand, Philippines, and Jamaica. He also conducted agricultural research in India, Pakistan, Bangladesh, Sri Lanka, Indonesia, El Salvador, and Brazil. His publications include work on the "Food Potential of Developing Nations" and rural income and wealth. He left the U.N. World Food Council as Deputy Director to join the International Food Policy Research Institute where he is presently Interim Director.

Nevin S. Scrimshaw is Institute Professor and Head of the Department of Nutrition and Food Science of Massachusetts Institute of Technology. His distinguished and varied career reflects his broad formal training. He holds a B.A. in zoology, M.A.'s in both biology (Ohio Wesleyan), and public health (Harvard), an M.D. (University of Rochester School of Medicine and a Ph.D. in physiology (Harvard). He specializes in world and regional health problems, including the physiology of development, nutritional factors in pregnancy, protein-calorie malnutrition, endemic goiter, protein and amino acid metabolism and requirements, nutrition and infection, as well as other aspects of clinical and public health requirements.

Nevin Scrimshaw serves on advisory committees to the National Academy of Sciences, the United Nations and its specialized agencies (WHO, FAO, UN University), U.S. Government departments, and several foundations. He has drawn upon this broad research, administration, and advisory experience to produce more than 400 publications and 5 books. In addition, he has been accorded numerous honors and awards.

Peter Timmer, Professor of Economics of Food and Agriculture, Harvard University, has had a long association with Harvard, receiving his B.A., M.A., and Ph.D. at that institution. His formal education was enriched by a year of food science study at the Royal College of Science and Technology in Glasgow, Scotland, as a Fulbright Scholar. His teaching career extended from Harvard, to Stanford University's Food Research Institute, to an endowed chair at Cornell and back to Harvard's Faculty of Public Health. He is on the Editorial Board of *Food Policy* and Co-editor of *Journal of Development Economics*.

He visited the People's Republic of China in 1975 as a member of the National Academy of Sciences Delegation to observe small-scale rural industry. The following year he was the lead analyst and member of the Nutrition Overview Study Team for the National Academy of Sciences' World Food and Nutrition Study. His research and publications are in the areas of measuring technical efficiency, choice of appropriate technology in agriculture, rice policy in Asia, food and fertilizer policies, and most recently the factors affecting food distribution.

Timothy Josling, Professor in the Department of Agricultural Economics and Management, University of Reading, England, taught at the London School of Economics during 1968-74 before joining the University of Reading faculty and has long served as an advisor to governments and international organizations. He has done work for various Parliamentary committees in the House of Commons, United Kingdom, the European Commission, the U.N. and its specialized agencies. He served in an advisory capacity for the World Food Conference Secretariat in 1974. His research publications are in the field of domestic agricultural policies, in particular the Common Agricultural Policy of the European Community, the trade implications of domestic farm policies and the question of grain reserves.

Fred H. Sanderson, longtime State Department executive in food and agricultural areas and presently Guest Scholar at the Brookings Institute, is currently directing a major project for Brookings on *World Agriculture: Reassessment of Trends and Policies*.

During his State Department career, 1946-73, he was Director of the Office of Food Programs, Deputy Executive Director of the President's Commission on International Trade and Investment Policy, and a member of the State Planning Staff with responsibility for international economic matters. He has served with the Organization for Economic Cooperation and Development (OECD) in Paris and on the Food and Agriculture Organization of the UN's (FAO) Committee on Commodity Problems and FAO's Consultative Committee on Surplus Disposal and as Deputy Director of the Energy Group on the President's Materials Policy Commission. He has represented the U.S. government in many international organizations, including the International Wheat Council. The Wells Prize (Harvard) and the Rockefeller Public Service Award were bestowed in recognition of his distinguished public service.

Among his publications are: "The Great Food Fumble," in *Science*, "The World Food Problems: Possibilities for International Action," *Current History*, "The International Grains Arrangement," *American Foreign Economy Policy and the Atlantic Community*, *Methods of Crop Forecasting*, *The Outlook for Energy Resources: Coal, U.S.-Soviet Agricultural Cooperation*, "World Food Prospects: Short-Term and Long-Term" in *World Health*, "The Next Steps on Grain Reserves," in *Global Food Interdependence and Food Trends and Prospects in India*.

D. Gale Johnson, Distinguished Science Professor and Dean of Faculties of the University of Chicago, has written extensively in the field of world agriculture and played an active role in the formulation of American economic policy.

Some of his activities have been serving on the Steering Committee for the President's Food and Nutrition Study, National Research Council, National Academy of Science; the U.S. mission to Brazil; the National Advisory Commission for Food and Fiber; the Advisory Board of the Policy Planning Council of the Department of State, and as a consultant and economic advisor to government agencies, research institutions, and private organizations. A member of the American Agricultural Delegation to the USSR in 1955, he has written several articles about Soviet agriculture, population, and trade. Other areas of specialization and publications are in the field of agricultural trade theory and practice, the role of agriculture in economic development, farm commodity programs, population issues, and national and international stock reserves.

His books and articles have had wide distribution. Some of those which should be noted are: *Agriculture and Trade: A Study of Inconsistent Policies*, *World Hunger*, *World Agriculture in Disarray*, *U.S. Agriculture in a World Context: Policies and Approaches for the Next Decade*, and *World Food Problems in Perspective*.

Harry Walters is the Assistant Executive Director of the U.N. World Food Council in Rome. Mr. Walters assumed this position after posts with the World Bank and USDA's Economic Research Service. During his tenure with ERS, he directed a number of significant studies on Soviet and Eastern European agriculture, was a pioneer in the work on comparing and contrasting U.S. and Soviet agriculture and headed the team which produced *The World Food Situation and Prospects to 1985*, a background report which has been recognized as a major contribution to the objective study of the world food situation. He has been a consultant for the Asian Development Bank (ADB) and, in cooperation with Joseph Willett, authored a study for the ADB on Southeast Asia, titled *The Green Revolution*.

Howard W. Hjort is the U.S. Department of Agriculture's Director of Economics, Policy Analysis, and Budget and is an agricultural economist with a unique background in management and administrative areas. He was formerly vice president of the agricultural consulting firm of Schnitker Associates, a planning and management advisor with the Ford Foundation in New Delhi, India, and staff director for USDA's Director of Agricultural Economics.

Dale E. Hathaway is a respected spokesman on domestic and international agricultural policy issues. Before being appointed Assistant Secretary of Agriculture for International Affairs and Commodity Programs in March 1977, he was director of the International Food Policy Research Institute. Prior to that, his positions included being an agricultural advisor for the Ford Foundation's Asia and Pacific program, chairman of Michigan State University's Department of Agricultural Economics, and senior staff member of the Council of Economic Advisors.

THE RELATIONSHIP BETWEEN DOMESTIC AND INTERNATIONAL FOOD POLICY

by
Howard W. Hjort
Director, Economics, Policy Analysis and Budget
U.S. Department of Agriculture

During my previous tenure at USDA, agricultural economists and policymakers were largely preoccupied with excess supplies. This posed a domestic dilemma: How could we hold farm surpluses down while keeping farm incomes up?

It was not until the seventies when shortfalls in world agricultural production, the large increase in U.S. agricultural exports, and the sky-rocketing of prices changed the concerns about our agricultural problems and policies. It became immediately clear that what happens in the rest of the world has extremely important consequences for the United States.

Our farm sector today is highly dependent on what happens in international markets. Agricultural exports are now contributing substantially to farm income. Roughly one-fourth of the cash receipts of farmers now come from exports. Farm exports have also led to surpluses of as much as \$12 billion in our balance of agricultural trade, which have helped pay for costly petroleum imports.

The other side of the ledger, however, is also important. Associated with the surge in commercial farm exports was a reduction in supplies available for domestic use, which in turn led to much higher food prices. Food aid shipments were also curtailed at a time when developing countries needed them the most.

As we have become more dependent on foreign markets as a source of income, so have the importing countries of the world become more dependent on the United States as a source of supply. During the seventies, the United States accounted for about 90 percent of the increase in world wheat exports and for about 80 percent of the increase in coarse grain exports. The United States now supplies about 44 percent of world wheat exports, about 55 percent of the coarse grain exports, three-fourths of the soybean exports, and one-quarter of the world cotton exports. We have also been the world's main donor of food aid,

accounting for about 60 percent of total world food aid during the seventies, compared with about 90 percent during the sixties.

World agriculture is always in a state of imbalance. This year food grain supplies are excessive, feed grain supplies are slightly in excess of market requirements, oilseed supplies are inadequate, cotton supplies tight, sugar supplies excessive, coffee and cocoa supplies inadequate, and meat supplies still abundant.

A major development this year is that we may see a replenishment of our depleted grain stocks. Because of record world grain crops in 1976, world carryover stocks may increase by as much as 50 million tons and reach their highest level since the early seventies. U.S. stocks, particularly of wheat, are also expected to increase dramatically. Grain prices have weakened from their previous highs and this is having a dampening impact on the incomes of farmers; however, the reverse is true of soybeans, with minimal supplies expected at the end of the current season.

The experience of the last few years has given rise to concern that widely fluctuating trade and price levels could be a recurring phenomenon, causing all sorts of havoc for farmers, consumers, government planners, and food aid recipients.

In order for the United States to develop appropriate policies to deal with fluctuating trade and price levels, the causes of these impacts must be identified. In large part, these impacts have been caused by the effect of weather on agricultural production and by policy changes in particular countries. In recent years, we have seen how a few countries relied on world markets as a buffer, instead of cutting back on consumption or depending on their own reserves, thus shifting a large part of the adjustment process to others, primarily the United States. This was particularly true of the Soviet Union, which has accounted for

a very large part of the variation in world production and trade levels, particularly for wheat. Policies of other countries also contributed to the instability, notably the European Community's policy of insulating its agriculture from world markets, Canada's and Australia's policy of varying their export prices, and Japan's policy of subsidizing consumers.

The United States not only has been forced to bear the brunt of the adjustment burden in periods of tight supplies, but also bears it during periods of abundant supplies. This is now evident in world wheat markets, where our market share is being eroded by the other wheat exporters. These countries rely on marketing boards which have complete authority to sell when, where and at almost whatever prices they choose. These marketing boards have a whole array of competitive tactics which include special subsidies, quality discounts and "flat" pricing.

The merchandising of U.S. grain, on the other hand, is handled by private enterprises which must compete with the monopoly power of marketing boards. The open marketing system in the United States generously provides price signals to the whole world. Such information is effectively used by our competitors to adjust their own marketing practices to gain the advantage in world markets. As a result, the United States may build up stocks, or be forced to take acreage out of production.

International and Domestic Impacts of U.S. Policy

I have just argued that it is the policies of other countries that the United States should be concerned with. While this is true, it neglects the important relationship between our own domestic and international policies. Our policies can work like a double-edged sword: Policies aimed at international problems invariably have domestic impacts, while policies aimed primarily at domestic problems have international impacts. With the present transition in policy, these relationships need to be reviewed. Of particular concern are:

The relationship between our domestic support prices and our competitive position in world markets: If price support levels are set above world equilibrium prices, our market share and in turn farm income will suffer.

The relationship between the level of stocks to future domestic and world food prices and growth in markets: Inadequate stocks and high and erratic prices reduce the rate of growth in demand for our farm products.

The relationship between export controls used to stabilize domestic prices and longrun growth in exports: The periodic use of export controls is likely to lead to loss of markets as

importing countries reduce their dependence on U.S. supplies by encouraging domestic production or purchasing elsewhere.

The relationship between a generous food aid policy and domestic food prices: Given a tight domestic supply situation, an increase in food aid shipments potentially leads to higher domestic prices.

The relationship between export growth, budget outlays, and domestic food prices: Maximizing exports may lead to large budget outlays for export subsidy payments at one extreme and reduced domestic supplies and higher prices at the other.

It is essential that these relationships be taken into account in establishing U.S. domestic and international food policies.

We are now faced with the job of doing just that—establishing new policies on a number of key issues. These issues fall into three major categories, which I've already alluded to: instability in supplies and prices of basic foodstuffs, maintenance and growth of markets for agricultural products, and food security for low income countries.

Policy Objectives

In order to develop policies that speak to these issues, it is necessary to look closely at our domestic and international objectives. Our overall goal is to achieve stable economic growth, a high level of employment, and a low rate of inflation. By my count there are four specific objectives within agriculture which, if met, would help achieve this goal.

The first objective would be to moderate extreme swings in prices. For the United States, feed grain prices are especially important, since major surges in feed grain prices can lead to adjustments in the livestock sector which, in later periods, impact on consumer food prices and the general level of inflation. Wheat prices, on the other hand, tend to be more important internationally since wheat makes up a larger proportion of total consumption in the rest of the world.

The second objective would be maintenance and expansion of agricultural markets. We should seek new commercial markets in the developing world, stable and expanding markets in the centrally planned world, and more liberalized markets in the developed world. A third objective, tied closely to the first two, is the expansion of farm income with a reduction in its year-to-year volatility.

Finally, from a humanitarian perspective, we want to help increase food security and overall production levels in low income countries. The United States will need to meet its fair share of the critical food needs of these countries.

It is evident that we are faced with a multiple set of objectives in which the maximization of any

one objective could jeopardize the achievement of other objectives. Thus, the tradeoffs between objectives will need to be fully analyzed so that there is a reasonable degree of success in achieving our overall goal of stable economic growth.

Policy Tools

In pursuing our objectives, there is a diverse set of policy instruments available to the Government. The question I would like to raise is, "Have we sufficiently evaluated the tools we have at hand, and fully utilized those tools which are capable of meeting our objectives?"

Policy tools fall into two categories. Tools which have a primary domestic focus include: (1) non-recourse loans and target prices; (2) storage incentives; (3) supply control measures; and (4) trade management tools, including subsidies, tariffs, licensing and export controls. Tools with a primary international focus, which require cooperation of other nations, include: (1) bilateral trade arrangements; (2) multilateral trade or commodity agreements, including trade liberalization; (3) food aid; and (4) financial assistance.

The challenge is to design an integrated package that uses these tools to achieve all of our objectives. In designing such a package, the relationships and primary and secondary impacts of the use of these domestic and international policy tools must be taken into account.

Alternative Policy Approaches

For your consideration, I would like to suggest three basic policy strategies which incorporate the policy tools I've listed. These possible approaches fall into the general categories of being either unilateral, bilateral, or multilateral. A fourth strategy is a mixture of these, but I will leave this one up to your imagination in the interest of time.

Unilateral Approach

The unilateral or go-it-alone approach would not depend on negotiations or cumbersome agreements. There would be several ways of combining the available policy tools under this option.

The important issue is "How well does this strategy meet our objectives on price instability, trade, farm income growth, and food security?"

On the stability question, the major issue is whether at the extremes the Government should intervene to manage trade flows and production levels or whether it should rely on reserve stocks as the principal policy tool.

We have seen in prior years the on-again, off-again, hand of Government in using trade controls, set-aside, and export subsidies. These tools were

usually applied in an ad hoc manner to resolve crisis situations. In an effort to minimize some of the apparent conflicts in the use of policies to meet objectives, this Administration has already decided that one major element of its policy will be a farmer-held reserve to help reduce the extremes in domestic and world commodity prices. This type of reserve scheme will help assure that supplies are available to meet domestic and international commitments. It will permit farmers to gain the benefits from future price increases, and it will provide safeguards for consumers and the national economy against sudden surges in food expenditures and rekindled inflation.

We have established this reserve unilaterally; however, only as a partial, positive step leading to the development of an international system of reserves. We have indicated to the international community that world reserves must be a cooperative and participative venture, that the United States will not be the granary for the world.

If we should approach the problems unilaterally, the question of what to do about the objective of maintenance or expansion of our markets, particularly in times of abundant supplies, is to my mind unresolved. In order to prevent loss of markets and at the same time protect domestic farm income, we could be forced to resort to export subsidies to compete with other exporters. The principal question here is whether or not the use of export subsidies actually results in any net economic benefit for the United States, particularly if the other exporters are willing to follow our lead. If the answer is no, then we might have to reduce our expectations of meeting some of our trade objectives under the unilateral option.

The question of food security under the unilateral approach, I suppose, would mean the giving of food aid to the voluntary agencies for distribution to the neediest countries. There would be real limitations on the amount of food that these agencies could handle, so it is unlikely that this approach by itself would meet our food security objectives.

On balance, the unilateral option has limitations. It is appealing to those who do not put much faith in international agreements. However, bilateral and multilateral options may hold more promise for they could lead to more orderly and, for us, less costly trade and food security arrangements.

Bilateral Approach

At present, the United States has bilateral trade arrangements with two East European countries, the Soviet Union, Japan, Israel, and Taiwan. The objective of these arrangements is to offer assurance of supplies to an importing country in return

for access to a particular share of that country's market over time. Other grain exporting countries have used bilateral agreements to help stabilize their share of world markets. The question that we need to answer is, "How well do bilateral agreements meet our domestic and international objectives?"

It has been claimed that the use of bilateral agreements can lead to increased market stability. The example of the U.S.-Soviet agreement is often used. However, whether or not such an agreement successfully insulates the U.S. domestic market depends largely on how other exporters react to unusually large Soviet purchase intentions. If the other exporters divert their exports from other buyers to the Soviets and then these buyers turn to the United States, the bilateral agreement, by itself, would not be effective in protecting the U.S. market. Furthermore, if we went too far in over-committing supplies to bilateral agreements, given the uncertainties of weather, the choice would be on one hand not to honor those commitments, or on the other hand accept the severe domestic price consequences when supplies were tight.

For the United States the issue is even more complicated since grain marketing is handled by private enterprise and not the Government. The crucial question is "How would the Government guarantee that forward supply commitments would be met?" One option would be to stand behind these commitments with a grain reserve. The other option would be a rationing scheme, where those countries with bilateral agreements would have first call on available export supplies. This approach, however, could lead other countries, which did not have or want bilateral agreements, to seek alternative sources of supply.

Bilateral agreements, given the above limitations, however, may be an effective tool for gaining a competitive trade advantage in particular country markets. They also could be an effective tool in meeting food security objectives in low income countries. This could be done through our food aid program, which would tie a multi-year food aid commitment to a commitment by recipient countries to encourage local food production. As countries moved through the development process, the bilateral food aid agreements could be converted to multi-year commercial agreements.

Multilateral Approach

Multilateral approaches toward meeting our objectives could reduce the cost of going it alone and enlarge the benefits to the world. At present there are a number of international initiatives going on which are closely related to our domestic and international objectives on prices, trade, and food security. What can the United States do to

turn these discussions into productive negotiations for the achievement of our objectives?

On the instability issue, discussions have been going on in the International Wheat Council (IWC) on developing a new wheat agreement with possible provisions for grain reserves. However, the U.S. proposal, made by the previous Administration, for an international system of grain reserves operated by quantitative indicators, has been rejected by other IWC members. These countries apparently want to negotiate an agreement that includes provisions for both prices and quantities. The implementation of our new farmer-held reserve program, related to a price-based mechanism, may enhance the development of an international reserves system. However, the specific details for linking national reserves to an international system have not been resolved and will need further attention if productive negotiations are to result.

In another forum the developing countries are seeking to implement an integrated commodity program in which commodity buffer stocks would be financed by a common fund in order to increase the level and reduce the volatility of their foreign exchange earnings. In a positive gesture the United States has recently said it will agree to a common fund approach to the financing of commodity stocks after individual commodity agreements are made. I have as yet not seen a definitive study on the U.N. Council on Trade and Development proposals and their impact on the trade and stability problem. It is too soon to tell whether this program will meet any of our objectives or the developing countries' objectives. I would urge further study of these proposals.

The other major international thrust is the multilateral trade negotiations (MTN). For some time these negotiations have been hung up on procedural issues. Progress in the MTN in reducing agricultural trade barriers could have important implications for the United States, if, in that process, we can gain greater access to markets. It could also mean a wider sharing of the adjustment process in times of future shortages and surpluses, and reduce the degree of price instability in the United States. Thus, through trade liberalization it would be possible to make progress in meeting several of our objectives.

In addition to the possible multilateral approaches I've just discussed, there are other options that should be evaluated in terms of meeting our objectives. There are many types of possible cooperation with various combinations of exporting and importing countries dealing with different kinds of commodities. There may be useful consultative agreements, buffer stock agreements, market sharing agreements, and specialized agreements on trade and food aid to meet the needs of the developing countries. We should be innovative

in our approach to international cooperation and should not let past successes and failures limit our view of the potential for solving problems.

I have talked about the relationships between domestic and international food policies, the objectives of these policies, the policy tools we have available, and possible ways to combine these tools into an effective and comprehensive food policy.

The task before us now is to evaluate each of these possible approaches and combinations of approaches in terms of their costs and benefits and their primary and secondary impacts on the domestic and world economy, so that policymakers can choose the right strategies. I hope this conference and followup efforts will help us in defining an overall food policy for the United States.

FOOD SELF-SUFFICIENCY: LESSONS FROM ASIA*

by

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ABSTRACT

In principle, food self-sufficiency has little economic logic; in practice the large, food deficit-countries of Asia have few alternatives to increased domestic production. Food aid and international trade can help at the margin, but logistical difficulties, balance-of-payments constraints, and limited exportable supplies (stocks) will preclude imports as the primary solution to Asia's food problems. For these nations, the question is not "whether" self-sufficiency, but "how." Self-sufficiency is most likely to be achieved in Asia through an increased focus on biologic research, by more positive price, trade, and expenditure policies toward the agricultural sector, and by a focus on agricultural planning which retains a strong emphasis on productivity.

"Food Self-Sufficiency" is the best and worst of topics. It is narrow enough to permit economists, statisticians, and political scientists to think that they are making precise statements, yet broad enough to encompass almost anything an author has to say.

To bring the topic to more manageable (if not definitive) boundaries, I propose to limit the scope of my remarks rather severely. I do so in part on the basis of other papers to be presented at this conference, and in part in terms of my own comparative advantage on the self-sufficiency topic. Specifically, even though 7 of the 10 largest importers of grain in 1976 were developed countries, I propose to deal primarily with low-income countries. Second, even though trade in food (the converse of self-sufficiency) can come about either as a consequence of diverging trends

in production and consumption or because of short-term variations about trends, I propose to concentrate mainly on the trend phenomenon. Third, even though statistical and policy studies are both necessary in order to analyze self-sufficiency, I have chosen to focus mainly on the latter approach. Many of the recent statistical taxonomies on food self-sufficiency have been developed by the International Food Policy Research Institute (IFPRI), on which Dr. Koffsky is reporting. In addition, my reading of the IFPRI results suggests that, among the less developed nations, the main self-sufficiency problems in terms of magnitude center on the food-deficit Asian countries. Finally, I perceive that while statistical analysis can provide an historical starting point, and can also provide some rough orders of magnitude, any discussions of trade and welfare must be firmly rooted in a political-economic setting.

More specifically, the view being put forward in this paper can be summarized as follows: Among the less developed regions, especially the large countries of Asia, the central food-policy issue for the medium run is not whether to strive for self-sufficiency, but whether means can be found to increase domestic food output at least 3 percent annually. This rate is obviously far from what would be optimal in terms of income growth, nutritional improvements, or employment generation. Unfortunately, even this "muddling-through" minimum cannot be taken for granted, and the primary focus of the remainder of this paper is on the domestic and international efforts that are required to permit food self-sufficiency in key Asian countries during the next decade.

The Rationale For and Limitations of An Asian Focus

The large countries of Asia provide useful limiting cases for analyzing trade/self-sufficiency options for the developing world. Since two out of every three persons estimated to be suffering from protein-calorie malnutrition live in Asia, any strategy decisions on food have an important, direct

*This paper draws heavily and directly on comments prepared for a seminar, "Transforming Knowledge Into Food," University of Minnesota, April 11-22, 1977. I am grateful for the suggestions of Carl H. Gotsch, Bruce F. Johnston, Scott R. Pearson, Anne E. Peck, and Pan A. Yotopoulos.

impact on human welfare in those areas. In addition, the enormous food-consumption base of Asia has important potential repercussions on the world grain economies. (While no thoughtful observer would suggest that the Sahel drought was unimportant to the specific countries, its international impact on the world food economy was limited because of the relatively limited population in that part of the world). Hence the size of Asia, plus the growing dependence on North America illustrated in figure 1, suggest that increased trade or food-aid cannot long sustain the growing gap between Asian food production and consumption. In short, balance-of-payments constraints, logistical limitations, and the limited capacity in other regions to supply increased exports to Asia interact in such a way that in broad terms Asia must become increasingly "self-sufficient." This judgment is not a blind call for autarky in all low-income countries (particularly small countries), nor a plea for domestic production at any cost. It represents rather the reality of magnitudes. Although in principle, "food self-sufficiency" has little economic logic *per se*, in practice, expanded agricultural output is consistent with the comparative advantage in many Asian nations.

If the centrality of the production conclusion is accepted, then the Asian experience of the past 10 years is helpful in focusing attention on three issues which I believe are related critically to food self-sufficiency.

Technology

The experience of the past decade has demonstrated the potential of new agricultural technology in Asia for helping to achieve self-sufficiency. Even more importantly, this experience indicates that neither the yield nor the profitability aspects of the new technology can be taken for granted by researchers, policymakers, or farmers. Recent history has shown instead that achieving a broader technological base is very difficult; moreover, without this broadened base, increases in production, improvements in income distribution, and growth of employment will surely be more, rather than less, difficult.

Although there has been some improvement in the past decade, knowledge about biologic processes is still limited in Asia and is focused mainly on wheat and rice under irrigated conditions. The promising start of several new international research centers offers hope for the improvement of several additional crops for the semi-arid tropics, but the research gaps are still large and important. These gaps are both technical and institutional in character. Research on, and diffusion of, new varieties of corn, sorghum, millet, and most of the legumes have far to go in a number of south and

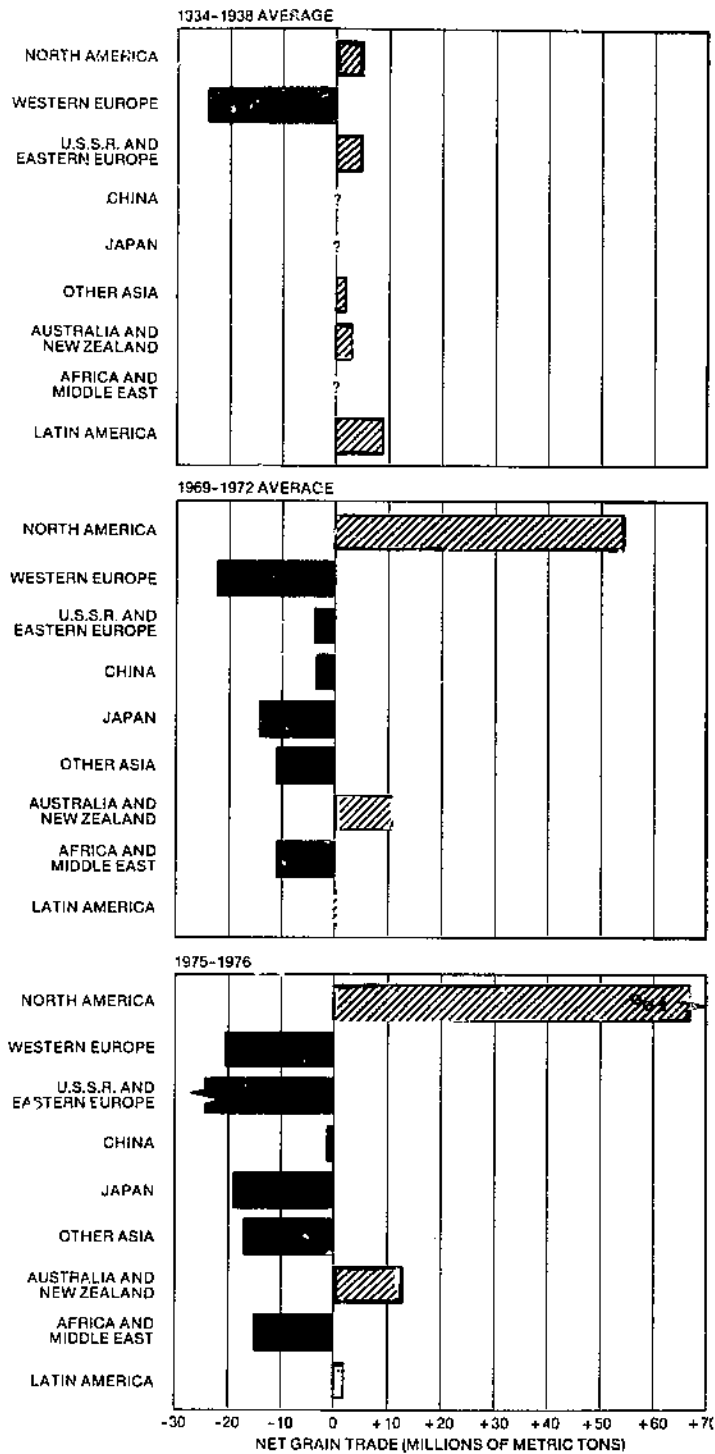
southeast Asian countries. Similarly, few breakthroughs have been made for the large and important animal-product sector. In addition, the technological packages for dryland areas are still largely at the experimental stage. Since dryland regions tend often to be marginal in terms of income and food consumption, this void is a serious deficiency and places an even larger production burden on the densely populated areas which have controlled irrigation. Moreover, the failure to devise new technologies for lagging regions is causing severe problems of internal adjustment on such issues as migration and the realignment of prices. For example, the income effects of new wheat varieties in irrigated areas within India and Pakistan have been most impressive during the past decade. Yet productivity increases in these areas have aggravated income disparities relative to dryland regions and have simultaneously raised serious policy dilemmas related to pricing and zonal restrictions. Therefore, as contrasted to the conventional wisdom of 10 years ago, there is increased recognition that broadening the technological base is necessary for increased output and improved regional income distribution.

The foregoing comments, which have emphasized the problems of gaining additional knowledge through agronomic and animal-science research, are not intended to minimize the institutional problems of creating an environment whereby new genetic material can be created and put to use. Unfortunately, the situation in many Asian countries can only be described as chaotic. Poor working conditions; salaries so low that scientists and extension personnel must hold several jobs to feed their own families; jurisdictional disputes between universities and ministries and between research and extension; and limited linkages between national research systems and the international research centers, are too often the rule rather than the exception. Hence, progress in achieving self-sufficiency will require significant internal reform as well as outside assistance if agricultural research is to continue to provide the basis for a growth in agriculture exceeding that of population.

Pricing

To argue that biologic research is important, indeed of primary importance, is not to argue that self-sufficiency "solutions" in Asia will be primarily technological in character. The past decade has also shown that economic policy can be competitive with, or complementary to, technological efforts to increase food production.

Given the political and economic importance of agricultural price policy within Asia, it is not surprising that this topic area continues to generate



The world's increasing dependence on grain exports of a few countries is shown by this comparison of the trade pattern before World War II with the situation more recently and estimated figures for the past year. Data are from Lester R. Brown, the Department of Agriculture, and IFPRI. Before the war most regions exported grain (pattern); Western Europe imported it (solid). Now, the U.S. and Canada supply most of the grain to make up deficits.

Figure 1

considerable controversy. Since national self-sufficiency has no meaning without reference to a set of prices, it is appropriate that the issue be addressed frontally in this discussion. My reading of recent evidence suggests that price problems continue as a serious impediment to increased Asian agricultural output.

The first point to be made is that agricultural input and output prices vary enormously across countries. In the case of the Asian rice economy, for example, the prices of paddy and of nitrogen fertilizer are one indication of the economic inducement being given to farmers. As shown in table 1, the ratio of rice to fertilizer prices varies across countries by more than 700 percent. Even when appropriate corrections are made for quality, wrongly valued exchange rates, and so forth, the range is very large. These cross-country variations in turn raise two other questions: How do these differences arise? and, how do these differences influence food production, consumption, and trade?

Since the cross-country differences greatly exceed transportation costs, a major explanation must lie within the general area of trade policy for the respective countries. Taxes on exports, bans on imports and exports, and trade only on government account are some of the policy instruments that are currently being used. Generally speaking, these trade policies are much more important in explaining cross-country price variations than are policies on domestic price supports for agriculture.

On the question of whether these varying domestic prices make any difference on production,

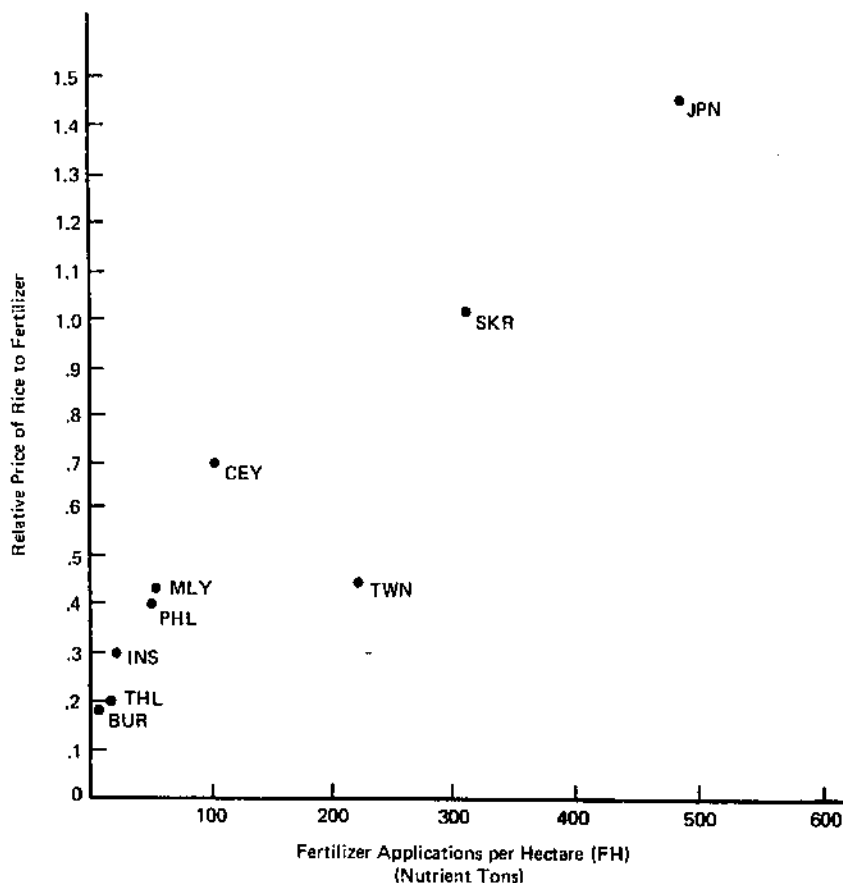
the evidence must be evaluated with caution. First, as shown by figure 2, there is a high cross-sectional correlation in Asia among yields per acre, the amount of fertilizer used, and the ratio of rice to nitrogen prices, even when temperate-tropical differences are taken into account. (These correlations also hold at the regional and village levels.) This relationship does *not* imply automatically that greatly increased agricultural prices over very short periods will alone "double" yields. The evidence instead suggests that a long-run induced innovation process may be at work, with the technical production possibilities which are open to a given country being a function of the level of relative prices. In this manner, the technical change referred to in section one of this paper may be significantly interrelated with economic policy, particularly with pricing decisions that arise through the use of trade instruments.

Within countries also, the interaction of prices and technology can vary importantly through time. In the case of Pakistan, for example, the very large productivity increases in wheat and rice during the middle and late 1960's meant that the profitability of irrigated agriculture was very high and was quite conducive to agricultural growth, even though the barter terms of trade for the agricultural sector showed a decline of more than 20 percent between 1967 and 1972. This period was one of those rare eras in Pakistan when food producers and consumers could both be relatively happy. However, given the regional and commodity constraints which limit the potential impact of pres-

Table 1--Basic rice statistics for a sample of nine Asian countries, 1970

Country	Production Metric tons	Consumption Kg. per capita	Relative price of rice to fertilizer	Paddy yield Metric tons per hectare
Japan	11,674	108	1.43	5.64
South Korea	3,939	150	1.00	4.55
Taiwan	3,290	163	0.45	4.16
Malaysia	930	120	0.43	2.72
Ceylon	993	122	0.70	2.64
Indonesia	11,420	105	0.30	2.14
Thailand	8,758	217	0.20	1.97
Philippines	3,473	94	0.40	1.72
Burma	5,550	178	0.20	1.70

Source: Timmer and Falcon (1, p. 59)



Relationship between the relative price of rice to fertilizer and fertilizer applications per hectare.

Figure 2

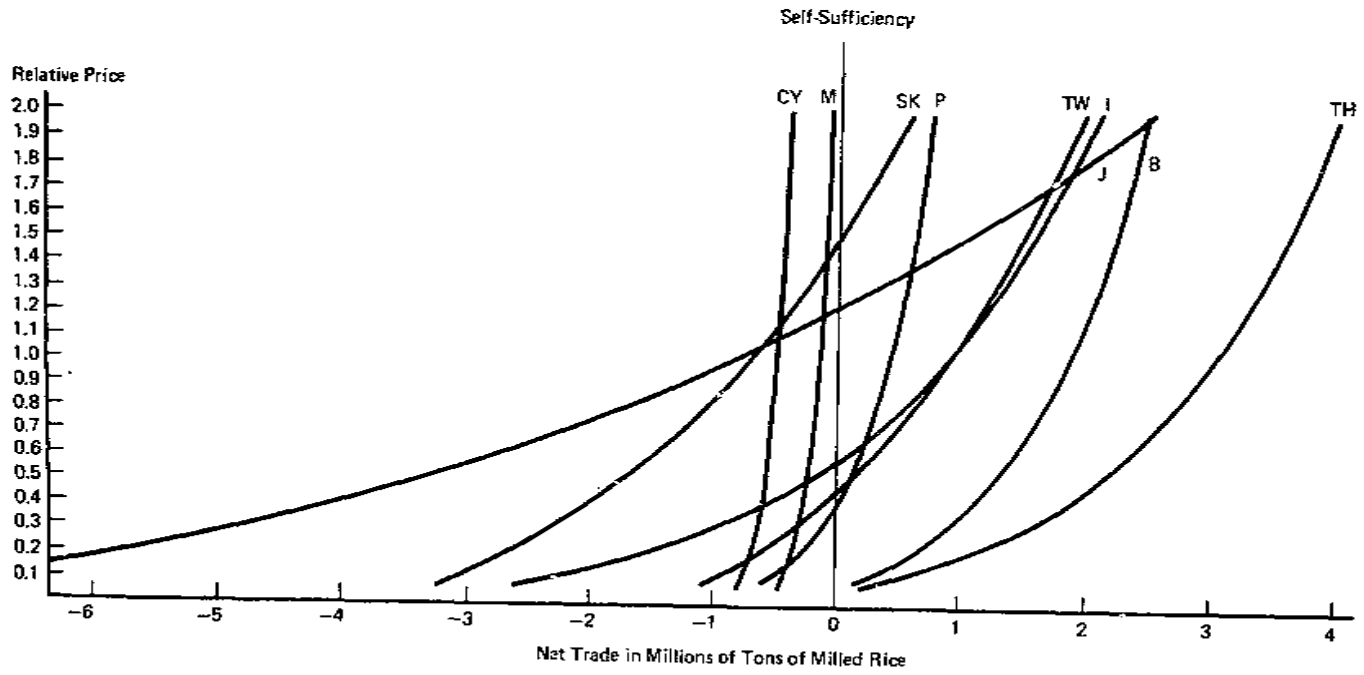
ently available technology, one suspects that within Pakistan (and in a number of other countries) a shifting of the terms of trade back towards agriculture may be necessary to get agricultural output growing rapidly once again. Obviously, such a move goes to the heart of urban-rural political issues. Agricultural prices again matter, because positive changes that may be necessary to stimulate longer run production may also be infeasible on shorter run political grounds because of the strength of urban consumer groups. (Although Egypt is not within Asia, the February 1977 food riots in Cairo are a vivid example of the problem.)

More generally, the point of view being put forward here is that "profitability" to farmers is one key to increased food output. This profitability can be disaggregated into two further components—one being largely technical in character, the other economic. If cost-reducing technical change can be expanded rapidly for other crops and regions, it

may be possible to squeeze agriculture continually in terms of price policy. If, however, as Asian evidence of the past 5 to 7 years indicates, there are significant technical and institutional constraints on creating and implementing the new technology in many areas, a higher proportion of the profitability may have to be met through a more positive price and trade policy towards agriculture. Higher agricultural prices stimulate production and are a restraint on consumption. That this mechanism could be important for self-sufficiency in rice is demonstrated in figure 3. Based on stimulated trade for 1970, these estimates indicate that self-sufficiency is indeed sensitive to prices over ranges of values that exist currently within Asia.

Planning

The lessons of the past decade regarding productivity, pricing and profitability have been influenced by, and in turn have influenced, planning



Net trade in rice as a function of price, by countries, assuming zero consumption response.

Figure 3

for the agricultural sector. During the past 5 years, traditional planning processes have continued to erode in several important respects. Among other things, events since 1972 have demonstrated the difficulties of projecting resource availabilities and prices. These difficulties have in turn undermined many of the bases for policy recommendations. Arguments about comparative advantage and bringing prices more into line with international markets have tended, rightly or wrongly, to be discredited in Asia, as key international prices, such as those for rice and fertilizer, have varied 500 percent over a 5-year period. These variations have been an important self-sufficiency force as countries have attempted to isolate their domestic economies from international price movements.

It might also be argued that countervailing forces in influencing self-sufficiency have been recent philosophies of agricultural development. It is on these issues that Asian planners and professionals throughout the world are most deeply divided.

Planning and policymaking for self-sufficiency would be considerably easier if, in fact, there were no tradeoffs between growth and equity within agriculture. This tradeoff may be particularly likely in situations where large farmers, small farmers, landless people, etc. coexist within the same region. While it is indeed possible to find occasional examples where a complementary growth-equity relationship exists within agricultural programs, there are only a limited number of Asian initiatives within the past 10 years that meet this test. In making this point, two caveats should be made explicit. It is "always" possible to reach disadvantaged groups, including the landless or small farmers, with pilot investment projects including "enough" external human and physical capital. The test, however, is in devising (a) programs and projects that are replicable on a scale which will make some difference in the aggregate, but which also fall within potential resources available to the country, and (b) programs which, when they are beyond the pilot stage, are not a threat to, and curtailed by, existing bureaucracies. Second, a whole spectrum of programs and policies are possible, and to observe that there is some likely tradeoff, in practice, between growth of output and equity is not to argue that the growth objective should necessarily dominate. Nevertheless, it is sobering to attempt to list the new projects and programs in Asia which fulfill much of the recent rhetoric on solving problems of the rural poor within a context of rapid growth in food production. While it is correct to say that the "trickle-down" theory of agricultural development has lost much of its appeal for solving agricultural problems within Asia, it is also fair to state that a feasible institutional alternative is yet to be found

in many countries where growth is urgently needed, but where the present distribution of assets is unequal in the countryside.

Perhaps the general dilemma for Asian agricultural planning can be characterized by two alternative approaches to agriculture. These alternatives are not mutually exclusive, although in practice they are likely to be highly competitive. One approach attempts to deal with the rural sector as a whole and to help small farmers by providing the right price signals, by generating divisible technology, by investing in water control projects, by making sure that inputs such as fertilizer are in fact available in the countryside, by eliminating rationing devices, and by improving tax and transfer mechanisms. This "progressive modernization" or "enlightened trickle-down" strategy will not work perfectly from an equity point of view, but it is likely to help to foster the growth in output required for self-sufficiency.

A second alternative is to create separate institutions and programs for the poorer groups. These organizations might deal with subsidized rural credit or inputs in kind for small farmers, food rations, and special welfare programs. Although in principle these interventionist policies are favored by many local and international agencies, in practice they have floundered because of their costs, and because they have failed to recognize the realities of power structures in the countryside.

Whichever strategy is followed, however, it is unlikely that any policy or program initiative in the 1980's is going to make as spectacular an impact as was possible with the new seeds in the 1960's. The technological possibilities seem more constraining for crops other than irrigated wheat and rice, and the lack of water control will continue to be a dominant constraint on agricultural production in many regions within Asia. Perhaps some shift of focus away from output maximization will become a reality in the 1980's. This shift may mean, for example, much more concern about the fourth and fifth quintiles and perhaps using more food aid or using the increased output of new agricultural technology to provide rations for the poor.

My own summary generalization is that given (a) the structure of many Asian rural societies, particularly with respect to asset distribution, (b) the unquestionably important but extraordinarily difficult task of reaching disadvantaged groups of food consumers and food producers in these societies, and (c) the difficulty in fostering accelerated agricultural growth, a "lagging self-sufficiency" scenario is not one which can be casually discarded. Indeed, avoiding that scenario will require significant commitments on the part of a great many individuals and institutions, and will be best accomplished by promoting agricultural policies

which retain a strong orientation towards increasing productivity.

Conclusions

My conclusions on food self-sufficiency for the food-deficit countries of Asia can be summarized in three propositions. First, most of the increase in future food consumption must be produced within the region. Food aid and international trade can be very helpful at the margin, but logistical difficulties, balance-of-payments constraints, and limited exportable supplies (stocks) will preclude an external-flow solution to Asia's food problems. The central question for much of Asia, therefore, is not "whether" to strive for self-sufficiency, but "how."

Second, farmers throughout the world have demonstrated that a key to increased agricultural output is "profitability" at the farm level. This profitability has two components, one technical and the other economic. Neither element can be taken for granted, as problems in both areas have imposed important constraints on the self-sufficiency of Asian agriculture within the past decade.

Third, although there is no disagreement on the desirability of the growth-with-equity goal, achieving this objective will be difficult. Assuming that major redistribution of assets is not possible in

most instances, reducing absolute levels of poverty is most likely to occur in situations of rapid agricultural growth. Consequently, those reformists most interested in alleviating absolute poverty must also have a critical concern with the growth-oriented policies and investments most likely to result in food self-sufficiency. Of particular importance are investments in fertilizer and water resource development.

These three propositions, taken together, suggest a near-term strategy for Asia that is composed of expanded biologic technology, of more "favorable" economic policy that tends to "squeeze" agriculture less, and of investments designed to alter the conditions of production so as to provide better control of water and other aspects of the farming environment.

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FOOD NEEDS OF DEVELOPING COUNTRIES

by
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I take this occasion to report to this conference on some preliminary results of a forthcoming report of the International Food Policy Research Institute (IFPRI). *Food Needs of Developing Countries: Projections of Production and Consumption to 1990*. The study underway is an updating and more ambitious undertaking than the Institute's *Research Report No. 1, Meeting Food Needs in the Developing World*, published a year ago. At that time, we projected food gaps in 1985 for 23 developing countries or country groupings based on a continuation of the historical trend for cereal production into the next decade. This provided a breakdown geographically and by income level of the potential food shortfalls of these countries or groups of countries, the projected shortfalls totaled about 100 million tons of cereals.

Now, in response to many requests for more detail, we have extended the analysis to cover over 80 developing countries (excluding the People's Republic of China and other Asian centrally planned economies) to include root crops, pulses, and groundnuts in addition to cereals where these are important sources of calories; to establish a target level of food supplies which would suffice to provide a minimum adequate energy standard for the underfed in a country; and finally to extend the projection 5 years to 1990. The projections have been extended to 1990 because IFPRI has undertaken a study for the Consultative Group on Food Production and Investment (CGFPI) to estimate the investment requirements for low-income food-deficit countries to increase their food production to self-sufficiency levels. It seems clear that no matter how well-intentioned aid donors and recipient countries pursue the problem of meeting food needs in developing countries, it will take that long—10 to 15 years—before investments made in the next 5 years or so are realized in significant increases in production.

The fact that much of the developing world had fairly good harvests in 1975 and 1976 has not changed the prospects for large and increasing

food deficits over time, although the food crisis of 1974 has receded. Production has merely recovered more or less to the historical trend line. The underlying condition of food production lagging behind demand in most countries remains a harbinger of a troubled future.

Meaning of Food Gaps

Before we turn to the projections, let us be clear as to what they represent.

Food deficits (or surpluses) represent the difference between projections of production (cereals and the wheat equivalent in terms of calories of root crops, pulses, and groundnuts) based on the historical trend and projections of demand arising from population and per capita income growth assumptions. Therefore, the deficits (or surpluses) reflect projected food demand relative to production, *if past production trends continue in the future*.

Even under existing circumstances, some countries will likely do better than in the past as improved technology takes hold and some will do worse as the land base is exhausted and no compensating improvements are made in other factors of production. Deviations from trend tend to be offsetting in the process of aggregation, but may not accurately reflect the situation for individual countries. Nevertheless, the historical record provides some statistical basis for assessing the needs for added investment in food production, the requirements for irrigation, fertilizers, and other inputs, and the improvement in agricultural performance which could lead to attaining specific food targets. This is the next stage of the CGFPI study.

The deficits that come out of such projections indicate the extent of the adjustments and options faced by the countries concerned: whether deficits are to be met by increased production; by commercial imports if affordable or concessionary food aid if not; and/or reduction of per capita consumption,

in many cases at levels already unsatisfactory, either by higher prices or by rationing.

Even if the projected demand for cereals which is largely a reflection of market demand is fulfilled, many people will still be below an adequate food intake as a result of low incomes and inadequate food distribution systems. Consequently, a target of food supplies required to take care of their needs has been added.

Overview of the Food Problem

The developing market economies (DME) included in our study contain about 2 billion people, roughly half of all people on earth. By 1990, the U.N. medium population projection for these countries totals 2.9 billion people. While there are some demographers who believe that more progress than indicated by the U.N. projection will be made in containing population growth, it is unlikely within the time period considered that population will be significantly below the projected number.

About 90 percent of these people will live in food-deficit countries, if past cereal production trends prevail. In 1975, gross deficits (the sum of individual country shortfalls) totaled some 36 million tons of cereals. By 1990, the shortfall in meeting demand from population and income growth at 1975 prices might well range from 120 to 145 million tons.

Almost two-thirds of all people in DME countries will live in *low-income* food-deficit countries (countries with less than \$300 GNP per capita in 1973). These are largely in Asia and Sub-Saharan Africa. Their food deficit, which was 12 million tons in 1975, is projected to rise to 70-85 million tons by 1990. This is the real core of the world food problem. Just to provide per capita consumption at the 1975 level will require some 35 million tons over and above the production trend projection. Most countries in this category have bleak prospects for earning enough foreign exchange to purchase commercially. The oil countries of Indonesia and Nigeria may be exceptions, and perhaps also the Philippines. On the other hand, few can afford to reduce consumption, which for most of their population is already below standard. This emphasizes the need to improve production in these countries from the historical rate of 2.4 percent a year to about 4.0 percent, since the alternative of obtaining such massive quantities of food aid seems to be out of the question.

That was the conclusion of the World Food Conference in November 1974. The major thrust of developments since then has been directed to that end. External financial assistance to improve food production in developing countries has increased

rapidly in recent years. In addition, a new International Fund for Agricultural Development is being established, primarily to provide concessional finance for low-income countries to improve their food production. Even so, the U.N. World Food Council estimates that total external assistance for food production would need to be more than double to bring production up to an acceptable rate. Also, given the slow process of development, there will be need in the meantime for increasing amounts of food aid.

At the other extreme from the low-income food-deficit countries are the high foreign exchange earners. They include OPEC countries and certain Asian countries such as Taiwan and South Korea which have had diversification and rapid economic growth. Only 8 percent of DME population is involved, but in 1975 this category required cereal imports of 13 million tons—about the same amount as the heavily populated low-income group. In general, their demands increase faster than their capabilities to produce food. Further, their resources may more appropriately be directed to other enterprises than food production. Their projected food needs of 30-35 million tons by 1990 are likely to be met by commercial imports.

In between, there are some 29 percent of DME people who will live in middle-income food-deficit countries which include most of Latin America and non-OPEC North Africa/Middle East. These countries have better prospects for being able to afford imports than do low-income countries. Their total imports of 11 million tons in 1975 were also about the same as those of the low-income countries. Their shortfall by 1990 is projected to rise to 20-25 million tons. In general, countries in this category will be primarily commercial importers.

Less than 10 percent of the DME population will live in cereal exporting countries which have the capacity to feed their people. These include Argentina and Thailand which are traditional grain exporters and Pakistan which is likely to become one if recent growth rates persist.

The Calorie Standard

The discussion above relates to food gap projections arising from the market. In addition, there are large numbers of underfed people in the developing countries, variously estimated at about 500 million by FAO and over 1 billion by the World Bank. At the latter level, about 65 million additional tons of cereals would have been required in 1975 to bring the diets of the underfed to a minimum adequate energy standard without reducing food intake of others. Of this amount, 52 million tons would have been required to feed the malnourished in low-income food-deficit countries.

By and large, the additional requirements for nutritional purposes would have required a food supply equivalent to an average of 110 percent of per capita calorie standards. But, in addition, intervention programs would be required to channel the additional food to the underfed.

Economic growth would go part way in reducing the incidence of poverty and malnourishment, but if past production trends persist, production of low-income food-deficit countries by 1990 would fall 110 million tons short of providing an adequate supply to eliminate malnutrition. For most of the other countries, if food supplies (whether domestic or imported) are commensurate with demand they will generally exceed 110 percent of the average per capita calorie standard, although intervention food programs would still be required.

Principal Problem Countries

The projections to 1990 strongly illustrate the precarious position of low-income food-deficit countries in Asia and Sub-Sahara Africa. Together, these countries account for over 90 percent of the food deficits of all low-income DME's. The Asian countries have a better production record, about in line with population growth but failing to meet food demands arising from economic growth. Their large deficits reflect the heavy population involved encompassing three-fourths of all the people in low-income food-deficit countries. Sub-Sahara Africa, on the other hand, has a lower production growth rate appreciably below a higher population growth rate. On a per capita basis, the projected food shortfall in 1990 is 2-3 times more severe in Sub-Sahara Africa than in Asia.

In Asia, *India*, with almost half the people in low-income food-deficit countries, is projected to incur a food shortfall of 21-25 million tons. To meet the shortfall, production would need to increase to 3.5 percent a year, compared with the historical record of 2.5 percent. Deficits of 6-8 million tons each are projected for *Bangladesh* and *Indonesia*. For *Bangladesh*, production would need to increase to almost 4.5 percent a year, compared with the historical rate of 1.5 percent. (In 1967-75, the rate declined to less than 1 percent a year.) For *Indonesia*, the historical production rate of 3 percent a year would need to increase to 4.3 percent (a rate which has been exceeded in the last 8 years).

In Sub-Sahara Africa, *Nigeria*, with the largest population, incurs a food deficit of 18-21 million tons by 1990, three-fourths of the total for the region. The historical production growth rate has been only .5 percent a year, while population has grown 3 percent a year. Production would need to increase 5-5.5 percent a year to meet the shortfall. The *Sahel* countries as a group are in a similar

situation, with a historical production growth of .5 percent a year, whereas 3.5-4 percent would be required to close the gap of about 3.5 million tons. *Ethiopia* also has a poor production record of 1.25 percent a year, whereas about 3.5 percent would be required to meet a shortfall of about 2.5 million tons.

In North Africa/Middle East, *Egypt* is chronically in a food-deficit position, and the deficit is projected to increase gradually to about 5 million tons by 1990. The historical production growth rate would need to increase from less than 2.5 percent a year to over 5 percent if food needs were to be met from domestic production.

Only two countries in Latin America have a per capita GNP of less than \$300—*Haiti* and *Bolivia*. Their food deficits are minimal compared with the total, but to meet food needs Haiti would need to increase production from less than .5 percent a year to 3.5-4 percent, and Bolivia from 2.5 percent to 5.5-6 percent.

For most countries in the low-income food-deficit group, the production growth rates would need to be increased by an additional .5 to 1 percent a year over and above those necessary to meet market demand if the food supply is to suffice to meet nutritional needs. Again, it should be emphasized that direct government intervention programs would be necessary if the food is to be channeled to those in need. Further, since a significant part of malnutrition is in rural areas which are difficult to reach, the most effective means to improve nutrition in those areas is to increase food production especially on small farms.

This emphasis on food shortfalls in low-income food-deficit countries is not to say that deficits in middle-income countries should be ignored. Clearly, the food problem is more urgent for the former group of countries, where development prospects are largely keyed to agriculture and where the ability to earn foreign exchange is quite limited. The priorities for additional external assistance to increase food production and food aid would appear to be in their direction. At the same time, there is need to assist other countries which are somewhat better off to improve their food production, in particular the Central American/Caribbean countries, the Andean countries of South America, and the non-OPEC North Africa/Middle East group. On the whole, their production records are better than the low-income group but most are in a substantial food-deficit position which has tended to widen.

Self-Sufficiency in Food

Not all countries can or should be self-sufficient in food. For most in the middle-income category or the high foreign exchange earners,

the more efficient use of resources may well be in other directions. The critical element is the availability of food from outside sources at relatively stable prices. This is related to world export supplies and to the level of world reserve stocks.

The situation is entirely different for most of the low-income food-deficit countries. They have little alternative except to press toward self-sufficiency. With few exceptions, their opportunities for development and employment for some time ahead rest on the agricultural sector. Opportunities for trade expansion are extremely limited for the agricultural export products that they produce or could produce over the next decade or so, even if trade barriers were reduced or eliminated. To produce more food is the main way that incomes in the rural sector can be improved and the development process accelerated. For many countries, inappropriate food price policies are a major deterrent.

There is a definitional problem of self-sufficiency. In 1975, food production in low-income food-deficit countries fell short of consumption by about 5 percent. But when the additional needs to feed the malnourished are considered, production was 21 percent short of requirements. Given present trends, these percentages will rise further unless per capita consumption is squeezed further, which would increase the incidence of hunger and malnutrition.

Production in middle-income countries in 1975 was 9 percent short of self-sufficiency in market terms and about 13 percent deficient in food supplies which would provide 110 percent of the calorie standards per capita. These proportions would hold more or less the same if past production trends continue in the future.

High foreign exchange earners depended on imports for 37 percent of their food supply in 1975, and if nutritional requirements are considered, production would have been 41 percent short. These proportions will tend to rise slightly over the years ahead.

Finally, in introducing this new set of projections, we recognize that as we get into more and more country detail, the statistical base from which the projections are derived is less secure. This is particularly so for many African nations where the food problem looms large. Accordingly, the results should be interpreted with caution. Meeting food needs in the developing world is one of the most difficult and complex problems facing the international community. Hopefully, attention will be given to improving the statistical base so that it can be dealt with more effectively.

Our new report will provide full details on production performance and projected food needs so that its users can bring to bear their judgments as

to the likely trend of events. In that sense the report will serve as a do-it-yourself kit.

Annex

Sources of Data and Methodology

Production/Consumption 1975 Base Year

Data on production and consumption of cereals by country for the years 1960/61 to 1975/76 are from the U.S. Department of Agriculture (USDA). These data comprise the only available and complete set of supply/utilization balances for cereals. For a few countries—Chad, Liberia, and Somalia—where USDA data were incomplete, they were supplemented by statistics on production and foreign trade from the Food and Agriculture Organization (FAO). The trend values for 1975, based on the trends for the period 1960-75, served as the base for projections of production and human consumption of cereals to 1990. Average consumption in 1973-75 was established as the base for projecting grain used as feed to 1990.

For consistency with the estimates for cereals, USDA data on production of *root crops, pulses, and groundnuts* were used for base year 1975 (normalized to adjust for major fluctuations from recent levels). These were converted to wheat equivalent tonnage in terms of calories and added to the cereal estimates of production and consumption for those countries where they were important in the diet, with each commodity group usually accounting for 5 percent or more of total calories consumed as calculated from the FAO report, *Food Balance Sheets 1 and 4-66*. In this way, two-thirds or more of calories intake was generally covered. In the absence of actual consumption data and since these crops are usually consumed where produced, it was assumed that consumption was equal to production. Although Nigeria and Niger have been significant exporters of groundnuts in the past, exports in recent years have been at very low levels, thus obviating the need to make allowance for this factor in the production/consumption balance.

Production Projections—1990

The 1975 base period production of cereals was projected to 1990 by extending the historical trend 1960-75 as calculated from USDA data. For the other food crops, production in the base year was projected by historical production trends for the period 1961-74, calculated from FAO data. The latter series offered some advantage over USDA from an historical viewpoint in that it provided data on the contribution of area and yield to changes in production.

Consumption projections—1990

Four sets of consumption targets were computed:

(1) A target assuming that per capita consumption of the selected food crops remains constant at base year 1975 levels, thus reflecting only the impact of population growth on demand.

(2) A low income growth set adds on the population projection the demand for food crops which would flow from a relatively slow rate of income growth per capita—slightly improved from recent unsatisfactory performance in most developing countries.

(3) A high income growth set adds on the population increase a faster rate of income growth, roughly that associated with the historical trend, and a more rapid increase in food demand.

(4) A target which provides enough cereals for a country to feed its underfed population a minimum energy diet.

The basic source materials include:

Population—The United Nations medium projection for 1975-90 was used. This is the usual series adopted in most studies of this kind.

Per capita income growth assumptions—These were derived from the 1976 *World Bank Atlas* and other World Bank materials. Under high income growth, the historical growth rates of GDP per capita for 1960-74 were assumed for non-oil exporting countries, with the minimum rate set at 1.5 percent per year. For major oil exporting countries, the recent, more rapid rates associated with 1965-74 were assumed, with a minimum growth rate of 4 percent a year.

Under low income growth, one-fourth slower growth rates than under the high income assumptions were assumed, with a minimum of 0.5 percent per capita per annum. This assumes that non-oil developing countries make some progress in adjusting to high energy costs.

Income elasticities—These were largely derived from the FAO report, *Agricultural Commodity Pro-*

jections 1970-80,¹ adjusted to accommodate high and low income assumptions.

Income elasticities for grain used as feed are those related to meat. Statistics for some major feed users among developing countries appear to confirm a close relationship.

Zero elasticities were assumed for rootcrops. This implies that increases in per capita income will be reflected more in demand for cereals, with their higher energy and protein content, as has been the experience in some countries.

Nutrition—Estimates of the additional amount of cereals needed to feed the underfed population in each country in the base period were derived from FAO data on average calories consumed as compared with minimum standards.² Analysis of the relation of income distribution and food consumption originated by Reutlinger and Selowsky³ estimates that in 1975 there were 1.2 or 1.3 billion underfed people in developing market countries and to bring them up to calorie standards would require 45-67 million tons of wheat equivalent. As a general relationship, the total supply requirements in order to feed these undernourished without reducing the consumption of those above the standard works out to an average of 110 percent of the minimum calorie standards.⁴ Thus, the additional cereals to meet the calorie gap was equivalent to raising average per capita consumption to that level. From this base, the requirements to provide 110 percent of the calorie standards for the population in 1990 were projected.

¹Volume II, FAO Rome, 1971.

²FAO *Monthly Bulletin of Agricultural Economics and Statistics*, April and July/Aug. 1976.

³*Malnutrition and Poverty: Magnitude and Policy Options*, World Bank Staff Occasional Paper No. 23, 1976.

⁴IFPRI Research Report No. 2 prepared for U.N. Protein Advisory Group, *Recent and Prospective Developments in Food Consumption: Some Policy Issues*, 1977.

COMMENT

by

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Not to my surprise, I find much more to agree with than disagree with in the presentations of Messrs. Falcon and Koffsky. But I will concentrate on some marginal differences, at least of emphasis.

Both speakers agree that for the poorest countries a push toward self-reliance is a matter less of choice than of necessity. I concur, not only

for the reason they emphasize—namely, that the gaps that would emerge if recent food demand and production trends in the poorest countries simply were extrapolated would be unfillable from outside, both physically and in terms of needed finance—but also because of the linkages between food production and the rest of the development process.

We now know how badly food shortages can bottleneck development, in particular the kinds of labor-intensive nonagricultural construction and other employment programs that in many countries offer the best hope for improving the position of the low-end poor. In many circumstances the best if not the only reliable engine of growth is a rate of agricultural expansion that exceeds the rate of population growth.

This last point—although I am at least as inclined to focus on South Asia as Wally Falcon—makes me uneasy about any diversion of attention from Africa. As Nate Koffsky points out, while the present population base in the poorest African countries is much smaller, for many the size and trends of the per capita food shortfalls are horrendous. In its way, Africa may be as urgent a case as South Asia, as to the needs both for agricultural acceleration and for decelerating population growth.

Now let me struggle briefly with the question of likelihoods as to food production growth prospects in these poorest countries. On the one hand I am troubled by the gloominess of our speakers. I hear them saying that sustained productive expansion will be difficult, and growth that barely keeps pace with population may be about all we should expect. If this is indeed the case, then I would be far more strident in sounding alarms than they have been, for it seems to me that there is no way that a bare matching of food and population growth in South Asia, even in sub-Saharan Africa, will be good enough. If that is in fact the prospect, it virtually guarantees some very bleak outcomes.

On the other hand, as the least qualified agriculturalist present, I cannot suppress some glimmerings of greater optimism. It is true, of course, that the wheat revolution has slowed down. But it is part of a longer run process of agricultural acceleration that probably is not yet exhausted. Mr. Koffsky, for example, speaks of India's "historical record of 2.5 percent" annually. But that record runs back only to 1950. For the half-century preceding, the gross production trend in India seems to have been essentially flat. Thus, there has been a fairly remarkable agricultural acceleration in the quarter-century since 1950. This, among other things, has entailed major changes in institutions and policies that are, I should think, neither finished nor spent. For example, the indigenous agricultural research system is far stronger, fuller, and more relevant than it was 20 years ago. As a result, it is more productive. Yet it also still has plenty of room for improvements, which there is a general policy disposition to make. The function of prices and incentives, the social usefulness of open markets, are better appreciated than in the fifties, and the spread of this policy change is not yet

ended. In nearly all the South Asian countries the priority for agriculture is higher than it was, and looks comparatively entrenched. And the untapped potentials for expansion still are enormous.

The last thing we need in this area are Pollyannas. The worst thing would be euphoria. But the second worst might be to set one's sights too low. I am convinced that with hard work and hard policy and substantial, well-aimed investment (especially, for instance, in the water management field) there can be profitable agricultural growth in these countries significantly in excess of population growth.

Mention of investment leads me to a word or two on external assistance. To urge the self-help theme as to poorest-country agriculture is in no sense to downplay the function of aid. There is great and urgent scope for the latter—and what is most of all needed, at least in South Asia, is costly big-ticket aid. We in the agricultural area still tend to get preoccupied with the idea of disembodied technological transfer, partly because we think we know a lot, and partly because, if they work, these are the cheapest transfers to make. In some of the larger countries, at least, the remaining scope for old-fashioned technical assistance is limited. Many of the needed institutions have been built after a fashion, and indigenous research systems have been established. They need strengthening; a great deal of adaptive and indigenous innovation of these institutions must be done in-country and these functions certainly can be helped by an enriched interchange with scientific and technical colleagues abroad. But in terms of medium term potential, the greater need, as to aid, is for embodying known and available technologies in capital-costly installations. This is true, for example, across the whole spectrum of interlinked water and energy needs.

Wally Falcon is absolutely right, I think, about the importance of agricultural pricing or, as he correctly puts it, profitability—and here there is an obvious linkage to aid. As a battle-scarred veteran, I shy away from callow talk about "performance conditioning." But if there is one dimension in which I would be willing to resurrect that approach, it would be, as a donor, to press for incremental reform in cases where the spreads between input and output prices are persistently aborting incentives to invest in new technology.

The nearest thing to a basic disagreement that I have with either speaker is with Mr. Falcon's treatment of the growth-equity issue, and even here it is only a matter of degree. I too, lately, have again been beating the growth side of the drum myself. But I could not agree with any implication that, as between the two objectives, equity needs are the more postponable. These systems simply will not

hold still for a continuation of the relative neglect of the low-end poor. What policy faces is a *double* categorical imperative—to move growth *and* equity jointly. This does not mean that one avoids any growth promotion that does not have direct side benefits for equity. But it does mean there is a premium on genuinely complementary, growth-cum-equity programs—and I don't think they're quite so elusive as Wally suggests. The double imperative means, also, that one must accept some pro-equity programs without side benefits for growth. And it means that agricultural expansion in these countries is going to have to cope with more structural and political turbulence in the countryside than agricultural production-function engineers might choose.

I am uneasy about Wally's distinction between two classes of policies: those that treat the rural sector as a whole with due regard to the poor are good; poor-specific policies are to be avoided. I cannot join in a broadside indictment of the latter: the criterion, rather, should be their productivity effects. Where existing imperfections in the market (which, in part, is to say inequalities in the status structure) cut off the poor from equal access to credit, marketing, or physical inputs, then class-specific programs are likely to promote both growth and equity, as well as build the political muscles of the poor in ways required for their greater participation in development in the longer run.

Finally, a positive word about food aid: It is, of course, important to avoid the crutch effect. But we all know this now—donor governments, multilateral agencies, and recipient governments; there is far stronger determination than in the late fifties and early sixties to make sure food aid does not erode indigenous incentives below needed levels, which themselves can be defended by indigenous support prices. Moreover, uses of food aid that satisfy this constraint are well recognized. In the first place, it can add food security to systems whose annual outputs are subject to heavy weather variations. By helping such countries replenish their

buffers, food aid can increase the ability to run market-stabilizing food policies that forestall the need for stop-go regimes of development financing which abort growth efforts. So used, the same aid can help, in times of domestic scarcity, to contain upshoots in food prices that disproportionately afflict the poor. Secondly, additional food aid can support additive rural construction and other labor intensive programs that can build productive agricultural infrastructure while delivering direct employment and income benefits to the rural poor. What has given such rural public works a bad name in the past has, more than anything else, been their triviality—small results after so much big talk. And the constraint, overwhelmingly, has been the food bottleneck—which purposeful food aid can relieve.

Thus it so happens that this particular form of commodity aid—which, although it by no means is any longer a redundant free good in the United States, is still (I suspect) politically cheaper than untied dollar aid, and can be an efficient, almost fungible, form of capital assistance to the poorest countries, for the creation of two kinds of needed capital goods, namely, buffer stocks and rural infrastructure. It warrants heavy emphasis, therefore, in the new U.S. scenario for North-South relations. But the need, we must recognize, will be for a very different style and status of food aid. No longer, if U.S. food transfers are to fulfill their potentialities for assisting development, can they depend on the leavings, the residuals in our own better crop years. The claim of aid—less a massive one than a reliable one—must be moved from the bottom to the top of our national food budget. I was delighted to hear this emphasis on assured multi-year food aid commitments in Mr. Hjort's paper earlier this morning.

The inversion of our traditional priorities in food allocation will be politically difficult. But once achieved, it should not be painful to maintain. And with reasonably good management of food aid by both recipients and donors, it can yield very large returns to the poorest countries.

COMMENT

by
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The International Food Policies Research Institute is establishing an enviable record for presentation and analysis of key data relating to the world food situation. Mr. Koffsky's paper is thus

edifying and important. I particularly like the principle of extending estimates of food needs to 1990 on the basis of the significant lead time needed for correct actions if production increases are to

become effective. It is also important that IFPRI take the next step of estimating input and cost requirements of the remedial actions they see as necessary so as to provide an understanding of the demands that will be placed on the developing countries and the donor community if these problems are to be solved. I would like to make two substantive suggestions with respect to this work.

First, it would be useful to deal explicitly with the effect of changes in the distribution of income—or more precisely the rate of growth of income of the lower income people—on the effective demand for food. While the bulk of the income effect does arise from changes in income of lower income people, there may be only a weak relationship between average rates of income growth and growth of incomes of the lower income quarter or even half of the population. I note in passing that in the draft 5-year plan for India, the quite different requirements of various consumption goods with alternative assumptions about income distribution was a useful and revealing presentation with particularly important implications to demand for food.

Second, and related to the first, it would be useful to analyze the alternative means by which the projected food gaps might be closed. It seems unlikely that imports of the magnitude depicted would actually occur. What are the nature of the demand changes, with what implications for the poor, which would be necessary to reduce that deficit if production efforts do not attain the recommended success?

Finally, I would like to raise a rather basic policy question. I note that two countries, India and Nigeria, alone account for over one-third of the adequate-calorie-based deficit of 1980. These are both countries which for one reason or another do not receive direct bilateral development assistance from the United States. If the world population-food balance problem is an important interest of the United States, and if the United States, through its technical capacity and resource strength, has particular competence to alleviate the

food supply problem through development assistance, then the question of our aid relations to the large less developed countries requires a policy analysis in the context of the global problems which those countries dominate.

Mr. Falcon's paper raises some particularly interesting questions with respect to growth-equity relations. Perhaps it should be said more forcefully that the most serious consumption deficiency faced by the poor is that of calories. And, vast numbers of the poor face this major deficiency in a context in which major redistribution of land is unlikely, at least in the near future. The remaining equity question is then how to increase production of food on land owned by the well-to-do in such form and in such context that the poor will have the purchasing power to obtain that food. That is a joint growth and equity problem. In this context one should note that many of the well-to-do people of developing countries are in families with under \$1,000 per year per capita incomes. They are hardly wealthy by U.S. standards!

Both Messrs. Koffsky and Falcon note the urgency of increasing domestic food production in deficit countries, even when the potentials of trade are recognized. It should be emphasized, however, that for very poor, capital-short countries to make the huge investments in transport, irrigation, land development, and power required for increased agricultural production, and to provide for employment expansion necessary to adequate purchasing power for the poor, will necessarily retard development of capital-intensive, large-scale industries such as fertilizer, steel, petrochemical, and cement production, each of which is essential to some aspect of the agricultural investment effort. The result is increased imports and foreign exchange requirements. To pay for those imports, exports of relatively labor-intensive goods will be necessary. Thus, trade is important to filling the world food gap not just through direct movements of food, but also through its indirect effect in influencing capital allocations for food production and job provision.

FOOD AID AND MALNUTRITION

by

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ABSTRACT

Three major roles for food aid as a vehicle to reduce malnutrition are identified. Famine relief has wide international support but requires access to food supplies on very short notice. Historic famine relief programs have not only saved lives but have also generated important lessons about the nature of the development process. Future programs should include systematic research efforts to broaden this understanding. Second, direct feeding programs using donated food supplies have been used extensively in most poor countries, but only a handful have demonstrated a significant nutritional impact on the target population. The reasons are tied to the type of political commitment needed to get resources to the neediest population groups. Societies willing to make such a commitment usually have poverty-oriented general development strategies, which offer the third productive use of food aid. The politics and implementation of the second and third roles are intimately connected.

In the recent World Bank book, *Malnutrition and Poverty*, which *Science* magazine called "revolutionary," Reutlinger and Selowsky concluded that: Malnutrition is unlikely to disappear in the normal course of development: that is, in the course of normal per capita income growth, even with greater emphasis on expansion of food production.... On the contrary the situation may worsen if present higher energy cost, leading to higher cost of food production, is not fully compensated by higher agricultural productivity. Only policies deliberately designed to reallocate food or income can eliminate undernutrition. (5, p. 7)

Despite some methodological problems with their underlying analytical approach, the conclusions seem unchallengable. Distribution and not

gross production is now and always has been at the heart of global malnutrition. Total grain production is currently about 1.3 billion metric tons relative to a global population of about 4 billion people. If evenly distributed, this grain would provide over 65 grams of protein and 3,000 kilocalories of energy per day for every person on earth, before any nutritional contributions from pulses, fruits and vegetables, fish or forage-fed animals.

The calculations are crude, but they make the point. The reason the billion or so individuals identified by Reutlinger and Selowsky are suffering from energy deficits is not because inadequate food exists but because they do not have access to that food (6). Any program aimed at eliminating that malnutrition must face the distributional issue in some manner. The important question is how and what role food aid might play in that effort.

It is very tempting to take the analysis that identified distribution and access as the critical variables in the malnutrition equation one step further. It is tempting to take the Children's Foundation postage meter advertising as a political and moral imperative: "FEED KIDS." And historically, at least part of U.S. food aid has been directed to precisely that objective. Why not simply recognize the simple logic of the access issue and use food aid as a redistributional device to feed the hungry of the world from the bounty of our farmlands?

The answer is that the one kid fed in 1947 with U.S. food aid became two kids to feed in 1962 and is four kids today. That is, simply redistributing food has not resolved any of the structural problems that cause the poverty and maldistribution of food (and other resources) in the first place. The trend of grain exports from North America—most of which are sold for hard currency—cannot continue its exponential growth of the past 40 years. Unless the poverty and access problems are attacked at a structural rather than

a superficial level, food aid can serve only as a temporary palliative in reducing hunger and malnutrition.

How then should food aid be used in the effort to eliminate malnutrition? There are three major uses to which food aid can be put in this global effort:

1. For famine relief to prevent widespread starvation in the face of nonrecurring natural or man-made calamity;
2. To provide food supplies for target-group oriented feeding programs; and
3. To provide additional resources in support of a country's overall economic and social development effort.

1. FAMINE RELIEF

The first role for food aid is to avert widespread famine in the face of clearly unusual natural or man-made circumstances—catastrophic floods or drought, earthquakes, and wars. Regularly occurring catastrophes must be dealt with by nonpalliative measures, and food aid may have a role. But famine relief must be reserved for situations like the Bihar famine of 1966-67. The Indian Ministry of Food and Agriculture evaluated that impending famine as "a natural calamity of a magnitude unknown in recent times" (1, p. 211). The relief operation that intervened between the potential disaster and the "disaster that never was" was a miracle of modern logistics under primitive conditions. Berg reports that:

During the crisis, the Indian government loaded and moved an average of 7 trains a day—50 cars per train—an average of 550 miles. By the end of 1967, 153,000 fair price shops were operating in the country (20,000 in Bihar, benefiting 47 million Biharis) and 6 million people were involved in relief works projects (700,000 in Bihar). Programs for youngsters and destitutes reached nearly 20 million (7 million in Bihar) during the two years. The cost of all this: somewhere in the vicinity of \$700 million (perhaps \$200 million of it spent in Bihar). Help came from many foreign quarters, but the major flow came from the United States which provided one-fifth of its wheat crop. This unprecedented movement of food from one country to another required an armada of some 600 ships. Ships docked at a rate of three a day, depositing an average of 2 billion pounds a month. Sixty million Indians are estimated to have been sustained for two years solely by these shipments (1, p. 216).

The efficacy with which food aid can avert such stark and sudden disasters is obvious, provided that the grain is available and that the relief operations can be mounted quickly and efficiently.

But what of the palliative nature of the effort? By its definition disaster relief focuses on extremely shortrun problems and should not be expected to have systematic impact on any underlying structural problems that may exist. On simple humanitarian grounds, this should not impede full commitment to maintaining adequate disaster relief capability. And yet, the Bihar relief operation was so dramatically successful that it had major impact on the health and wellbeing of millions of Biharis.

Berg writes: The famine and the emergency program dramatized the importance of nutrition to the government. The famine led to interest and in some cases emotional commitment, which in turn led to a variety of programs, a national nutrition policy, and a chapter on nutrition for the first time in the Five Year Plan (1, p. 217).

The new commitment was translated into physical development programs via work relief projects. Berg's conclusion was that: What might have been a major disaster was, in fact, an incentive for more development in Bihar than probably took place in any other comparable period in history. There is an important psychological dimension to this. The famine, which was dramatic and created attention, was parlayed and effectively used for agricultural, nutritional, and other developmental objectives. It is doubtful, even with a sufficient budget, that such activities would have taken place in the absence of the trauma created by the famine (1, p. 220).

The important issue here is the role of food aid in catalyzing positive efforts addressed to the longrun issues. The widespread national and international support for using food aid in natural disasters or other emergencies that the U.S. Department of Agriculture identified in 1974 (8, p. 577) does not depend on this catalytic impact. But some important lessons about general development strategies are to be learned from these experiences, lessons which should then be built into the design of both emergency relief programs and general development programs. It is important to realize, however, that these structural lessons do not come free. They are provided only in the context of rapid access by relief programs to adequate quantities of food aid to provide the resources that generate the structural attack. The availability of food aid and its efficient deployment are the prime and critical ingredients.

2. AID TO TARGET GROUPS

The second major role for food aid in combating malnutrition is to provide food for target-groups on a continuing basis. These food aid programs have a long history and appear in many forms. In order from most-targeted to least-targeted, some examples are mother-infant clinics with in-clinic feeding, school lunch programs, food-for-work projects, food coupons, ration shops, and basic food price subsidies. Reutlinger and Selowsky argue that these are the only types of programs that have any real, i.e., political, chance of significantly alleviating existing malnutrition.

Is there any evidence that these programs work in the short run to reduce malnutrition, or in the long run to remove structural barriers that leave so many in poverty? Is any short run effectiveness at the expense of long run incentives to food production and to structural change?

The answers to these questions are pathetically few and hypothetical. Conducting a USAID-financed project to write a field manual on child nutrition intervention projects, Jim Austin and his co-workers have had an extraordinarily difficult time identifying even a half-dozen projects—out of the hundreds and probably thousands around the world—where *cost-effectiveness* evaluations can be made in a rough fashion. The state of knowledge prevents any attempts at cost-benefit evaluation.

The best we can do is look at some suggestive evidence. The Indian State of Kerala is an increasingly well known paradox. Its income levels are among the lowest in India, and average per capita food consumption is below what even the low income would predict. Even with perfectly equal food distribution in the State, the total availability of food would have been barely adequate to meet minimum nutritional norms. Judging from estimates of inequality in the early sixties, by the early seventies not less than a third of the population of Kerala was likely to have food intake levels below nutritional norms. So far the picture is consistent with other very impoverished regions of many countries in the Third World. The paradox is that in the same intervening period between the early sixties and the early seventies Kerala "... had apparently succeeded in lowering mortality rates and raising life expectancy to the same levels as in the developed countries and, more recently, in lowering birth-rates at a faster rate than elsewhere in India" (4, p. x).

Much of the Kerala story can be told only in the broader context of a development program directed at providing minimum basic needs to the entire population. Land reform, low technology

housing, rural health programs, and agriculturally productive public works no doubt are the major ingredients in the broad-based transformation of the public health statistics. But the State of Kerala has also used several direct food distribution programs very intensively, and it is these that are important to the present discussion.

Public distribution of food takes place in Kerala at two levels: primary school children approximately 6-10 years old, and the general population. Food, whatever the quantity, is free to primary school children, but to the general population it is distributed at controlled prices, below those prevailing in the open market. But the distribution of food is quite comprehensive at both levels. While only about three fourths of primary school children in the state avail themselves of the free school feeding program, the proportion of households now covered by the fair price shops is virtually 100 percent.

Other public programs and schemes for food distribution are also in operation within the state. For instance, under the maternity and child health program, food is distributed free through primary health centres and subcentres to some 150,000 beneficiaries every year, including pre-school children and expectant or nursing mothers. Also, under the special nutrition programme, some 2,000 feeding centres within the state give assistance in the form of food to tribal children or slum-area children. But, in terms of the quantity involved, this program is not significant (4, p. 41).

The school feeding program was supported from the beginning by CARE, and its 20,000 tons of food contributed per year served as an important net addition to total food supplies in Kerala, especially since they were targeted in favor of lower-income groups. Present efforts underway to make the school feeding program locally self-sufficient (by using a blend of tapioca flour and peanut powder) will eliminate the problem of unreliable supplies that has plagued the CARE program. "But this will certainly mean a decline in the total availability of cereals within the state" (4, p. 43). And, as was noted earlier, those total supplies are only marginally adequate at best. Any government looking for an effective program to place food aid on a continuing, long-term basis should consider the Kerala school feeding program.

Food distribution through fair price shops is available to 97 percent of the state's population, the only exclusions being rice producers deemed

large enough to supply their entire consumption requirements. The program is no token effort:

...the food-grains distributed publicly through the fair price shops form a substantial and increasing proportion of the quantity consumed each year. While in 1961/62 distribution through fair price shops accounted for some 13 percent of the cereals consumed in the state, in 1971/72 it accounted for over 37 percent. Though the average proportion for the 1960's was 36 percent there were intervening years, 1965/66 to 1969/70, when the movement of food-grains into the state through trade channels was virtually stopped and the quantity distributed through fair price shops was a little over 50 percent of the cereals consumed within the state (4, p. 43).

What is perhaps more important is that in those years nearly all of the grain available in the market was through fair price shops as open market supplies were virtually non-existent. Even in 1971/72, somewhat less than half of marketed basic foods (cereals plus tapioca) were sold in the open market—and the total marketed food did not quite equal self-consumption by growers (table 1).

The distribution through fair price shops has almost certainly had a significant leveling effect on distribution of food consumption in Kerala, but the important issue for this discussion is the heavy reliance on outside supplies of cereals to stock the shops. In 1961/62, the entire 249,000 tons of cereal sold through fair price shops in Kerala came from the Indian central pool, i.e., from outside the State. In 1971/72, over 90 percent of the supplies came from the central pool—about 850,000 tons—and only 70,000 tons were procured within the State. Internal procurement depends on a graded levy system with higher quotas for better land and for larger farmers. Raj roughly calculates that less than rigorous enforcement of the graded levy cuts actual procurement to perhaps half of what it might be. At best, however, internal supplies could account for only a fifth of the amount distributed in 1971/72. Outside cereal sources are absolutely critical to the success of the Kerala distribution program. The potential role here for food aid on a long-term basis is obvious. In the context of everything else Kerala is doing to meet basic human needs, even substantial quantities of food aid are not likely to jeopardize seriously Kerala's commitment to equitable economic growth.

The suggestive evidence from other contexts is not so promising. Hakim and Solimano report that about 90 percent of all direct expenditures for improving nutrition in developing countries go to child feeding programs, which in principle

should be able to have a significant nutritional impact.

In practice, however, a variety of social, economic, and institutional barriers often prevent these programmes from meeting their nutritional goals. In developing countries, the most nutritionally vulnerable groups (i.e., marginal urban and low income rural populations) typically have only limited access to those institutions generally charged with managing feeding programmes, and often turn out to be legally or functionally excluded from the benefits of these as well as other social welfare measures. The stratification, skewed distribution of income and public services, and other social factors responsible for their vulnerability to malnutrition, tend also to prevent low-income groups from participating in programmes supposedly designed to alleviate malnutrition. (2, p. 257)

The prospects for dropping large quantities of food aid into such environments are not promising nutritionally. Most targeted feeding programs of this sort have political and human objectives beyond the nutritional ones and may well be good programs relative to these broader objectives. Supporting targeted programs on nutritional grounds, however, seems to require new mechanisms of management and distribution. Relatively little information is available that would permit confident design of new systems in the context of existing political priorities. Where reaching the nutritional target group conflicts with reaching the political target group the justification for supplying outside resources is questionable. But the only fair assessment is that we do not know very much about these tradeoffs.

3. AID IN SUPPORT OF DEVELOPMENT

The third major role for food aid in combating malnutrition is in support of general development policies. Historically, the largest quantities of P.L. 480 food shipments have been used ostensibly in this broad context. The obvious questions are whether general development policies have significantly reduced malnutrition; whether food aid has fostered (or hindered) nutritionally relevant development policies, and whether scope exists for improving the "nutrition connection" between food aid resources and nutritional change.

Even less is known about this topic than about the previous two topics. An argument that is gaining currency reasons that the use of food aid to support general economic development policies is nutritionally irrelevant. Lance Taylor and

Table 1: Kerala: Pattern of supplies of cereals and cereal substitutes, 1971/72

Item	Cereals	Tapioca	Total	Proportion of total supplies
	- - Million tons - -			Percentage
Self-consumption by growers ..	0.872	1.576	2.448	54.9
Public distribution through fair price shops	0.926	—	0.398	20.7
Open market	<u>0.691</u>	<u>0.398</u>	<u>1.089</u>	<u>24.4</u>
Total	2.489	1.974	4.463	100.0

Source: (4, p. 46)

his coworkers at MIT have econometric evidence that suggests that food aid imports substitute on roughly a dollar-for-dollar basis for commercial food imports. That is, such imports do not represent a net addition to national food supplies, and hence do not have a disincentive price effect on producers or a consumption (i.e., nutritional) impact on consumers. In the absence of food aid, the evidence says, countries would tend to import equivalent amounts, and so the supply-demand equation is relatively unaffected.

The search for the impact of food aid on the development effort must then be pushed back a stage. Food aid becomes a form of foreign exchange support for the recipient country, and the uses to which the freed foreign exchange are put determine the long run effectiveness of food aid. An expanded fleet of Mercedes-Benz autos for highranking government or military officials may only exacerbate distributional inequities and increase malnutrition. Imported steel tubing and a labor-intensive bicycle assembly plant may make a real contribution to equitable economic growth. The point is that the food aid itself is neutral in this regard.

Such an argument misses the important longer run dynamics of economic development. While it may be true that food aid imports and commercial imports tend to substitute for each other on a one-to-one basis in the short run, as governments defend their immediate food price objectives, in the longer run foreign exchange pressures force an examination of domestic food alternatives to imports. The long run availability of food aid reduces the financial and political pressures to invest in domestic food production capability even though the short run price effect on food production may be neutral. The Stanford Project on the Political Economy of Rice in Asia has

generated fairly strong evidence that this long run investment decision is as important as the short run price response. (7) The important role for food aid in this broader context is in the manner in which it alters short run and long run constraints.

An Indonesian example from the late sixties is particularly revealing of the complexity of this type of interaction. Between 1967 and 1971, the availability of large amounts of food aid, primarily from the United States, made it possible for the Indonesian government to raise the harvest price for farmers above what it would have been otherwise. The food aid provided commodities to stabilize food prices for urban consumers which in turn provided the favorable political climate for a commitment to farmers. Seasonal price fluctuations had been so wide historically that a floor price at harvest and a ceiling price at *pace-lik* (preharvest period) could improve both producer and consumer welfare. The logistics agency that defended the price range needed a guarantee of outside food resources, i.e., from food aid, before dropping its historic domestic procurement policy of driving harvest prices as low as possible before buying. Food aid was the critical ingredient in a price-incentive food production strategy.

Such a program, however, easily cuts the other way. If the commitment to food production is not strong and the food aid is readily available even as the incentive strategy begins to pay off, real prices will decline and the longer run investment climate for food production turns sour. Looking for and finding the turning point and acting on the information is absolutely critical for effective use of such a strategy using food aid as the resource base. It is a game of high risks but equally high payoffs. The transfer of real resources inherent in a large food aid program

can make a significant impact on the rate of development. In the right context such aid can make a significant impact on agricultural development. In the Indonesian example the rupiah proceeds of the internal food sales were channeled into the development budget, much of which was devoted to improving rural infrastructure and an effective agricultural extension capability.

A logical trap has now been laid. A plausible case has been made for a positive connection between food aid and economic development. At the beginning of the paper, however, the Reutlinger-Selowsky proposal was accepted, implying the nonexistence of a significant link between gradual economic progress and reduced malnutrition. Is not food aid in this third role damned by the logic and the evidence?

The historical record reveals few positive links. The number of "growth with nutrition equity" examples is extremely limited: Japan, China, Taiwan, South Korea, the Indian state of Kerala, and a few others. Sri Lanka is probably an example of "nutritional equity without growth." But the experience of the rest of the third world offers little hope that a strong positive nutrition connection exists between economic growth and improving nutritional status. At least as many countries as listed above can be sighted as evidence of a negative connection. What then is the likely impact of food aid in such countries?

The real resource content of food aid can be used in support of development programs that reach the malnourished in a structural context, i.e., through job opportunities, health environment, and the real cost of food, clothing, and housing. It has already been noted that few models exist that have successfully made this connection. But it is not an empty set, and the examples must be studied for general lessons of transferability. Outside resources, both food and nonfood, have played an important role in the early stages of structural change, especially in Taiwan, South Korea, and Kerala. Using food aid resources to help establish a nutritional connection in the development process is a difficult but not impossible task. Very little is known about the essential ingredients that must be blended to establish the needed linkages. Pushing food aid into the same programs as in the past is unlikely to create such a blend now when it has failed to do so before. John Mellor has summarized the issues in the following way:

Past deficiencies of food aid and its tarnished reputation fall in three categories: depressed food production in the recipient country, failure to reach the poor and failure to develop commercial markets. The

three deficiencies are closely linked and all grow out of failure to enlarge markets for food by reaching the poor (3, p. 1).

The issues must be considered in the context of our understanding of the development process. Malnutrition is not simply an unfortunate appendage attached to the body economic and politic, to be surgically removed by skilled technicians using a variety of precisely targeted programs—with or without food aid. Malnutrition is a structural condition of the body itself, and any measures to correct the condition will involve the entire social organism. The issues that must be addressed are the nature and extent of that involvement, the ability and willingness to undertake self-diagnosis (and to call in outside specialists), and commitment to administering the prescribed regimen. Some societies may get by with a couple of aspirin in the form of two shiploads of P.L. 480 wheat every four months dropped casually into the local market (although none come to mind). Most countries seem to need stronger medicine. *The critical need is to specify the political and economic context in which food aid can be a potent ingredient in that medicine.*

The recommendations are vague because the examination of the patient from this perspective has barely begun. High priority must go to finding out more about the basic structural causes of malnutrition and to understanding the impact of general economic and agricultural development policies on the structure itself and on changes mediated by the structure. This research should have both a short run and a long run perspective. In the short run, Reutlinger and Selowsky are probably right. For most poor societies, the only feasible means of reducing malnutrition will be through target-group interventions, because other alternatives are too expensive either economically or politically. But even in this narrowed context, an understanding of the nutritional impact of nontargeted development policies is crucial, because they determine the size, location, and characteristics of the target group. No targeted program can hope to be cost effective without understanding these issues in a functional sense.

The knowledge is more important for the longer run because no society has succeeded in eliminating malnutrition for more than short periods through palliative programs. In effect, any government willing to make long run commitments to eliminating malnutrition has also been willing to deal with it at a structural level. The political commitment and the structural concern are, in essence, the same thing. The primary hope for the U.S. food aid program is that ways will be found to translate political willingness to

accept shortrun palliative programs aimed at specific target groups into longer-run political willingness to deal with the structural problems. In this context food aid should be viewed as an opportunity rather than as a club with which to wield influence.

The more immediate recommendations that flow from this analysis are fairly obvious. Famine relief has worked in the past not only to save lives but to alter commitment. Both roles require that the food be available very quickly under flexible arrangements. These arrangements will no doubt be part of any discussions on food security.

The last and most concrete recommendation is addressed to the day-to-day administration of present food aid deliveries. The question, "Who benefits?" should always be asked about every delivery. I am pragmatic enough to know that the answer is seldom, "the most disadvantaged nutritionally." When that is not the answer, the deliveries are probably not going to stop, but surely we need to know, to know why, and to know the marginal changes that will slowly shift the answers in the right direction.

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NUTRITIONAL CONSIDERATIONS IN FOOD AID

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ABSTRACT

In the past, food aid has served a variety of purposes, ranging from disposal of troublesome surpluses of food to support of military efforts. This paper will be concerned only with ways that food aid can improve the nutrition and welfare of low income people. This requires consideration of the nutritional issues involved, including the roles of protein, vitamin A, and other essential nutrients as well as calories, and the promotion of food production and equitable distribution in the recipient countries.

During the fifties and sixties, nutritional emphasis in food aid was concerned not only with massive supplies of cereal grain to meet overall food deficits, but also to some extent with adequate protein for vulnerable groups. In April 1971, a Joint FAO/WHO Expert Committee proposed a 20 percent lower protein allowance for adults, while energy recommendations remained unchanged from previous reports (1). Calculations based on the committee's proposal for "normal, healthy individuals" showed that the average per capita protein intake of population groups in developing countries by these criteria was usually less limiting than the average calorie intake. This was interpreted to mean that protein needs would be met adequately simply by consuming more of the usual diet.

There are several reasons why this conclusion is inappropriate. The subjects on whom the recommendations were based were mainly young, healthy Caucasian university students consuming egg or milk protein for 1 or 2 weeks and receiving excess dietary calories (1, 2). Results from these studies were extrapolated to include the majority of the world's population, and have been misinterpreted in their application.

Critical examination of these data, and additional studies done after 1971, have shown that if

excess energy is provided, protein utilization is markedly increased (3, 4). However, most of the nutritionally vulnerable groups in the less developed countries are consuming less energy than that required for an active, fully productive life while living under conditions of stress that tend to increase protein needs.

Short term evaluation of diets can fail to show the long term consequences of their consumption. We have conducted 3-month-long studies on subjects consuming the 1973 FAO/WHO recommended intake of 0.57 grams of egg protein per kilogram per day and have found important pathological changes induced by the diet that are reversed when protein intake is increased. In three successive studies, most of the subjects lost lean body mass even when body weight was maintained by extra calories, and several had blood enzyme changes suggestive of reduced liver function. At the end of the period, significant changes in serum albumin and hemoglobin were detectable in some subjects (5, 6). It was ultimately established that about 500 calories above normal requirements were needed to achieve positive nitrogen balance at this protein level (7). Under these circumstances, the subjects were gaining weight despite the loss of lean body mass. Clearly, the figure of 0.57 gm. per kilogram is not sufficient for this population. We have no firm data as yet to provide the correct figure, but in four subjects receiving their usual caloric intake, 0.8 gram per kilogram of beef protein appeared adequate for a 3-month period.

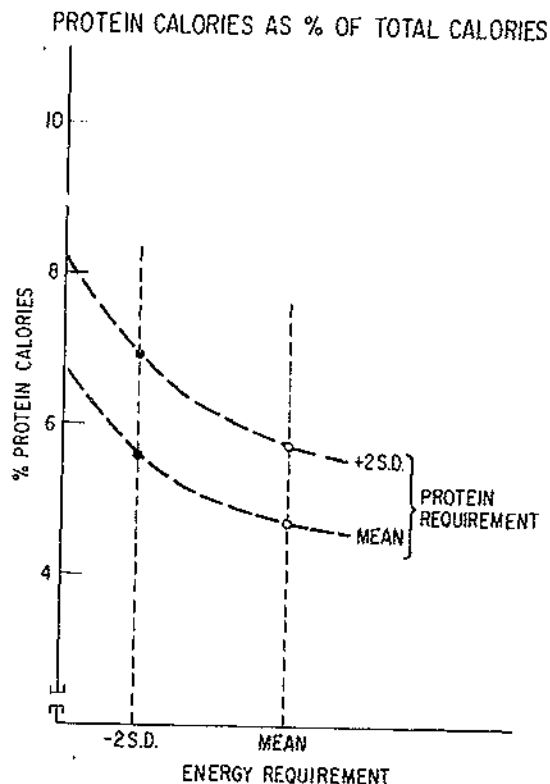
The FAO/WHO report states that recommendations are intended for healthy individuals, but notes that "...acute and chronic infections of all degrees of severity, including parasitic infestations, are endemic in many regions of the world." While it indicates that "Infections affect protein requirements by inducing some degree of depletion of body nitrogen during acute episodes," it provides no quantitative guidance as to how to

take this into account in evaluating the needs of underprivileged groups, especially children in less developed countries, where infections are so prevalent that they are a normal part of daily existence. Infections increase nitrogen losses as a result of the increased urinary excretion, and often as a result of interference with intestinal absorption, especially during bouts of diarrhea. At the same time protein intake is generally reduced owing to anorexia, and often because of improper therapeutic practices (8).

The net result is that a safe protein allowance for individuals in these groups must have a margin above the upper range of requirements for normal, healthy persons if it is to provide for repletion of body protein before the next acute episode depletes body proteins even further. This vicious cycle of infection and malnutrition should not be forgotten, because without massive and costly sanitary improvements and changes in personal hygiene practices, it will continue to be a reality that must be taken into account.

In addition to recovery from disease, which affects both children and adults, catch-up growth must be considered when assessing the protein needs of infants, children, and adolescents. The FAO/WHO calculation of protein and energy needs assumed growth to be a uniform process and divided yearly weight increases by 365 days to determine the daily extra needs for growth at various ages. A fact known to parents as well as pediatricians is that growth is not a uniform process, and that growth spurts are a common event even in healthy children. Dietary protein recommendations need to allow for normal rates of growth beyond the mean daily increment as well as for growth recovery after episodes of acute infection. Whitehead has shown that developing-country children whose home diet is reasonably adequate may show catch-up growth after an illness that is five times greater than the average daily rate (9).

The implications of the combination of these factors can be understood more readily when protein needs are expressed as percent of protein calories. Figure 1 illustrates the percentage of protein calories necessary to ensure that nearly all of a normal population receives sufficient protein when individuals meet their energy needs (10, 11). Comparison cannot be made with the figure calculated from protein allowances and average caloric requirements, as has generally been done by economists and statisticians, but rather with the amount of protein needed by individuals whose protein requirements are at the high end of the normal distribution and whose caloric requirements are at the low end. This is especially important for developing countries because, as we



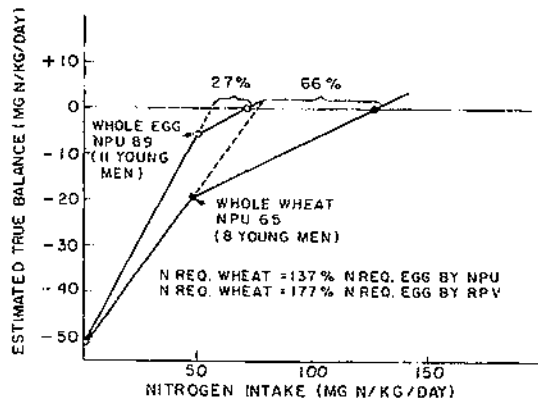
The percent of dietary calories that must be supplied as protein increases as energy requirements decrease, because there is little or no correlation between the protein and energy needs per kg of body weight of individuals.

Figure 1

have seen, caloric intakes of low income populations are shifted toward the low end of the distribution of environmental and social circumstances, e.g., the effects of acute and chronic infections, that also will increase individual protein requirement.

In order to adjust protein allowances expressed in terms of egg or milk protein to values appropriate for the protein in ordinary diets, the 1973 FAO/WHO report proposes the use of net protein utilization (NPU). It is now apparent that this measure overestimates protein quality because the efficiency of protein utilization at requirement levels is less at the suboptimal intakes at which NPU is conventionally measured than at maintenance levels (12). Allowance was made for this in the FAO/WHO committee report that specifies the amount of egg or milk protein required, but it is now clear that the poorer the quality of the protein, the greater the over-estimate of its value by the NPU procedure and the more protein need is underestimated.

For example, we have found, as illustrated in Figure 2, that for whole wheat fed to young adults, a correction of 23 percent beyond the



The utilization of both egg and whole wheat protein at zero nitrogen balance is less than at lower intakes associated with negative nitrogen balance, as is customary in measuring net protein utilization (NPU). However, the discrepancy between NPU and utilization at maintenance levels is not constant, as assumed in the 1973 FAO/WHO Report, but appears to be progressively greater as protein quality decreases (2).

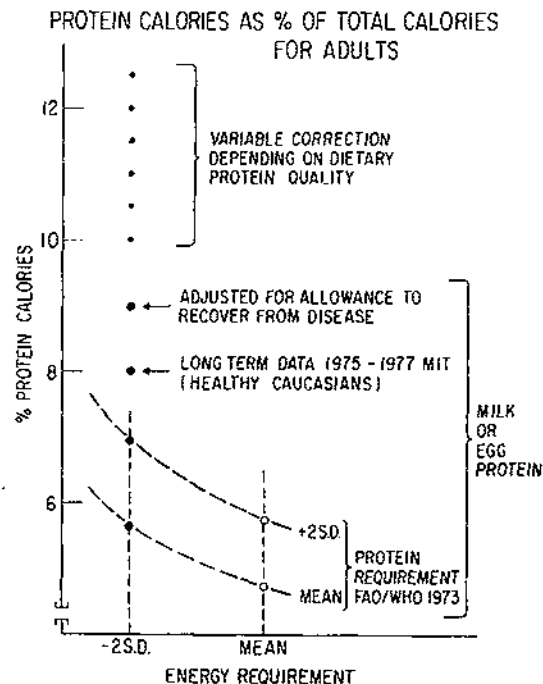
Figure 2

NPU adjustment needs to be used to predict requirements (13).

If one takes into account the recent evidence I cited: (a) that the present protein allowances may be too low, (b) that stress often increases individual protein needs, and (c) that adequate correction must be made for the differences in protein quality of diets, it becomes clear that the percentage of protein-calories in diets should ideally be considerably higher than is now often the case for under-privileged groups. Figure 3 shows that this is the basis for reemphasizing that protein needs should not be neglected in evaluating food aid for developing countries, especially for vulnerable groups of young children and pregnant and lactating women.

A United Nations University (UNU) working group (14), which met in Costa Rica in February 1977 has set forth, on the basis of available data, the interim recommendations shown in Table I. This group highlighted the important gaps in our knowledge and suggested that the UNU give a priority to support of research to fill them. This new and unique U.N. entity, with headquarters in Tokyo, works through existing institutions and has three major priority areas: world hunger, human and social development, and use and management of natural resources. Despite limited resources, it is already playing a major role in sponsoring the much-needed research in these vital areas in qualified institutions in developing countries.

I would like to make it quite clear that there is nothing controversial about either the calorie deficits of populations in developing countries or the consequences of these deficits. As a primary consequence, physical activity is reduced as the only



See legend for fig. 1, p. 38. This figure shows, in addition, the protein calories expressed as a percent of total dietary calories required, in theory, to insure that 97.5% of the population consumes enough protein when consuming sufficient calories for various estimates of protein need.

Figure 3

means of survival. The secondary consequences include diminished work output and less ability to participate in activities essential to social development.

The frequent conclusion that little problem exists, if national per capita food consumption is close to average requirements, is untenable. The effect of maldistribution has been well illustrated by Reutlinger and Selowsky (15). Figures 4 and 5 show that a few consume much more than they need, and the lowest income groups markedly less. While there are some problems with such aggregate data, the principle is undoubtedly correct. If, in calories, the average per capita consumption in less developed countries is close to estimated average requirement, an affluent segment of the population is consuming or wasting excess calories. On the other hand, the under-privileged who consume less will reduce their level of activity and body mass, adapting to this phenomenon. The adverse consequences to a nation are obvious.

As Kofsky has pointed out in his presentation at this Conference (16), 110 percent of the average is a more reasonable target. The reason the figure is relatively low and can be stated with some precision is that people cannot eat much more than their requirements even when they are

Table 1--Interim practical suggestions for protein intake to allow for satisfactory recovery from infections and for catch-up growth

Type of diet	Protein-calories as a percentage of total calories
	-- <u>Percent</u> --
Mixed diet, considerable animal protein	9-10
Usual developing country diet, mainly vegetable protein	11-12
Diet based on roots and tubers	13-14

Source: U.N. University Working Group, Costa Rica, February 1977.

becoming obese, although they can waste considerable additional amounts.

Comparable data for *protein* are lacking, but we may expect an even more marked maldistribution, as those who can afford to do so eat, by preference, far more protein than they need—often double or triple the estimated requirement. In addition, the needs of the underprivileged will be higher for recovery from frequent acute infections and other source of stress. It is statistically impossible to judge protein adequacy, either absolute or relative to calories, from average per capita dietary intake. Data on distribution are always required for this purpose.

The recommendations of the UNU attempt to allow for the range of individual needs, but no allowance can compensate sufficiently for severe maldistribution. It is clear, however, that the average protein consumption of a heterogeneous population must almost always be considerably higher than protein recommendations to allow for marked inequalities in distribution. How much higher will depend on the income distribution pattern in a population. It is unrealistic to expect that the excess consumption of protein by those who can afford it can be reduced enough to eliminate this factor other than by strict rationing.

The Protein Advisory Group of the U.N. System has appropriately stated that the protein gap is not one of overall supplies, but rather a gap between what is required and what can be purchased by the poorest segments of society, or distributed to the most vulnerable (17). For this reason as well as the physiological ones previously mentioned, there still needs to be concern

for sources of dietary protein more concentrated than found in cereals. For populations in less developed countries, this usually means ensuring adequate supplies of legumes at reasonable prices.

The U.S. food assistance programs for vulnerable groups in less developed countries must also pay attention to assuring more protein than provided by cereals alone in the supplementary feeding of infants and young children, or to improve the diets of pregnant and nursing mothers. Indigenous sources of protein are preferred, but the United States has supplied dried skim milk (DSM), corn-soy-milk (CSM), or wheat-soy-blend (WSB) directly to governments or through voluntary agencies. When such programs are well defined and targeted, they should be continued.

Criticism of the supplying of milk for this purpose, because of the high prevalence of lactose intolerance in most populations, is not justified. An international workshop convened in 1971 by the Protein Advisory Group of the U.N. System received reports from many persons experienced in working in less developed countries confirming that programs in Asia, Latin America, and Africa under the auspices of UNICEF, CARE, Church World Service, Catholic Relief Services, and other private agencies and governments had encountered no significant problems with milk in the quantities and manner used despite the fact that most recipients were in ethnic groups who characteristically have low levels of intestinal lactase after infancy and early childhood (18).

In our own published studies of 69 Boston Negro children, 11 percent of those 4 to 5 years old, 50 percent of those 6 to 7 years old, and 72

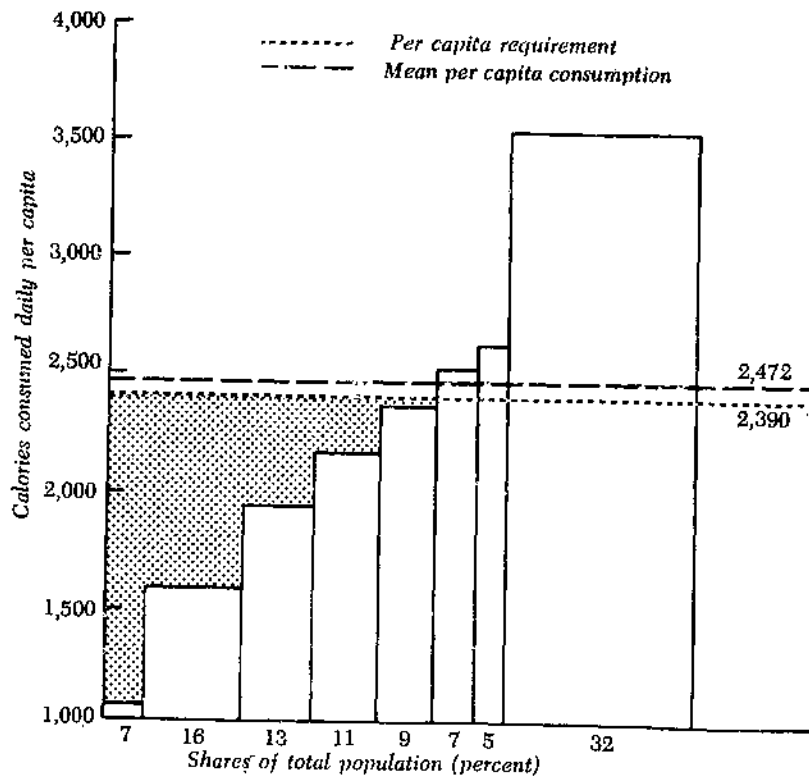


Figure 4

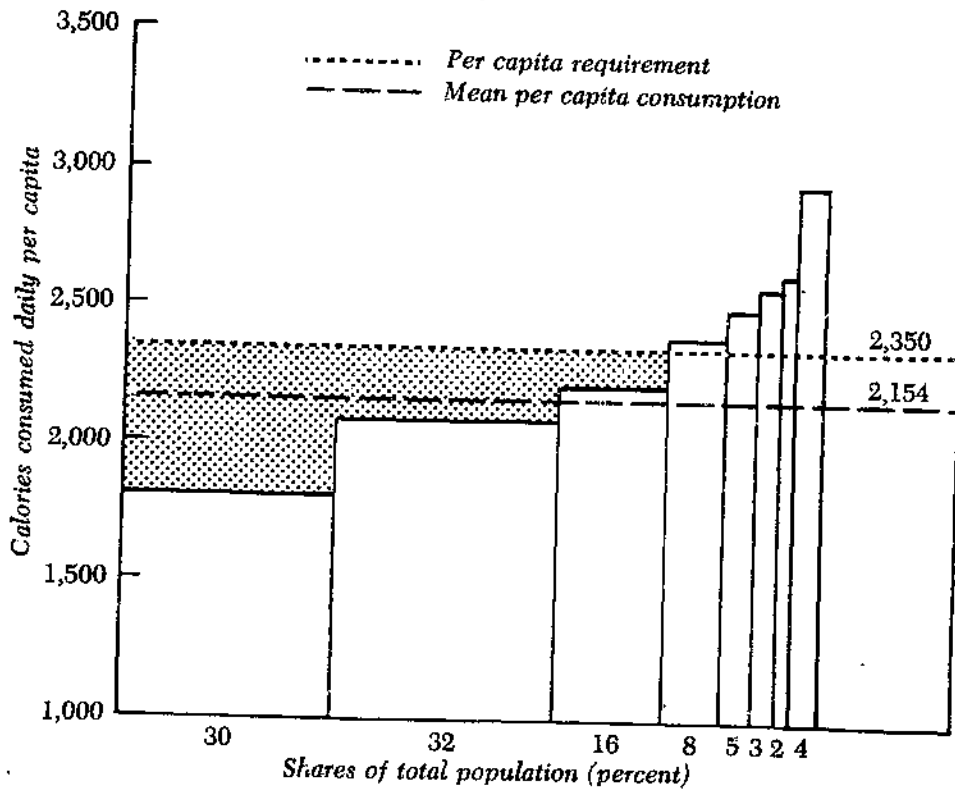


Figure 5

From data on food consumption and income, Reutlinger and Selowsky (15) have calculated the distribution of caloric intake. It is apparent that even when the average intake differs little from the estimated average requirements, this is not enough to prevent severely inadequate caloric intakes for a substantial part of the population.

percent of those 8 to 9 years old were found to be lactose-intolerant, yet all of them could tolerate a glass of milk without symptoms (19). An MIT graduate student, Peter Kwon, has since completed a study of 82 high school students. Of these, 62 percent were lactose intolerant when given the standard lactose tolerance test, yet not one of them experienced symptoms from consuming a single glass of milk. We believe that the often-quoted Baltimore studies of milk rejection (20) are seriously defective in assuming that the relationship between milk rejection by children and lactose intolerance is a causal one.

Another issue associated with U.S. provision of DSM in food aid is its content of vitamin A. The diets of many young children in developing countries are deficient in vitamin A, and episodes of infection and their nutritional consequences often precipitate xerophthalmia, keratomalacia, and blindness. Providing protein and energy without concern for vitamin A to children who are eating poor diets, and who have low vitamin A reserves in their bodies, can aggravate this situation. Vitamin A fortification of DSM supplied as food aid for child feeding as a corrective measure is an obligation.

In addition to protein-calorie malnutrition and the ocular complications of vitamin A deficiency, a major nutritional problem in most developing countries is iron deficiency. This occurs because predominantly vegetable diets contain compounds, especially phytates, oxalates, and fiber, that reduce iron availability. Also, the blood losses associated with such diseases as hookworm, schistosomiasis, and the effects of malaria, add to iron requirements.

In Indonesia, we found a significant linear correlation between the take home pay and hemoglobin levels of rubber tappers paid on an incentive basis. Moreover, the take home pay of anemic workers increased by more than a third after two months of oral iron administration, and morbidity from diarrheal and respiratory disease decreased. Figure 6 shows the linear relationship between hemoglobin level and physical capacity, as judged by the Harvard Step Test, for plantation workers studied by Viteri (21). Improved performance followed correction of the iron deficiency. Clearly, food aid designed to improve malnutrition should include iron fortification whenever feasible.

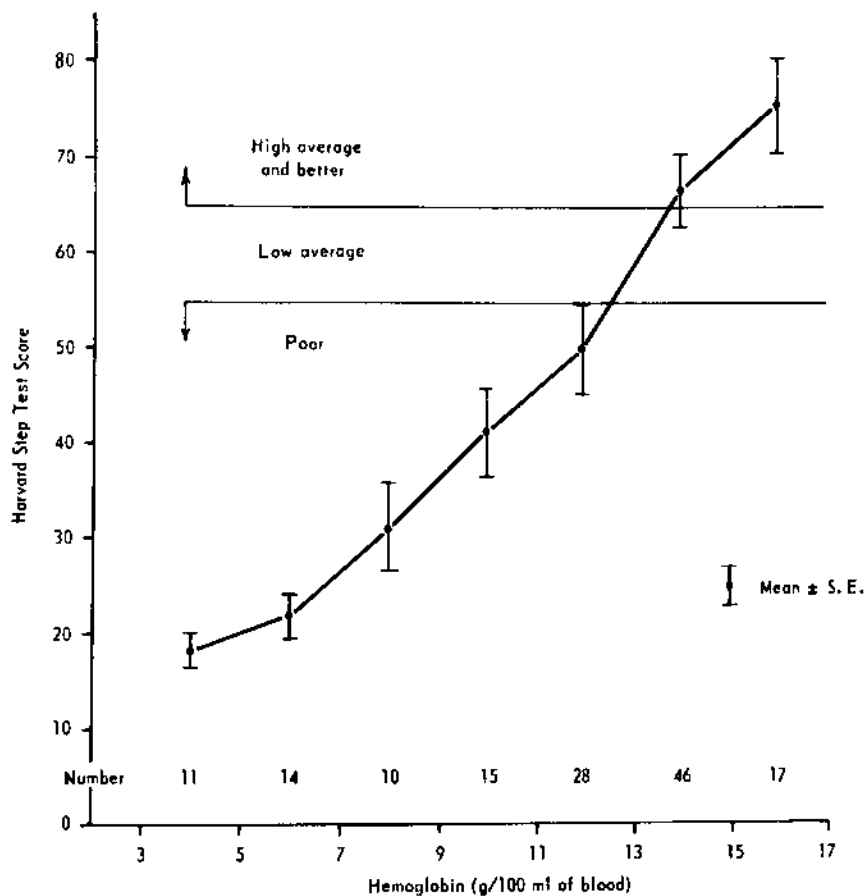
U.S. food assistance programs are often intended to provide economic assistance or to help countries meet the internal demand for food. Even when the stated objective is improved human nutrition, the program is in reality providing food in response to effective demand, or serving an economic function. U.S. P.L. 480 Title II,

however, is a program intended to benefit specific target groups. An additional dimension of food aid, the interrelationships among domestic food prices, food production, and food consumption by the poor are beyond the scope of this paper.

It is not always sufficiently emphasized that the adequacy of the nutrition of a population is not determined primarily by the adequacy of the food supply, but by the adequacy of actual food consumption by the poorest sectors. The latter, in turn, depends on the amount and kinds of foods that the family actually obtains for consumption. This is contingent upon what the family chooses to, and is able to, produce, collect, or obtain by barter or purchase. Other sessions of this Conference have pointed out the extent to which food is produced and distributed to meet effective demand, not human needs.

In 1975 I had the opportunity to lead a study mission for the U.S. Senate Subcommittee on Health (Committee on Labor and Public Welfare) and for the Subcommittee on Refugees and Escapees (Committee on the Judiciary) to five food-short countries: Egypt, Pakistan, India, Bangladesh, and the Philippines, for the purpose of determining what a rational policy of assistance to these countries might be relative to their food problems (22). We urged that the United States, because it is by far the largest producer of food for export, provide leadership in helping to establish policies that will assure adequate world food reserves. These should be designed to guarantee adequate food supplies to meet genuine emergencies, and be managed so as to insure farmers fair prices for their products without wide swings in commodity prices because of natural events. However, such a reserve should not be designed to provide for the *chronic* shortages of countries.

We noted that in the past, food aid on the concessional terms of P.L. 480 Title I has sometimes served as a disincentive to local agricultural efforts, or encouraged governments to neglect priority allocation of funds to the agricultural sector. For this reason it will usually be desirable to tie concessional sales to food-for-work or other programs designed to contribute to agricultural productivity through the construction of irrigation and drainage canals, fish ponds and reservoirs, flood control levees, rural access roads, and the like. I repeat this for another reason. Food aid put into distribution systems focused on the politically active populations of cities and towns may do little for the rural hungry, but if they are hired for food-for-work programs they will benefit. Even during periods of rehabilitation after natural disasters, food-for-work programs under P.L. 480 Title II may be a desirable and feasible means of assistance, both through the



Physical fitness in relation to hemoglobin concentration in Guatemalan agricultural workers.

Figure 6

World Food Program and direct bilateral agreements. This is not the place to discuss the very real difficulties and infrastructure limitations to food-for-work projects.

The provision of food to developing countries without cost except for transportation can easily delay the development of indigenous means for the feeding of vulnerable groups. Conversely, it may make possible the initiation of worthwhile programs that might otherwise never be started. P.L. 480 Title II assistance used in this way can make a valuable contribution to nutritional improvement in developing countries; i.e., when used for assisting governments to start worthwhile targeted projects that are later continued without external assistance.

To these more general recommendations, I would add several more specific points:

1. Calorie deficits are real and almost universal among lower income populations of less developed countries. Programs are needed that will improve this situation, but they must be based on more than increased food production and food availability. Equity considerations are essential.

2. Attention must be paid to the adequacy of protein in the diets of vulnerable groups of developing countries even when caloric needs are met. Such foods as DSM and CSM are appropriate in P.L. 480 Title II assistance that is designed to improve the nutrition of infants and preschool children, pregnant women, and nursing mothers. When possible, it is preferable to use Title II commodity assistance to promote the formulation of local weaning foods that later can be wholly indigenous. (Examples are the supplying, in the sixties, of wheat for Bal Ahar in India and corn for Incaparina in Guatemala when these cereals

were not locally available in sufficient quantities. Both weaning foods have since continued to be produced in these countries in large quantities from local ingredients).

3. Supplementary feeding programs for school children are rarely worth the transport and storage charges and the administrative costs in money and time, even when the food is delivered to the country without charge. This is because school children have passed the age at which malnutrition is most common and are usually growing at rates comparable to well nourished children elsewhere, even though they are smaller for their age. Educational benefits from school feeding programs are seldom of practical significance, although attendance is sometimes improved.

4. Maximum resources and effort in supplementary feeding should be concentrated on pregnant women and younger preschool children. For the latter, the greatest need is likely to be in the second and third years of life. Programs that reach only the older preschool child, like those for the school child, are too late to be of much value.

5. Where DSM is supplied for the supplementary feeding of infants and young children, it should be fortified with vitamin A.

6. Where CSM and other processed weaning foods are provided, they should be appropriately fortified with vitamins and minerals, with special attention to vitamin A and iron.

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COMMENT

by
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I want to focus my remarks, as I comment on the two papers we have heard this afternoon, on the connection between food aid and malnutrition at the level of public policy. Previous speakers have addressed the "nutrition connection"—that is, the link between the food needs of hungry people in developing countries and the resources available to them in the form of food aid. Equally important, in my view, is what one might call the "political connection"—that is, the link between food needs and food aid as it exists in legislative policy in this and other countries.

In my view there is a major disconnect between hungry people on the one hand and food aid on the other. The disconnect is not nutritional but rather political. We know enough about human hunger on the one hand and food aid policies and programs on the other to forge new food aid legislation and to operate more effective, human needs-oriented food aid programs. I think it misses the essential point to quibble whether there are 400 million, 460 million, or 500 million chronically malnourished people in the world. The point, rather, should be to remedy the patent disconnect which currently separates food aid and malnourished people.

I commend the two papers which we have heard this afternoon for pointing out the link between malnutrition and statutory dysfunctions in the economic systems within, between, and among nations. I would like to underscore Dr. Scrimshaw's observation that the adequacy of a nation's nutrition is determined not by how much

food it produces or how much food it has on hand, but by the adequacy of food consumption among the poorest segment of society.

I also find very helpful the approach taken by Dr. Timmer in disaggregating food aid for specific purposes: Emergency relief, targeted programs such as food for work and maternal and child health, and general economic development. Past and current U.S. food aid has clearly been more successful by and large in meeting effective demand than it has in addressing the needs of those who lack the resources to purchase food—that is, what Dr. Scrimshaw calls "latent demand." I make this observation not to detract from the quality programs which have been operated under the grant provisions of Title II, but to point out that roughly 75 percent of U.S. food aid has gone through the concessional sale program of Title I where it has had a much more uneven impact on the poor majority in developing countries. In my view, while food aid has a variety of objectives, the overriding objective should be to assist people who without food aid would remain essentially hungry.

I take exception with the view that more research needs to be done before we can act to provide a more effective linkage at the level of public policy between food aid and malnutrition. We know enough about nutrition and malnutrition to make concrete policy changes now, thanks, in part, to the work of nutritionists such as those who are here today. Similarly, we know enough about food aid to make the necessary

changes. After all, the U.S. has provided in the past 23 years more than 265 million metric tons of food aid, valued at more than \$26 billion. Clearly the issues are not nutritional/scientific/technical, but political.

At the 1974 World Food Conference there was a clear consensus on the part of the international community on the need for the following measures: an annual food aid target of 10 million tons; the forward planning of food aid on a multi-year basis; increased food aid in grant rather than loan form; food aid more oriented to the development needs of poor nations; the establishment of an international food aid reserve for emergencies; and an improved policy framework for food aid.

How far have we come since late 1974 in making changes in food aid policies along these agreed upon lines? The most recent, definitive, and objective review of international progress in this area is provided by the World Food Council. Its Secretariat, in a series of illuminating and constructive documents prepared for the Third Meeting of the World Food Council, has taken stock of progress in areas of food aid, nutrition, food trade, increasing agricultural production in developing countries, food reserves, and other priority food policy areas which it is monitoring.

With respect to food aid in particular, the Conference documents note some progress on some of the above items. However, their general assessment is a somber one: There has been a general loss of political momentum which has resulted in a failure to move on many of the food aid pledges made at the World Food Conference. The document notes that food aid still bears little relationship to the basic needs of developing countries.

Similarly, with respect to the implementation of the Conference resolutions on nutrition, the World Food Council documents conclude that "a start has been made towards the implementation" of those pledges. However, "progress overall has not moved far in the direction required by resolution V towards a major, concerted approach to nutrition improvement. Fundamental changes in scale, scope and the nature of efforts by governments and the international community are needed if action is to lead to quantitatively significant progress towards the achievement of the World Food Conference goal of adequate nutrition for all."

Let me shift my attention to the more immediate U.S. national scene. Various legislative proposals relevant to our discussion here today are currently pending before the Congress. For example, the Administration has requested that Congress authorize food aid to be provided for

humanitarian and developmental purposes irrespective of the prior satisfaction of international commercial demand for U.S. agricultural commodities. This would be a welcome change both from past Executive Branch policy and from currently existing law. The House Agriculture Committee has approved assured continuity of food aid supply for humanitarian purposes but not for developmental uses. This would protect programs only in the first of Dr. Timmer's three categories and perhaps a few programs in the second category—but would not extend to developmental projects such as food for work efforts. The Senate Agriculture Committee has yet to respond to the Administration's request.¹

The Congress has also before it a proposal for a new Title III of P.L. 480 which would make food aid available on grant terms for food-for-work and other developmental efforts at a larger scale than is currently possible under Title II. The House International Relations Committee has already acted favorably on a new Title III. The Senate Agriculture Committee is expected to act soon.² Title III is responsive to the view expressed by Dr. Scrimshaw that food aid can be used effectively in developmental efforts such as food for work programs.

Dr. Scrimshaw also emphasized the necessity of establishing a U.S. grain reserve which would serve as a backstop to U.S. food aid. The Senate Agriculture Committee is currently considering a reserve for such purposes.³

Dr. Scrimshaw will also be pleased that the House International Relations Committee has sought to target food aid more specifically on the most malnourished persons in the poorest areas. It adopted an amendment which would require Title II programs to be so targeted, although it did not specify children as Dr. Scrimshaw suggested. An amendment is likely to be proposed next week in the Senate Agriculture Committee which would safeguard against the shipment of P.L. 480 commodities to countries where it would

¹On May 3 the Senate Agriculture Committee voted to recommend legislation guaranteeing continuity of supply for developmental as well as humanitarian food aid use.

²On May 3 the Senate Agriculture Committee approved the proposed Title III, virtually assuring that it will be adopted by the Congress in legislation this year.

³On April 29 the Senate Agriculture Committee approved an emergency reserve for food aid and other overseas use in the range of 2-6 million metric tons. There is currently no similar provision in the House omnibus farm bill.

serve as a disincentive to local agricultural production. This speaks to a concern which Dr. Timmer raised in his paper.⁴

While amendments such as the ones I have described are generally encouraging, I am somewhat discouraged by the range of actions which Congress is taking this year on food aid. This year could and, in my opinion, should be a time of more wide-ranging review and of more substantive reforms in P.L. 480. However, congressional strategy has addressed only some of the basic problems in the program, and only some of the current weaknesses have resulted in legislative remedies. I am, therefore, pleased that the House is recommending only a 2-year extension of the P.L. 480 program. I hope that in the coming 2 years those of us involved in the formation of public policy and public opinion will step up our efforts to develop a constituency for a P.L. 480 program more nutritionally and developmentally oriented.⁵

Let me close by commenting on an important byproduct of the current legislative discussions on P.L. 480. Some of us are sensing the beginning of the emergence of a new spirit at the U.S. Department of Agriculture. In the past many private groups, including many of us in the religious community, have perceived the Department of Agriculture as an adversary rather than an ally in the area of nutrition. Our perception has been borne out all too often, whether the

issue was international food programs or domestic feeding efforts. Now, on the contrary, food is beginning to be viewed less as a commodity and more as a developmental resource. Particularly welcome on the international front has been USDA's support for taking food aid out of the category of surplus disposal of U.S. agriculture abundance. Particularly welcome on the domestic front to many in the religious community, has been USDA's support for the elimination of the purchase requirement in the Food Stamp program. Let me hasten to point out that the new image is still only embryonic. What has emerged so far has, for the most part, been commitments at the level of broad policy. The real test will come in the specific actions which are needed to put flesh on these commitments.

I am also pleased to see a less antagonistic relationship developing between and among USDA, the State Department, and the Agency for International Development—all of whom need to have a hand in the shaping of a new U.S. food and development policy. I am looking forward to the Third Session of the World Food Council in Manila in June as a sort of coming-out party for new U.S. food policies. That meeting provides an ideal forum for the United States to present to the international community more of the specifics regarding the directions in which it proposes to move in the altogether essential areas of food aid, nutrition, food reserves, development assistance, and food trade.

COMMENT

by

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Someone during this morning's discussion mentioned that he thought there was now general agreement that the world's nutritional problems reflected insufficient caloric (energy) availability. Dr. Scrimshaw's paper is largely an argument that current protein requirements are set too low. Table 1 helps us fit this argument into the evolving perception of the nutritional status of the less developed countries (LDC's). It summarizes the findings of the major postwar world food studies

done by FAO and the USDA. Excluded is the USDA's excellent report FAER-98 (1), since it accepted the findings of the FAO background study for the 1974 World Food Conference (2). Nor do I include the recent World Bank study (3). As I will bring out, the data situation is such that the approach employed in this study cannot be implemented.

The analytical approach followed in the early surveys was simple in the extreme, and may be summarized by the equation:

$$\frac{\text{Food available for human consumption}}{365 \times \text{population}} \sim 15\% \text{ loss} < \begin{matrix} \text{average} \\ \text{daily} \\ \text{recommended} \\ \text{nutrient} \\ \text{allowance} \end{matrix}$$

⁴The Senate Agriculture Committee approved an amendment by Senator Bellmon on May 3 along these lines.

⁵The Senate Agriculture Committee on May 3 approved a 5-year extension of P.L. 480. A compromise between the House and Senate extensions of the Act will be sorted out in a conference committee.

Table 1--Conclusions of major early postwar studies of the world food situation and selected recent pronouncements

Year published		
1946	<p>FAO - "World Food Survey" 1/ "In areas containing over half the world's population (prewar) food supplies . . . were sufficient to furnish an average of less than 2,250 calories . . . an average of more than 2,750 calories . . . were available in areas (with) less than a third of the world's population . . . the remaining areas . . . had food supplies between these . . . levels" (pp. 6-7).</p>	<p>National food balance sheet availabilities minus 15 percent wastage allowance compared with 2,600 Kcal./caput/day allowance (p. 11).</p>
1952	<p>FAO - "Second World Food Survey" 2/ "The average food supply per person over large areas of the world, five years after war was over, was still lower than before the war" (p. 2). "59.5 percent of population (lives in countries) with under 2,200 (calories)" (p. 11).</p>	<p>National food balance sheet availabilities minus 15 percent wastage allowance compared with regional allowances (p. 22):</p> <p>Far East - 2,230-2,300 Kcal. Africa - 2,400-2,430 Kcal. Latin America - 2,440-2,600 Kcal.</p>
1961	<p>USDA - "World Food Budget, 1962 and 1966" 3/ "Diets are . . . adequate in the 30 industrialized nations . . . (where) more than 900 million people live . . . For most of the 70 less-developed countries . . . diets are nutritionally inadequate, with shortages of proteins, fat, and calories. These countries contain over 1.9 billion people. In most of them, population is growing rapidly, malnutrition is widespread and persistent, and there is no likelihood that the food problem soon will be solved" (p. 5).</p>	<p>Most identical to "Second World Food Survey."</p>
1963	<p>FAO - "Third World Food Survey" 4/ (As of 1957-59, national food balance sheets and extrapolation of a limited number of budget surveys imply:) "as a very conservative estimate some 20% of the people in the underdeveloped areas are undernourished and 60% are malnourished. Experience shows that the majority of the undernourished are also malnourished. It is believed therefore . . . some 60% of the people in the underdeveloped areas comprising some two-thirds of the world's population suffer from undernourishment or malnourishment or both." (Since some people in developed countries don't eat well,) "up to half of the peoples of the world are hungry or malnourished" (p. 51).</p>	<p>National food balance sheet availabilities with distribution around mean inferred from a few surveys in India and elsewhere compared after allowance for wastage with requirements calculated according to the 1957 FAO 5/ system.</p>
1964	<p>USDA - "World Food Budget, 1970" 6/ "Two-thirds of the world's people live in countries with nutritionally inadequate national average diets" (p. 111).</p>	<p>Little changed from "World Food Budget, 1962 and 1966"</p>
<p>In 1971 an FAO/WHO Expert Panel reassessed energy and protein "requirements" and dropped the protein figure for adults by about one-third. 7/</p>		
1973	<p>FAO - "Food Balance Sheets and World Food Supplies" 8/ (As of 1964-66, most national balance sheets) "suggest a surplus of protein availability." (However, other evidence) "suggests a very uneven distribution of protein supplies . . . aggravated by seasonal imbalances . . . Furthermore, wherever calories are in short supply, proteins are diverted from their primary function of providing for growth and maintenance of tissues to the supply of energy for other vital functions. This explains the widespread incidence of protein/calorie malnutrition in spite of the apparent excess of protein supplies" (p. 19).</p>	
1974	<p>UN World Food Conference - "Assessment of the World Food Situation, Present and Future" 9/ "Taking a conservative view, it would appear that out of 97 developing countries, 61 had a deficit in food energy supplies in 1970 . . . Altogether in the developing world . . . 460 million people are affected; a less conservative definition might give a much higher figure" (p. 5). "The poorer segments of the population, and within these segments, the children in particular, will bear the brunt of an insufficient food supply" (p. 64).</p>	<p>National average availabilities with distribution by income inferred from a limited number of surveys compared with energy cost of maintenance (1.5 x basal metabolic rate) minus 20 percent. "It is the use of this very conservative level that leads to the estimate of over 400 million individuals . . ." (p. 72).</p>
Sources:	<p>1/ FAO, World Food Survey (Washington, 5 July 1946). 2/ FAO, Second World Food Survey (Rome, Nov. 1952). 3/ USDA, ERS, The World Food Budget, 1962 and 1966 (FAER-4, Oct. 1961). 4/ FAO, Third World Food Survey (Freedom from Hunger Basic Study 11, 1963). 5/ FAO, Calorie Requirements (Nutritional Studies 15, 1957). 6/ USDA, ERS, The World Food Budget, 1970 (FAER-19, Oct. 1964). 7/ FAO, Energy and Protein Requirements (Nutrition Meetings Report Series 52, 1973). 8/ "Food Balance Sheets and World Food Supplies," (FAO) Nutrition Newsletter, Apr. 1973. 9/ UN, World Food Conference, Assessment of the World Food Situation, Present and Future (Item 8 of the Provisional Agenda, Nov. 1974).</p>	

To determine whether or not a country was experiencing a food problem, apparent per capita food availabilities, minus a 15 percent allowance for wastage, were set against estimates of per capita nutrient needs. Where and when availabilities exceeded requirements, all was presumed well; where they did not, the country or region's entire population was considered to be inadequately nourished.

The limitations of this approach are many and, when probed, obvious. In addition to an unrealistic assumption of dietary homogeneity, it presumes a sophisticated ability to quantify. To estimate food availabilities, one must construct a balance sheet, incorporating on the supply side measures of production, trade, and stocks changes, and on the utilization side such items as seed and feed use and losses in storage. Availabilities for human consumption are derived as a residual and thus reflect the totality of error. The evidence is that these errors in statistically underdeveloped countries act in the direction of understatement; minor or exotic foods are often ignored and—because the government official is still equated with the tax collector—farmers tend to minimize production. Detailed evaluations of a number of Asian countries by Cornell students suggest underreporting of from 10 to 15 percent, and preliminary work on Africa points to an even greater margin of error (4, 5, 6).

Compounding this tendency to undercount food availabilities have been the difficulties associated with estimating food needs. These needs have been overstated. Nutrition is still a young science and our ability to establish minimal or desirable levels of intake is not nearly so precise as we would like it to be. What in fact have been used as surrogates for minimal acceptable levels of intake in most food evaluations have been the recommended allowances prepared as guidelines for dieticians and other nutritional workers. To insure that the substantial variations in food needs among individuals will be covered, these allowances consciously err on the side of caution. They are also periodically revised as new knowledge becomes available. The history of the FAO, the U.S. Food and Nutrition Board, and other responsible organizations has been one of continual—and generally downward—modification. The energy allowances for the U.S. "reference man"—in his twenties, moderately active, weighing 70 kilograms—now stand at 2,700 calories daily, 500 calories less than the 1953 recommendation (7, following p. 128).

With the cards thus stacked, it is not surprising that the early FAO and USDA global food assessments were able to paint a gloomy

picture of world hunger—a picture which has persisted despite appreciable changes in the method of analysis.

The first global study to break away from the assumption of dietary homogeneity and to recognize that the key determinant of an individual's (or country's) eating patterns is his level of income was the *Third World Food Survey* published in 1963. As such it marked an important milestone. It is obviously the poor that suffer. Less obvious is how many and how.

The Third Survey concluded that the problem was with malnourishment: that whereas their energy intake was generally adequate, at least 60 percent of the population of the developing world was too poor to afford the more costly foods which are the principal sources of protein and the essential vitamins and minerals. This conclusion was widely held during the sixties; the food problem became a protein problem and in some quarters the technical advances which have come to be called the Green Revolution were decried because they emphasized crops which are principally energy suppliers.

But in 1971 there was a flip-flop. The expert panel to which Dr. Scrimshaw referred was convened by the FAO and the World Health Organization to review the international dietary allowances, and it revised the adult protein recommendations downward by about one-third. The effect was to convert the list of "protein deficit" countries to one of sufficiency. If the protein problem did not vanish overnight, at least its statistical underpinnings had been swept away.

The current consensus seems to be that the old notions of malnutrition (insufficient protein and other "protective" foods) and undernutrition (inadequate energy intake) are no longer valid and nutritionists concerned with the LDC's now speak of protein-calorie malnutrition. This sees a shortage of calories again as the prime problem and takes into account that an apparent adequacy of protein can be converted into a deficit should a portion of it be metabolized to compensate for insufficient energy intake. The Green Revolution is again acceptable.

The best recent estimate of the extent to which the poor of the Third World suffer from protein-calorie malnutrition was prepared by FAO for the November 1974 World Food Conference. It suggests the problem to be largely an Asian one—certainly true—and indicates that perhaps a quarter of the population of the Third World (ex-China), or in excess of 500 million people today, is inadequately fed. To be sure this is much less than the two-thirds found by the *Third World Survey*, but nonetheless it represents an unconscionable segment of mankind (2, p. 66).

It is difficult to evaluate this figure. Certainly the nutritional standards used today are far more reasonable than those employed 30 years ago. Food availabilities no doubt continue to be underestimated. But the real problem is knowing how available supplies are divided across the income range. It is commonplace among serious pronouncements on the food situation that global supplies are sufficient to feed all. Would that our ignorance on matters of distribution were equally publicized. The survey data from which inference about the effect income has on eating habits simply do not exist for most LDC's, and until there is a (modest) hue and cry for their generation I see no likelihood of the situation being corrected.

Table 1, a summary of the effect income has on nutrient intake in Sri Lanka, illustrates some of the difficulties. The survey on which it is based is almost unique; to my knowledge only three or four surveys of equal coverage and integrity exist for the entire Third World. Yet, even with this survey, one can infer precious little about the extent of protein-calorie malnutrition. The dietary adjustment most commonly associated with rising income is a decline in the importance of the starchy staple foods—read rice in southern Asia—as sources of energy and a shift to the more expensive, flavorful foods such as meat, fish, and vegetables. In Sri Lanka this tendency is observable among only the four uppermost income classes (20 percent of the population), and then, because of recent egalitarian measures, only weakly so. Between the lowest class (43 percent of the people) and the next lowest (37 percent), the sole change is quantitative. There is a difference in apparent per capita daily availabilities of 200 calories and 10 grams of protein, but none in dietary composition.

What are we to infer from this? Because FAO now (quite reasonably) reckons energy requirements in South Asia to average about 1,900 calories per day, it could suggest either of two very different things. If the standard factor of 15 percent is applied to account for wastage between purchase and actual ingestion, the 200-calorie gap could be interpreted as implying enforced reduced activity among the poor or actual physical deterioration. But just as reasonably, one might postulate caloric adequacy among that element of society which is too poor to waste anything and which, given the very high rate of unemployment in Sri Lanka, leads a less active life and therefore has lower energy needs. Thus it is possible to have it either way: depending on your assumptions, you can prove beyond a statistical doubt that 43 percent of Ceylonese suffer protein-calorie malnutrition or none do.

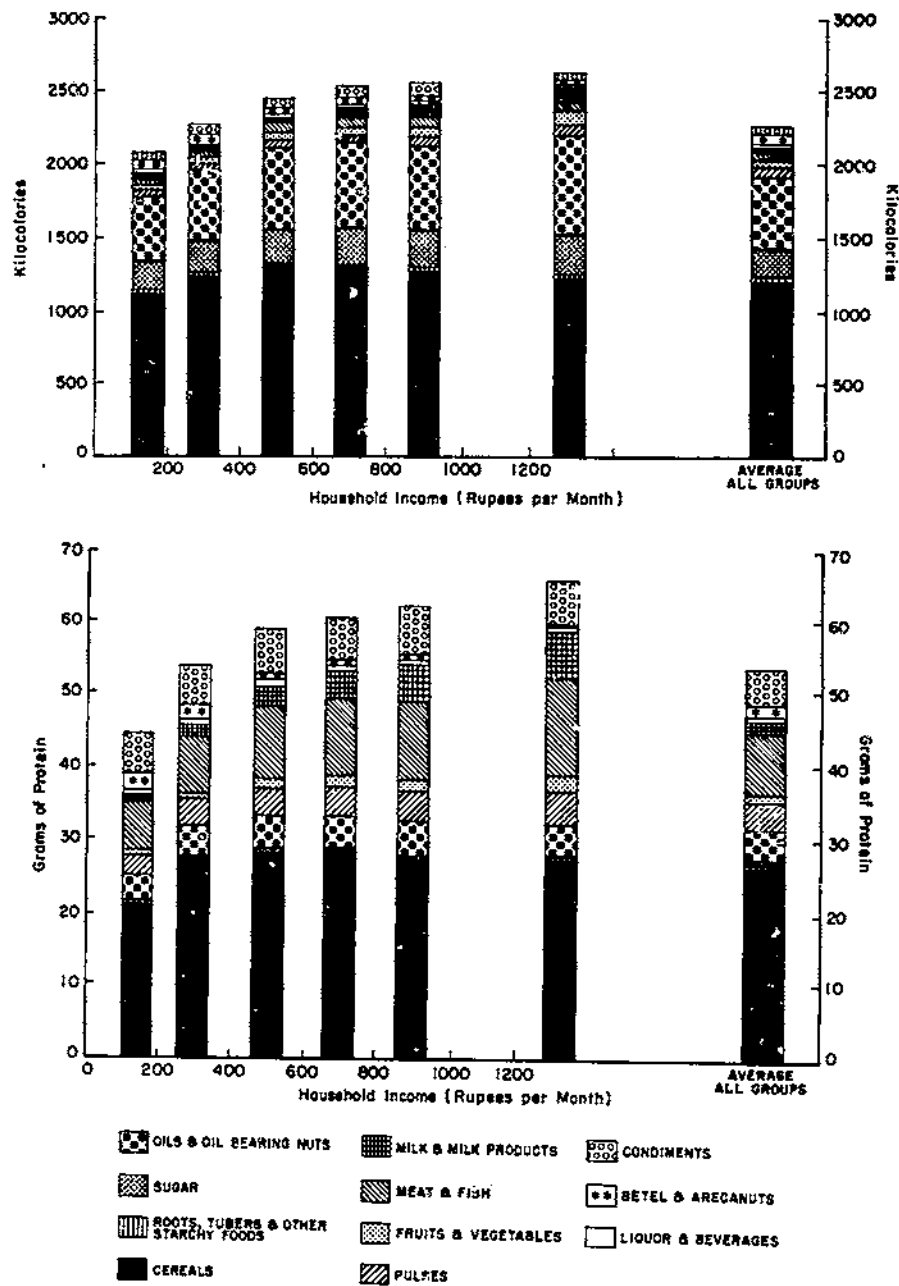
Having been fortunate enough to have spent some time in Sri Lanka over the last decade and a half, my impression is that the optimistic interpretation more nearly approximates reality. Overt signs of inadequate feeding are few in Sri Lanka; and it is illogical for people who are short of calories not to satisfy this need from such cheap sources of energy as rice, sugar, and coconut before spending on what to them are luxury items.

Indeed, an implicit presumption of such illogical behavior underlies the whole notion of massive protein-calorie malnutrition, and I for one am skeptical. The more I study food behavior in the developing world, the more impressed I am with the efficient and rational way in which most people allocate their resources so as to get by on, what by the standards of the West is very little. There are exceptions, of course: the so-called vulnerable groups—pregnant and lactating women, the preschool child—are truly vulnerable and need assistance. But the great majority of people neither look nor act malnourished, and quite possibly enjoy more healthful (though less tasty) diets than do many of their overweight and underexercised cousins in the West.

Thus, though I can't prove it, there is no doubt in my mind that the picture of 500 million people struggling at the brink of starvation is an exaggeration; certainly the estimated range of between 1.1 and 1.4 billion reached by the World Bank team is utterly unrealistic (3, p. 30). But why worry? Surely it is not wrong to exaggerate the misery of the few by making it seem the plight of the many, if the result is to hasten remedial steps. In fact, the result has been just the opposite. Instead of galvanizing mankind to useful collective action, the hunger exaggeration has given rise to a whole range of misconceptions, not the least of which is that a key way in which the West can aid the developing world is through food aid.

With the bulk of Dr. Timmer's paper I am in hearty agreement and congratulate him on a tidy summary of the various forms food aid can take and their consequences. That most Title I shipments are counter-productive from the point of view of the recipient countries is increasingly accepted by responsible commentators. The objections center on the dampening effect they have on the price incentives needed over the long pull to bring forth additional production.

But one cannot sell on concessional terms to those who do not want it, and it is well to remember that if the farm sector in developed countries seems possessed of political clout all out of proportion to the number of people involved, it is just the opposite in the LDC's. There it is the urban dweller who has the power to make or



Apparent per capita daily energy and protein availabilities in Sri Lanka (1969-70) by income class (34).

Figure 1

break, and though their numbers may be small, the politician is at pains to assure them cheap food. What more painless way to do this than with cut-rate imports from abroad? Thus it was the politically articulate few who objected mightily (and brought down the government in Thailand) when in the early seventies the run-down of surpluses in the West and signs of local agricultural stagnation caused many governments to reverse their pricing policies and offer greater incentives to farmers. And so it may be that foundations for the next food crisis—of the early eighties—may be laid by a clamor, now that things no longer look so bad, that these incentives are no longer necessary.

It does not follow that all food aid need be harmful. Certain forms of targeted assistance can bring help to the nutritionally most vulnerable and at the same time act to bring fertility under control. There is a growing body of evidence that rapid population growth can be contained rather quickly once certain preconditions have been achieved. Among the most important of these preconditions is a reduction in infant mortality, so that parents need no longer plan on two live births in order to feel reasonably assured that one child will reach maturity. To this end there are no more effective means than clinics which provide supplemental food as well as medical services to mother and child. Recent change in P.L. 480, requiring that 75 percent of concessional sales go to countries with per capita GNP's of less than \$300, make support of such programs a greater possibility. But whether the recipient countries can muster the technical expertise and administrative competence to implement them—particularly at a level commensurate to the 10 million tons of food aid annually called for by the World Food Council—is open to question. It is a priority matter which should be pursued with extreme care.

One country in which food aid is being successfully channeled through maternity and child-health clinics is Sri Lanka, where a fortified weaning food called "Thriposha" is distributed at fortnightly clinics to some 40 percent of the infant population.

Sri Lanka is also a country in which the possible pitfalls as well as the attractions of nutrition-oriented equity policies may be observed. As Dr. Timmer noted, the Indian state of Kerala is an interesting anomaly: a region which bids fair to bring fertility under control, despite poverty, through education and public health programs and through a policy of making subsidized food available to all. Similar policies have been pursued in Sri Lanka since the war. Today every man, woman, and child on the island receives a

grain ration (part of it free, part at appreciably less than the market price) equivalent to at least 700 calories daily. Such largess has depended heavily on the availability of food aid—in the current year 400,000 tons, or about a fifth of total grain disappearance—and has accounted for between 15 and 20 percent of Government outlays (8).

The real cost, however, defies quantification. Sri Lanka at the end of the war was far and away the wealthiest country in South Asia. Today the agricultural potential of its Dry Zone remains unrealized, efforts to develop it having been hamstrung by insufficient price incentives. Unemployment is rife and, though the 1971 insurrection of frustrated youth was put down, resentment over the lack of opportunities smolders. The welfare system has become an unmanageable albatross. Democracy persists, but any politician who has attempted to stem the rot by reducing benefits has found himself out of office.

To my mind, Sri Lanka is not the example some hold it to be for the Third World, but should stand as a warning.

I would like to conclude my remarks with a plea that we stop thinking of the plight of the LDC's in terms of hunger. The extent of hunger has been much exaggerated by those with the purest motivation. Nor should we think of the LDC's as being confronted by a race in which food and population push relentlessly toward some hypothetical saturation point.

The Third World is more hungry for jobs than food. Jobs and rising income are the great equilibrators. With them there is every reason to believe that the LDC's can repeat the Western experience and simultaneously eliminate hunger and bring population growth under control.

Seen in this context, food aid can play but a limited role. That food aid is usually counter-productive from the point of view of the recipient country should be recognized, and to the extent it is pursued as a means of surplus disposal, steps should be taken to minimize the effect on producer price incentives. This is easier said than done, but an ideal means for its achievement—and simultaneously for improving nutritional well-being and the prospects for population control—would be to channel this aid through maternity and child health clinics.

The real aid from the West should take the form of technical assistance to agricultural research institutes and credits to underwrite the capital works needed to complement the new varieties—irrigation systems, fertilizer plants, and the like. To a maximum degree these works should be designed to benefit the smaller farmers. But no matter should they not. Probably the best way

the West can improve the lot of the disadvantaged of the LDC's is not—as seems the aim of recent modifications in the U.S. aid legislation—to invest solely in projects oriented toward them. Rather it would be to reduce the incredibly high tariffs on processed and manufactured items which have prevented the LDC's from exploiting their comparative advantage in the international marketplace. In not a few instances, this would be at the expense of jobs in the developed countries. But if a North-South confrontation is to be avoided, and something approaching global equality is to be achieved, the West, too, must be prepared to sacrifice.

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THE RELATIONSHIP BETWEEN TRADE AND WORLD FOOD SECURITY

by
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This morning the conference will focus on issues of agricultural trade. Later this afternoon the topic will be international food security. I am going to attempt to convince those of you here this morning that you shouldn't go home after lunch. I believe there is a relationship between international trade and world food security. The issues are closely related—so much so that progress on either depends upon progress on both.

The concept of world food security is rather vague, so let me begin with a definition. Food security has both a long-term and a short-term meaning. In the long term, food security is the assurance that per capita food consumption can at least be maintained at current levels and preferably increased over time, particularly in poor countries. In the short-term, food security is the capability to prevent sharp declines in supplies and resultant sharp increase in prices to levels which many low-income consumers at home and abroad cannot afford.

Of course, the food security issue does have special importance to developing countries. For these nations, failure to achieve food security can mean acute hunger, malnutrition, or even starvation. But, food security is significant to all nations, and the term should not be used only with reference to the concerns of developing countries. Indeed, constructing a system for world food security is dependent on the ways in which all nations relate to each other.

With these terms defined, I want to discuss four issues: the relationship between trade and long-term food security, the issues involved in short-term world food security, the special concerns of developing countries, and an outline of the proposals which the United States can put forward to contribute to world food security.

We are all aware that long-term food security requires increased food production. Without sustained production increases—particularly in the

poorest nations—there can be no long-term food security for the bulk of mankind.

In order to achieve additional food production, the world must expand the production capability of efficient, low-cost producers and give them access to world markets. Trade, and trade liberalization, have an important role to play. World food production can increase more rapidly because resource investments are concentrated in the areas which yield the highest returns. This will increase the likelihood that per capita food consumption in all countries can be increased over time.

In order to provide short-term food security, each nation must develop the capability to offset weather-induced fluctuations in production. Both reserve stocks and international trade opportunities are very important, and their relationship deserves special attention.

Aggregate world grain production is clearly much more stable than the production of individual countries. Poor harvests in one region are usually offset by above average production elsewhere. Therefore, in theory, if grain were allowed to flow freely among nations, allocated only by a free market price, all nations could achieve a high degree of year-to-year stability of supplies without large reserve stocks. In such a free trade world, each nation could rely primarily on its trade opportunities, and financial reserves to offset fluctuations in its own production.

But, the world is not structured as economic theorists might want. Most nations have policies to stabilize domestic grain prices by insulating themselves when possible from adverse movements in the world market. The mechanisms to do this are familiar to all: variable import levies and export tariffs, state trading organizations which vary the differential between internal and export prices, and other export and import control devices. Few nations operate without some protective policies.

Through these policies, nations maintain stability in their domestic prices and prevent short-term adjustments in consumption or production. Ideally, the burden of curtailing consumption in response to a world production shortfall should be shared by all nations. For example, given a shortfall in the world production of one grain, all nations should permit the commodity's price to rise in order to discourage it being fed to livestock. But, the burden falls most heavily on the poorest food-deficit nations or on countries which seek to maintain an open economy. Domestic price stability for some is achieved through policies which contribute to instability for others.

Several economists have tried to estimate the extent to which such barriers to adjustment contributed to the world food crisis of 1972-74. Tim Josling, of the University of Reading, has estimated that domestic price stability schemes reduced the amount of wheat available to the world market by over 19 million tons in 1971-74. This is the same order of magnitude as the Soviet purchases or the world production shortfall in 1972.

The impact of such barriers to adjustment is shown by a recent FAO study indicating that between 1971 and 1974 consumer wheat prices more than tripled in the United States, while prices rose only 35 percent in the European Community, 52 percent in Japan, and 60 percent in Australia. Food grain and price increases in some poor food deficit countries were even greater than in the United States.

The general implications of these analyses are clear: reducing the barriers to short-term adjustments would contribute significantly to short-term food security. If these are reduced, the amount of reserve stocks needed to achieve a measure of international price stability would be smaller. In most cases, the adjustment barriers are in fact trade barriers. Therefore, reduction of these barriers requires certain trade liberalization measures.

Now we come to the chicken and the egg problem. Some advocates of trade liberalization argue that an agreement to use reserve stocks to moderate price swings would constitute acceptance of existing barriers to trade and adjustment. They assert that a reserve program would reduce the pressure for a reduction of barriers. And, they argue, this would be bad for two reasons: first, it would institute a stabilization policy based on stocks which would be less reliable and more expensive than stabilization based on liberalizing trade. Second, it would forego the long-term economic gains of more open trade.

I question these arguments. In the first place, nations will be willing to reduce their trade barriers only when they believe the international market is sufficiently reliable to provide adequate

supplies at reasonable prices. In this sense, a food security system is a prerequisite for trade liberalization. Without reasonable security, most countries will feel a need to maintain protective barriers. Thus, achieving greater security with reserve stocks will improve prospects for eventual reduction of trade barriers. I believe that the issue of commitments to adjustment policies should be included in discussions of international food security. Negotiating an international reserve agreement does not mean that efforts to liberalize world grain trade will be abandoned.

In summary, then, my position is this: trade liberalization and reserve stocks both contribute to world food security. For the short-term, food security must rely significantly on reserve stocks. Assuring long-term food security will require increased production and a reduction in barriers to international trade.

But, how do we deal with the special problems of developing countries? Achieving short-term food security for each developing country involves some very difficult policy choices. The objective is clear: a developing country must be able to obtain adequate supplies of food grains even if its own harvest is very bad or if international prices rise because of harvest failures in other countries. Developing countries have two means to achieve this goal: (1) improve capacity to import food grains, and (2) establish domestic grain reserve stocks. To improve the capacity to import food grains would require careful management of foreign exchange resources. And it may require additional investment in transportation infrastructure such as port facilities. Building grain reserves involves postponing the consumption of scarce food. It requires investment in both grain and storage facilities. It diverts resources which might otherwise be invested in irrigation and other programs which increase production and reduce the risk of harvest fluctuations. In the short term, a nation's foreign exchange reserves, its transportation system, and its crop information system may not be adequate to ensure its capacity to import grain whenever necessary. Therefore, some national reserve stocks of grain are probably a necessary part of each developing country's food security system and would contribute to the international food security system. However, in the long term, investing in the capacity to expand production and to finance and transport imports when necessary has significant advantages over investing in large national grain stocks. Financial reserves are not only cheaper to store than grain but are also more flexible in their end use. Improved transportation systems contribute significantly to the general economic development of the nation. So the lesson is clear: for a developing country,

improved opportunities for and capacity to trade can make an important contribution to food security.

There is a potential inconsistency in my argument which needs clarification. I have argued for each nation sharing the burden of reserve stocks and market adjustments. Nations should not pursue policies which attempt to shift the burden of maintaining food security onto others. I have also suggested that each developing country should be willing to rely at least partly on the international market for food security.

This is not inconsistent. For the most part, the developed countries have pursued policies which shift the burden of adjusting to world supply conditions onto others. These policies must be corrected. No nation—particularly a developing country—should be encouraged to pursue an autarkic approach to food security by building reserve stocks large enough to cover all foreseeable domestic shortfalls—without resorting to any imports.

There are several things which wealthy nations can do to help developing countries achieve food security. First, we must ensure that food grains are always available to developing countries in commercial markets, and an international reserves agreement coupled with grain trade liberalization would help. And, as further assurance, major exporters should agree that they will not deny commercial exports to a developing country. Guarantees against export embargoes to developing countries would lessen the fears and tensions created by talk of using food as a weapon. Such fears contribute to the determination of developing countries to undertake costly and inefficient approaches to food security.

Second, donor nations should seek to ensure that food aid will be made available to help offset major harvest shortfalls and other emergencies in developing countries. In this way, food aid can be an instrument to help each developing country stabilize its food grain consumption. Perhaps this use of food aid should be backed up by a special reserve stock. This question deserves further study.

Third, developed countries should continue efforts to improve the foreign exchange earnings

of developing countries and to construct an international monetary system in which developing countries' financial assets can be efficiently managed. For agricultural trade, this would involve reducing market barriers for developing countries' products. However, I should note that a recent study suggests that the potential value of such liberalized access for agricultural products would be of limited value to the poorest developing countries.

Finally, through established multilateral and bilateral aid channels, through institutions such as the International Fund for Agricultural Development, and through the worldwide network of agricultural research institutes, all wealthy nations should contribute efforts to expand food production in the developing world.

To conclude my remarks today, I want to outline the ways in which the U.S. Government is now trying to contribute to world food security. First, the United States must maintain its own productive capacity. As one of the low-cost producers of grain, the United States has a special obligation in this regard. Second, we are cooperating fully in international efforts to increase food production in developing countries. Third, the Administration has taken the initiative to create a reserve from the existing large wheat supplies. Through the recently announced extended resale program, the United States will be providing incentives for farmers to hold stocks off the market during periods of low prices for release during periods of relative shortage. But, the United States does not intend to unilaterally assume the burden of maintaining world reserve stocks. Fourth, we hope to participate in an international agreement in which other nations would share obligations both for reserve stocks and for adjustment measures. Fifth, we are continuing our efforts to seek trade liberalization for agricultural products. And, sixth, we are examining alternatives to ensure that priority food aid contributions are uninterrupted during periods of high prices.

I have limited myself to rather general statements. I hope that the discussion today can examine the details of these issues and contribute toward the objective of developing effective policies for world food security.

AGRICULTURAL TRADE POLICIES: ISSUES AND ALTERNATIVES

by
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ABSTRACT

Trade policies of individual countries are the outward manifestation of domestic policy choices, in foodstuffs as in any other area of commercial activity. The interaction of such trade policies determines the structure and the performance of the trading system. The performance of this system must be examined to see the extent to which it is consistent with providing for a growing demand for food at reasonable cost and distributing that food in an equitable manner. The performance of the system at present falls short of these objectives in that production patterns are distorted by the incidence of trade policies used to support domestic farm and food programs, and in times of shortage the burden is placed on those countries least able to adapt.

The main forum for the discussion of such issues is the GATT, and the present round of negotiations offers the chance of an improvement in the conditions of trade in the major temperate food zones. To realize such an opportunity requires the willingness of major trading countries to coordinate their policy response to abnormal market situations and to adapt their own domestic policies, in particular with regard to price setting, to maintain a closer relationship between domestic and international conditions. The main beneficiaries will include developing countries, who will force a viable alternative to uneconomic high-cost domestic food production which might otherwise be forced upon them by the unreliability of open food policies.

Agricultural trade policy as a theme runs throughout this symposium. The question of the desirable degree of self sufficiency for developing

countries, the probable size of their "food gap," the question of trade under concessional terms, and the issue of food security, all have to do with the trade policies of individual countries, and with the interaction on a global level of such national policies.

The specific set of issues which might usefully be addressed in this paper have to do with the performance of the trading system, in particular with respect to the basic foodstuffs. The performance of any system has to be assessed in terms of its objectives and viewed in the light of realistic constraints. The objective I take to be the humanitarian, utilitarian, and consumer-oriented aim of feeding the world at the lowest feasible cost and of satisfying not only basic nutritional requirements but also the variety and quality demands of those who can afford the luxury of choice. The main constraints are the limits of world production, the uncertainty of that output from year to year, and the fundamental inequality of purchasing power existing in the world today.

These are not, of course, the only possible premises. Low food prices, some would argue, depress rural incomes to the benefit of those in cities and towns. Closing the food gap in this way might run counter to other social and developmental objectives. Others might take a more rigid "nutritionist" viewpoint, and deny that one needs to cater to the whims and fancies of the affluent consumer. More substantially, it could be argued that ideological and political objectives are lurking beneath the surface of the world food issue, or at least that there are major constraints on the system which arise from such political considerations. It may, moreover, seem insensitive to take existing income distribution as a constraint. Some would wish to see the food system itself redistribute such income, though I remain to be convinced of its scope for so doing. But

even if the aim of low-cost food production subject to natural and technological limitations appears somewhat bland, it provides a basis for evaluation.

There would seem to be three basic questions regarding the performance of the world trading system for agricultural products; the answers to which determine the link between trade issues and those of developing country food policy, food aid, and food security.

The three questions are: (1) Can the trading system handle the anticipated expansion of food demand from developing and middle income countries over the next decade? (2) Can the trading system mobilize this food at a low cost and one that is acceptable in political as well as economic terms? (3) Can the trading system distribute this food equitably, both in times of shortage and when supplies are adequate?

The first is partly a question of physical infrastructure, about which I am not qualified to comment. But I am not persuaded by the argument that a movement of 100 million tons of grain to the low-income countries in 1985 would be impossible just because it cannot be done in 1977. The more significant constraint is a monetary one: Will those countries be able to afford to import the grain needed to feed their populations? Again, I will leave this question for others to answer in more detail. But clearly international action must be focused in this area if the trading system is to work adequately in the cause of global nutrition. Such action should include better access to developed country markets for nonfood exports of low income countries; more comprehensive balance of payments facilities for developing country importers of food—with, perhaps, special arrangements to compensate for fluctuating food import bills analogous to the schemes for stabilizing export earnings, perhaps a bias in the creation of international liquidity in favor of such importers; and the control of balance of payments surpluses to ensure that the fruits of increased agricultural sales are turned into purchasing power to stimulate non-agricultural trade.

The second of the three basic performance questions relates to the ability of trade to lower the cost of food. In one sense the question is trivial: Trade takes place *because* foreign supplies are cheaper for the importer, and overseas markets more remunerative for the exporter. In the first case, trade lowers the price of food; in the second, it lowers the price of nonfood commodities relative to food; and in both cases there are potential income gains to the trading nations. But the less tractable question is whether the

existence of a properly functioning international market allows better investment decisions relating to domestic agriculture. And, the proper functioning of the system includes reliability and political neutrality as well as direct resource cost. The rules governing such a trading system have to give sufficient confidence to the importer to allow the development of a trade based-food policy, and enough assurance to the exporter to enable expansion of profitable production.

The third performance criterion follows from the question of cost. In an uncertain world, the supply of foodstuffs cannot be totally assured. But the ability of the food system to distribute supplies in times of shortage, as well as to absorb unanticipated bounty, is perhaps the main test of its performance. The problem is one that faces all countries however rich or poor. But if the trading system militates against the poor it will be rejected, at the least it should be neutral, and preferably its effect should be progressive.

How does the present system stand up to these criteria? The post-war period as a whole has generally vindicated those who have worked for a more liberal trading regime, but it has also shown up the weaknesses of economic interdependence in a world of nation-states seeming to care little for each others' well-being. Political interdependence has lagged seriously behind the intermingling of economies, even in such experiments as the European Community (EC). In terms of meeting food needs, the rapid and impressive adoption of modern production techniques in the major temperate-zone agricultural areas has helped to keep pace with rising populations in less affluent areas of the world. Trade patterns have changed dramatically in consequence. The world's monetary system stumbles on, sometimes facilitating trade, sometimes hindering it. Plans for "reform" follow each other in procession, and the system itself slowly adapts to each new crisis. The transportation network has coped with international movement of produce, even if internal distribution problems are still a serious impediment to the eradication of hunger in many parts of the world.

Two main weaknesses are apparent in the present trading system as it operates for basic foodstuffs. First, agricultural policies in both developed and developing countries have manipulated the terms and conditions of trade in temperate-zone foodstuffs to the point where price levels on international markets have lost credibility. During the sixties the international price of many products was artificially depressed, by means of importer protection and exporter surplus disposal, below those levels which were consistent

with increasing agricultural investment. In developed countries, governments have had an ambivalence toward farm expansion. At the levels at which *domestic* prices were set, modern agriculture was encouraged to expand. But this in turn increased program costs and directed public and private resources away from other sectors whose output had a higher international value. Successive administrations in the western world have been caught in a dilemma. Once a public body takes responsibility for a price level, a different set of forces come into play from those of the market. In particular, domestic cost of production, as perceived by the farmers and measured by statisticians, comes to dominate alternative supply price as a measure of value. But domestic production costs have an uncanny habit of rising to meet the political willingness of government to give recompense. Thus these governments have been forced to rely on tighter control over domestic production and consequently yet more disruptive trade policies.

Developing countries over this period found themselves in a difficult position. With foodstuffs readily available on the world market, domestic agricultural investment seemed unattractive. And yet their growing dependence on imported food was linked not so much to an increased competitiveness in nonagricultural production but to the low agricultural prices resulting from developed country farm policies. The trading system was creating a transfer—developed country farmers and developing country consumers generally benefited at the expense of developed country consumers and taxpayers and developing country farmers. Whether this system led to higher average food costs for the world as a whole is difficult to say. In terms of the social cost of production, it is probable that a shift of incentives away from farmers in industrial countries towards those in low-income countries would have been preferable.

The unusual events of 1972 showed up the second major weakness of the trading system. With domestic prices remote from international values, the ability of governments to cushion their economies from the harvest shortfalls was in direct proportion to their existing level of protection and their ability to transform producer-protective policies into measures to aid consumers. By the logic of the pre-existing order, it was the developed countries that were best able to perform this feat. Additional pressure on the market forced prices far above those that would have resulted from supply shortfalls alone. Developing countries bore the brunt of the price rises and suffered most from the increased import costs. The distributive element of the trading system

had failed to respond equitably to the challenge of managing a temporary shortage of basic foodstuffs.

The major task before governments in the coming years is how to establish, or reestablish, a trading system which provides correct incentives to producers throughout the world, and which gives sovereign governments the assurance that in times of market disturbance the burdens will be equitably shared. Any country that does not have confidence in such a system will tend to "go it alone". This does not in itself vitiate the systems, but it places an additional cost on the autarchic country and reduces the advantage that other nations can obtain from trade, both in food and nonfood products. It follows from the preceding discussion of the performance of the system that a major part of the task falls to governments of the developed countries, including centrally planned economies, to reestablish appropriate trading conditions. The major casualties, if action is not taken, will be the developing countries. Those that choose an open food policy will remain vulnerable to market fluctuations caused by both natural events and political decisions in other countries. Those that reject trade as an element in food supply policy will be in danger of hindering their own development by engaging in high-cost domestic food production. Those who in turn have an exportable surplus of basic foodstuffs will continue to find overseas markets unpredictable and unprofitable.

The two elements with the highest payoff in terms of improving world market performance would seem to be: (1) the restoration of a link between domestic farm policy price levels and world market conditions and, (2) the decision as to how to counter inevitable instability in markets.

The two are clearly related. If market instability is reflected in wild movements of world price levels, then autarchic price decisions under domestic programs will appear to be vindicated. Conversely, if domestic policies respond more to international conditions, then the task of stabilizing markets is made easier. The institutional framework under which such policy decisions are made may not be of great importance. At present, various elements of trade reform in agricultural products are being discussed in the GATT, the UNCTAD, the World Food Council, the various commodity councils, the FAO, and the North-South dialogue. While all these have their place, determined largely by their constitutions and constituencies, the major responsibility for a constructive initiative would seem to rest with the GATT negotiations, the Multilateral Trade Negotiations (MTN), linked where necessary to more detailed discussions in

the commodity councils. The UNCTAD and the North-South talks can provide the appropriate climate for a constructive settlement of matters relating to export earnings of developing countries and associated financial questions. The World Food Council can add political stimulus to the resolution of food problems and can coordinate developments in the areas of food security, food aid, and technical assistance. The FAO has an important role through its information network and its early warning system. But the focus of discussions on the key elements of intra-developed country agricultural trade policies over the next few months will be the MTN. It is to these issues that I wish to turn in more detail.

We can perhaps usefully think of the issues themselves as being of two types: (1) "nodal" issues within the package where a high level of agreement is necessary because of the sensitive nature of the issues themselves, and (2) "balancing" issues which are important but less politically charged. The "nodal" issues, thus defined, would include the question of grain market stability and access, the arrangements to be made in the dairy and the beef markets, the matter of soybean trade, and the relationship between defensive trade policies in agriculture and their counterparts in other sectors. The balancing items relate to negotiations in other agricultural trade products, the accommodation of the less developed countries (LDC) interest, and the sharing of the burden of food aid. I shall confine my remarks to the "nodal" issues.

1. Grain

It is essential that within the MTN some acceptable accommodation is reached on the question of grain markets. I believe such a compromise to be possible. The compromise would depend on the extent to which governments felt able to yield some domestic autonomy for the sake of an improvement in the performance of the world grain market. Only when such changes are made in national policies is it reasonable to hope for longer term adjustment of production patterns. Market stability can be conceptually separated from market access - in other words a market can be "stable" even in the presence of trade barriers which distort production patterns. But these two aspects are clearly not politically separable. The solution therefore is to devise a program of cooperation among major grain trading countries which holds out the promise of "stable and expanding world trade" over a period of years without imposing unacceptable political costs in the short run. Such a program is quite easily defined, though the implementation will require considerable diplomatic skill.

The first hurdle is to agree on those elements of the present situation in the grain market which require modification. These were referred to above as an undesirable degree of autonomy in price fixing and stockholding. This suggests a criterion for measuring an "improvement" in the grain market. To the extent that countries take into account world market developments in their domestic policy formulation, the performance of the market itself is enhanced. The question of the mechanism for such an advance revolves crucially around the relative importance that countries put upon price stability as such, as opposed to maintaining prices within a broad band and taking policy actions only when extreme conditions prevail in the market. These two alternatives can be put in the following way.

First Alternative. Countries might agree on an upper and a lower level of prices which would be deemed to define "normal" market conditions. Within that "band," no coordinated policy would be required. Such a band effectively puts a limit on price-collusive and price-competitive behaviour. It would prevent both exploitation of market shortages by either an exporter cartel or by the residual stockholder, and exploitation by the importers of the intensity of competition when surpluses depress world prices. In a market unregulated by government actions, such a price band may be superfluous or even harmful in terms of the economic criteria set out above. In a world where price instability is itself generated by government action inconsistent with these criteria, such limitations on the free working of the market may be justified.

The concept of a price band, however, leaves out two important elements. First, the level at which the prices are fixed initially, and the sensitivity with which they are altered as circumstances change is itself crucial to the evaluation of such a proposal. Even the currency in which the band is expressed is of no small concern. These are in themselves the stuff of detailed negotiation, as the UNCTAD in a different context will find when detailed talks begin on other commodity agreements. But equally important is another element, that of the mechanism by which such a band is maintained. The choices are basically between stocks policies and domestic demand and output variations. In other words, international agreement on price bands presupposes a willingness of individual governments to validate such decisions by their own actions. The logic of the market would suggest that the appropriate action depends on the expectations of governments as to the persistence of the disturbance which would otherwise take the price outside the band.

A temporary surplus—a coincidence of high yields in major producing regions, or a fall in (say) demand for grain for livestock feed related to a cyclical downswing in cattle numbers—would easily and quite justifiably be taken up in stock accumulation. A joint agreement on such purchases would ensure that independent action did not undermine the price floor. A shortage could equally be “managed” by progressive stock release in coordinated fashion, subject to any arrangements which might be considered for giving priority to developing food deficit countries with severe foreign exchange constraints. Should stocks themselves accumulate, to where the cost of holding such reserves is patently above the expected gain from their release, *only* action by governments to increase import demand or reduce export supply will restore balance. The political decision is to achieve a balance between importer and exporter responsibility for such medium-term adjustments. A similar adjustment problem is posed when supplies are short: Either importers must cut back their demands on the market or exporters must release more supply. The mechanisms by which governments make these adjustments will clearly differ from country to country, and need not be specified in advance.

Second Alternative. Countries might instead choose to pursue a much more active policy of intervention in world markets to stabilize prices. Rather than a “wide band” as suggested above, instability in output and demand might be deliberately absorbed in stock changes to preserve a stable price. But again, logic demands that if such instability in stocks is not in itself to result in either a steady rundown or a steady accumulation of reserves, governments must make adjustments on the basis of the level of stocks through changes in domestic policy and hence in import requirements and export availability. Again, the price level at which stocks were purchased and released would be important, but unless this level itself was reflected in domestic policy reaction, it would have little meaning except as a way of distributing the burden of stockholding.

It is useful to compare the two alternatives with proposals already mooted by the major grain trading nations. At first sight, the first alternative would appear to be consistent with the EC suggestion on price triggers for stocks. But such a consistency is illusory. The idea of commercial trade operating within a particular price range, where that range is respected not as an end in itself but as a means of preventing price collapse or explosion, and where the action taken to maintain such stability is a mutually agreed set of policy changes, is much akin to

U.S. thinking. Market conditions trigger action by both importers and exporters, with the action itself being appropriate to the expectations of governments as to the persistence of the problem. In obvious surplus periods, both access to import markets and control of competitive subsidies would be affected. And the ability of the market to ration supplies in shortfall periods would be enhanced as a result of such actions.

By contrast, the other alternative, although at first sight appearing to rely on quantitative stock management to stabilize the market which is consistent with the U.S. suggestion of quantity-trigger stock rules, is in fact much more “European” in concept. The function of the market of allocating supplies among importers and eliciting supplies from exporters is removed. Instead, the “price” merely becomes an arbitrarily determined value which if placed too high puts consumable food into storage bins and if too low rapidly exhausts the necessary reserves on which supply credibility depends. It is in fact because of an “elastic” stock system of this type operated *de facto* by the United States over the sixties, that the market could swing from surplus to shortage so quickly in 1972.

In practice, a balance between these two systems must be maintained. Prices should be allowed to vary to reflect the values that consumers place upon grain supplies and the costs that producers incur in meeting that demand. But “active” intervention in anticipation of market surpluses and shortfalls will in itself enhance the value to consumers and the stability of prices facing producers. Thus a coordinated decision to carry over stocks should neither be divorced from price levels over a normal range, only to be called on in exceptional periods, nor should it bear the full brunt of normal market developments such as fluctuating supply levels without the aid of price levels as market signals. A well functioning stock scheme uses all such information as existing quantity of stocks, expected production, and anticipated demand, and makes a decision as to the amount to be carried over to the next time period which in turn will influence price levels. What is needed, then, is agreement: (1) to cooperate in the management of stocks to maintain market stability, (2) to agree on action to be taken *in extremis*, (3) to avoid an overly rigid price system which puts all the burden on stocks and supply control, and (4) to avoid inflexible stocks “targets” which tend themselves to destabilize prices.

2. Dairy Products

In the case of dairy products, somewhat different economic problems exist in the world market,

and these in turn lead to different possible negotiating outcomes. The market for milk and milk products is complex, but certain features can be isolated. Fluid milk is at present costly and difficult to transport. It moves occasionally into international trade between contiguous countries, but in general the "natural" protection afforded by its characteristics mean that few border measures are specifically needed to protect local markets. Milk products, on the other hand, primarily butter, cheese, and skimmed milk powder, have a long history of international movement between countries. New milk-based products are being developed which also have export potential. But the structure and pattern of such trade is inextricably tied in with the measures that national governments take to maintain the prices and markets for the milk sold by dairy farms. In some countries, the marketing of liquid milk is controlled by a variety of statutory and producer-cooperative agencies. Liberal trade in dairy products threatens the power of such agencies to use the milk-product market as part of their control over milk distribution. In some cases, employment and investment in the processing industries themselves are protected as an objective, but in the main, control over such trade is designed to prevent the latent excess capacity of the dairy sector from weakening farm-gate milk prices. By the same token, countries occasionally seek to use the international milk product market as a way of disposing of such surplus capacity. In other countries, the fluid market is much less organized, and governments concentrate their attention on support of the milk product market itself, as an indirect way of maintaining milk prices to farmers. Again, excess capacity, aggravated by constraints on consumption caused by high prices, forces governments into the dilemma of subsidized exports or expensive storage programs. A few countries have consciously developed export potential in these milk products, often supported implicitly by high internal prices, only to find that their markets are more than usually vulnerable to the impact of policies supporting the dairy sector of the importing regions. It is, perhaps, the least satisfactory of all agricultural markets, and raises domestic political emotions more intense even than those surrounding the grain trade.

It seems inherently implausible that any lasting improvement in the performance of the trading system can be expected until domestic dairy policies are considerably modified. At least, the dairy issue raises few problems with respect to developing countries and their food supply difficulties. Some dried skimmed milk moves as food aid, but in general, imported dairy products are

not particularly crucial to the nutritional needs of such countries. The conflict is among temperate-zone countries. The political importance of dairy products within the MTN rests with the fact that, in the cases of both dairy products and meat, the United States finds itself defending its own policies rather than attacking those of other countries. If an agreement on access into the U.S. market for dairy products is a part of a package which includes concessions by other countries on other commodities, then such an agreement could be worthwhile even if the true economic impact on the dairy trade itself were minimal.

The main requirement for obtaining even a limited improvement in the state of the dairy product market is to distinguish between exports which arise legitimately from the specialist producers of such goods and those which are an unwelcome overflow from excessive domestic price support. A reduction of protection in, say, the United States, Canada, and Japan would certainly increase trade. If supplies were to come from New Zealand and Australia, then the objective of trade rationalization would have been achieved. Adjusting domestic policies in the importing countries would represent a significant breakthrough in the improvement of world trade. But if the extra supplies were merely to perpetuate excess production in the EC, and to put off the day when changes to the dairy regime within the Common Agricultural Policy were made, then little would have been gained. The economic and political criteria for "success" in negotiations appear to conflict in this sector. The EC would support a set of agreements which restricted the cost of its own surplus disposal programs and would be more inclined to relax protection in other products. But the test of whether such agreements were beneficial in the context of an overall improvement in trade policies is the extent to which commercial exports would replace subsidized surplus disposal. Agreements of that kind would again put pressure on the EC. The MTN has the unenviable task of designing a package which has elements of both political attraction and economic sense.

3. Meats

The economic problems of the meat trade can be divided into three separate issues. Some meats, notably mutton and lamb, are reliable in supply and, like milk, are produced at relatively low resource cost in a few temperate-zone areas where grazing is available for much of the year. The Southern Hemisphere output complements that of the northern temperate areas, and has led to a recognized and steady trade. Problems arise with

sheepmeat in two respects: Many hill farmers, whose livelihood is the concern of governments worried about the depopulation of remote rural areas, rely on a protected market for their sheep and lambs; and the price to the consumer of sheepmeat is an important factor in the demand for other meats such as beef and pigmeat. Trade liberalization in sheepmeat is therefore not without its complications, but it is probably true to say that the world market for these products is less bedeviled with acrimony and engrained defensive attitudes than in other products. Problems for exporters arise as often as not from the instability in the wool market rather than arbitrary controls on meat trading. A reduction in the EC's common external tariff on sheepmeat, and a liberalization of the "voluntary" U.S. import quotas would represent positive steps towards improving trade prospects for exporters, but in harsh political terms it is not easy to see whether those countries which would stand to gain have the negotiating weight to impose such changes if they were to be resisted by the importing nations.

Other meats, such as pigmeat and poultry, also enter into trade among temperate zone countries to a limited but not insignificant extent. The main features of the production of these meats, their reliance on grain as the major feedstuff, give them an ambivalence in terms of trade policy. Protection against imports, as in the case of the EC, in turn implies a higher demand for imported feed. The protection itself is often linked to grain costs. Economies with high grain prices consequently have to resort to export subsidies to remove surpluses from their markets. But the level of protection on the grain-using livestock sectors themselves is often small; it could in fact be increased by reductions in the protection of domestic grain markets. Domestic policies are often more concerned with apparent cyclical instability in pigmeat markets, while poultry producers have increasingly escaped the attentions of government support policies. The trade issues in these products are not so much the major conflicts among divergent farm policies as the occasional skirmish relating to export subsidies and injury to domestic processing concerns. The resolution of these issues, if attempted, will tend to spring from consideration of the general question of subsidies and countervailing duties, rather than any initiative on trade liberalization on these products themselves.

The most significant marketing problem relating to meat arises in the beef sector. As with sheepmeat, a profitable and mutually satisfactory trade should have been developed between the northern and southern temperate zones, based on

extensive grazing, with high-cost grain-fed beef animals satisfying urban demand for choice cuts of meat. The problems have been of two types; the fact that much of the production of beef has come from dairy herds has led to the attempt by many governments to use beef support as an additional method for supporting incomes from milk; and the long maturity period for the beef animal has induced cyclical production swings which have led to crisis measures when prices are weak, which are in turn difficult to remove during periods of firmer prices. Support for hill farmers, for whom beef cattle and sheep are often the only feasible enterprises, has added to protectionist policies. The result has been in recent years a swing between shortage and abundance; with import restrictions being imposed when export supplies were readily available and only relaxed when beef availability was seriously curtailed. Predatory buying by centrally planned economies, less sensitive to the impact on domestic markets, and more able to take advantage of bargains, has at times been the only market outlet.

It is difficult, as with dairy products, to see any improvement in world market conditions so long as domestic farm policy objectives predominate over the provision of an adequate, low-cost food supply. If cattle cycles were out of phase, then trade would act to stabilize prices. Specialist beef producers would indeed have an incentive to counteract the cyclical nature of importer production if market access were more assured. But when governments run their domestic beef market regimes to benefit the farmer by not allowing consumer-access to overseas supplies, it is not surprising that periodic collapse of prices occurs. It is not easy to see how quota agreements, occasionally suggested in European circles, and market share agreements as operated by the United States, can help in such a situation. If domestic production varies with the cattle cycle, then imports must also vary inversely to maintain stable consumption. Since beef is expensive to store, the alternative to quotas as such is to enter into agreements with suppliers whereby the timing of supplies is conditioned by anticipated needs. The emphasis in the EC position on beef on a regular exchange of information may be a prerequisite for such orderly marketing, but a cynic might say that such information is as likely to be used to thwart the penetration of commercial beef exporters as to facilitate access. And "concerted discipline" itself must carry with it not only the implication of exporter restraint to avoid disruption of importer markets, but also the necessary element of liberal market access in periods of firm prices that is needed to allow exporters to

phase their production. It is hard to see how any development other than trade liberalization can provide a satisfactory basis for the world beef market; it is the unpredictable and erratic use of import restrictions that to a large extent generates the price swings in international trade which in turn appear to provide their rationale. Perhaps a 5-year moratorium on the use of import controls might break the vicious circle of self-justifying disruptive policies.

4. Soybeans

There has been as yet no suggestion that the issue of trade policies in this product should form the subject of negotiation within the MTN. Yet it is the ghost at the banquet. The growth in trade in this product, partly at the expense of other sources of animal feed, has been extraordinary. Importers have allowed relatively free access to soybeans and soy meals, and supplies, with one partial exception, have been reliable. But it is the result of the heavy dependence on soy imports and the fears for supply security that give this trade its importance. Dependence runs both ways, exporters depend on markets just as importers rely on supplies. In the case of soybean trade, the United States as the major supplier is vulnerable to any move to impose trade controls. Although such controls would generally be against undertakings in the GATT, the threat undoubtedly exists. It might be thought of as an "ultimate deterrent"—never to be used, but kept in the background just in case. But, the exporter could perhaps defuse the weapon: An agreement on regular supplies of soybeans to importers could be sufficient to make acceptable a package on, say, cereals which would otherwise prove unpalatable. Since such an agreement would seem to be consistent with the exporter aims of regular and expanding markets, it would perhaps be taken as an indication of the way in which liberal trade policies need not in themselves be hazardous to importers. If importers are to be convinced of the wisdom of liberal trade, then some offer by the exporters to safeguard soybean supplies could provide the key.

5. Agriculture and Defensive Trade Controls

Conflicts on agricultural trade in temperate-zone products tend to fall into the following two categories: (1) the major long term conflicts over those domestic policy objectives and mechanisms which shape the structure of world markets and the development of trading patterns, and (2) the brush-fires of dissatisfaction arising from short term market disruption caused by domestic policy

actions, often hastily conceived and insensitively administered. The two sets of problems are related, in political terms, and often occur within the same commodity market. But the solutions may require a different approach. The possibility of integrating the short term market disruption problem in agricultural trade with that in other goods represents a positive step in the improvement of the trading system. The apparently capricious export subsidy used as a way of unloading a domestic problem onto the world market should be discouraged, and the conditions under which countries can apply countervailing duties need to be clarified. The problems arise not from the desirability of such measures applying equally to agricultural and manufactured trade, but in the danger of the more serious longer term issues of policy inconsistencies being too great for the mechanisms established under such procedures. To take an example, the EC regularly uses export subsidies as a device for maintaining price levels on domestic markets in such products as soft wheat, sugar, butter, and cheese, but the automatic imposition of countervailing duties not only represents in itself an element of farm policy in the importing country which may not domestically be desired, but could magnify the market disturbance to other countries through greater instability in world markets. The threat of a countervailing duty may have a salutary effect on domestic farm policy formation; the actual application over a long period of such duties may merely serve to exacerbate trade problems and worsen the conflicts discussed above in respect to grains, dairy, and meat. The solution, if this analysis is correct, lies in advance on both fronts. Reduction of major policy conflicts will enhance the possibility of the adoption of an improved framework for settling minor or sporadic disputes.

Domestic Adjustments to Trade Policy Changes

It has been implicit in the discussion above that domestic interests have to be prepared to adjust to changes in trade policy. This raises two related problems: How domestic policy itself will react to trade policy agreements, given that the two, in agriculture as in other areas, are different sides of the same coin; and how domestic legislatures and pressure groups can be reconciled to a trade package which will clearly contain objectionable as well as desirable implications. Though negotiators may see the package as a whole, individual interests cannot be expected to take such a broad view. And even the sub-parts of the package, such as an agreement on agriculture, will contain both popular and unpopular aspects, as

might elements within such sub-parts dealing with individual commodities. With respect to domestic agricultural policy changes, the attitude of major countries appears quite realistic. Trade negotiations circumscribe to an extent the options open to countries in the continual process of development of farm policies, just as the domestic objectives inherent in such policies determine the flexibility of trade negotiating positions. The question at issue is how a government chooses to view its best interests. The trading system for agricultural products has deteriorated because domestic policies were imagined to be particularly resistant to change. The conflicts among such policies showed up in worsening trade relations. But recent events, in particular since 1972, have cast doubt on the obstinacy of such policies. Significant changes in attitudes to farm programs, and in the operation of these policies themselves, have brought about an awareness of the need for a stable trading system to provide the context in which to develop such policies. Such recognition was probably inevitable: It has its counterpart in the importance of a stable trading environment in other products and in a workable international monetary system for the operation of domestic economic policies aimed at stability and full employment. More than ever, the present round of negotiations on agriculture are basically about the types of changes in domestic policies which will shape a trading system which will in turn provide a stable basis for the policies themselves.

The main problem regards timing. This shows up in three ways. First, domestic policy developments themselves desirable and desired, may be held up in order not to expend negotiating capital in the MTN. The second problem of timing is that policy changes, where such policies are defensive against world market uncertainties, cannot themselves precede the introduction of market stabilization measures. At best they can be coincident. The EC, for instance, might adapt its beef or cereals policies in response to satisfactory world market assurances against disruption of supplies or injury from imports. But it is unlikely to specify in advance such policy modifications and appear to leave domestic producers without the support guarantees to which they have become accustomed. Some domestic policy elements, such as the level of support prices themselves, almost by definition will adjust only slowly over time to new realities. It is the security of the world market which will allow such adjustments, and the time scale of the MTN will not allow for these to become apparent until long after the trade measures have been agreed. This in turn illustrates the third timing problem: A degree of trust is implicit in the assumption that

domestic policies will adjust to reflect improved trading rules. Where such trust is absent, the trade discussions themselves are severely constrained.

The other link between domestic policy changes and trade negotiations is the problem of convincing special interest groups, either within legislatures or administrations or outside, of the desirability of the trade package. Clearly there are some who would regard any apparent concessions as a defeat, and for whom the failure of the MTN, either in agriculture or in other aspects, would be welcome. In some ways, the exercise of trade negotiations in itself is a way of controlling such attitudes. Just as countries might postpone desirable changes in domestic policies to avoid losing negotiating capital, so protectionist measures can be resisted during such negotiations for the same reason. If the problems of agricultural trade policy do finally prove intractable to international discussion, at least the attempt to reach agreement might have had some temporary inhibiting effect on autarchic tendencies in certain countries. But the implication of the decision to engage in negotiations implies that the governments concerned feel that an acceptable package might emerge.

In the case of the major agricultural issues, the acceptability of such a package would seem to depend on two criteria. For exporters, the outcome must offer either an opportunity to expand sales abroad or, at the very least, an assurance that policies which restrict market outlets are brought under control. The logic may sound mercantilistic, but the right deed is often done for the wrong reason. Importing countries go into negotiations in a defensive posture: An acceptable package is one where they have appeared to have preserved their own essential control over domestic marketing and resisted the onslaught of the exporters. The benefits are more diffuse and less visible: They cannot parade their own trade concessions before their constituents, but they can point to "more orderly conditions" in world markets arising from agreement and can play up the aspect of supply security. Since few countries do not have both import and export interests in agricultural trade as a whole, the task of domestic presentation of a package is made easier by concentrating on potential export gains. To be more specific in the case of the major participants, Canada and the United States will have to be able to claim some progress in improving prospects for grain sales, even if the major benefit would be the limitation to financial commitments under domestic support programs through a managed stock policy, and the main impact on world markets would be better access to U.S. markets

for dairy products and meat. The EC would have to claim that its own surpluses, such as soft wheat and dairy products, could be disposed of more easily in an "orderly" market, even though the major contribution might lie in reducing the surpluses themselves by domestic policy changes and in abstaining from the imposition of disruptive bans on beef imports. Though marketability of an agricultural deal is important, the acceptability of the outcome of the entire MTN allows countries to give different emphases to

various parts of the negotiated package. An agricultural deal rests as much on progress in tariff and nontariff discussions on manufactured trade as do these other issues on the success of the agricultural deliberations. Some bold and imaginative bargaining is needed to reach a conclusion by the end of 1977. The prize is a world trading system more responsive to the needs of developing countries, and less disruptive of commercial relations among the major industrial powers.

THE ROLE OF INTERNATIONAL TRADE IN SOLVING THE FOOD PROBLEM OF THE DEVELOPING COUNTRIES

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ABSTRACT

The purpose of this paper is to assess the rising grain imports of the developing countries in the perspective of their overall trade position. Its principal conclusions are:

(1) Projections indicating a further increase of the developing country grain deficit from about 40 million metric tons to at least 60 million tons by 1985 are probably not far off the mark. While developing food production may increase at a somewhat faster rate than in the past, this is equally true of the demand for food.

(2) The foreign exchange cost of grain imports amounts to only 3 percent of projected export receipts of non-oil exporting developing countries—about the same percentage as at present. But grain imports represent a significant balance-of-payments burden (8 percent of export receipts) in the poorest countries which account for about 25 percent of the grain deficit.

(3) The most important contribution the industrial countries can make to help the developing countries finance their grain deficit is to keep their doors open to developing exports of labor-intensive manufactured and agricultural products, which, on present policies, are projected to rise from \$120 to \$200 billion by 1985.

(4) Complete liberalization could add another \$6-7 billion to the 1974 base level of developing countries manufacturing exports and a somewhat smaller amount to agricultural exports. However, the best possible outcome of the multilateral trade negotiations (full use of the U.S. authority and assuming exclusion of textiles) will fall far short of this (about \$2.6 billion in manufacturing exports). Trade preferences, at best, accomplish little more, and in practice

almost certainly less, than tariff cuts on a most-favored nation basis.

(5) Successful producer cartels could add several billion dollars to the export receipts of certain developing countries. However, only a few primary commodity markets have the characteristics necessary for the successful exploitation of monopoly power. Producer/consumer agreements, while desirable for market stabilization, will make only a modest contribution toward increasing the export earnings of developing countries.

In discussions of the world food problem, attention has been focused almost exclusively on the growing grain deficit of the developing countries. This trend, in turn, is taken as an indication that the developing countries are "losing the ability to feed themselves." The prospect that the developing countries as a group (excluding Argentina) may import between 60 and 80 million metric tons of grain 10 years from now is widely regarded as financially, and even physically, impossible. The only solution, it is asserted, is for the developing countries to regain the "maximum possible degree of self-sufficiency in basic foods" (World Food Conference Resolution-II).

There are several problems with this reasoning. It does not take account of the fact that the "third world" is composed of countries with diverse characteristics as to resource endowment, income levels, industrial development and export prospects; and it disregards the important role of international trade in helping to finance the rising grain imports of the developing countries.

The purpose of this paper is to assess the food problem of the developing countries in this broader perspective. Specifically, it will deal with the following aspects: (1) the developing country grain deficit and the reasons for believing that it will continue to grow; (2) developing country

export prospects, assuming no significant changes in present policies; (3) possible gains from trade liberalization (most-favored nation or preferential); and (4) possible gains from international commodity management (producer cartels or producer/consumer agreements).

THE LDC GRAIN DEFICIT

Net grain imports by the developing countries (excluding Argentina) have been rising for some time. In the sixties, they rose from 18 to 27 million tons. The trend accelerated in the last 3 years, when net imports reached an annual average of 41 million tons.

Import needs of the developing countries will be less this year because some of the most populous developing countries had 2 years of favorable weather. Bumper crops together with a high level of imports enabled India and Bangladesh to build up stocks to the limits of their storage capacity. What about the future?

A great deal of work has been done in the past few years on future food production and food needs in the developing world. All of these projections—by the Food and Agriculture Organization (FAO) (1), the U.S. Department of Agriculture (2), the International Food Policy Research Institute (IFPRI) (3), and the World Bank (4)—agree that the grain imports of the developing countries will continue to rise. The projections to 1985 range between 60 and 100 million metric tons.

These projections are, by and large, based on the expectation that trends in population, income, and grain production will continue more or less as in the past 15 or 20 years. In general, projections based on the period ending with the three poor crop years 1972, 1973, and 1974 have led to more pessimistic conclusions than more recent projections taking the favorable crops of 1975 and 1976 into account.¹ In the light of long-term production trends, a projected deficit of around 60 million tons is more likely than one of 100 million tons; but even this would mean a 50-percent increase.

Bearing in mind that the developing countries are not a homogenous group, it is useful to consider separately (a) the oil-exporting countries; (b) the middle income group (over \$200 per capita in 1973) and (c) the low-income group. The oil-exporting countries, which currently account for about 20 percent of the 40 million ton "trend" deficit, may well double their grain imports by

¹For example, IFPRI revised its original estimate of the 1985 developing country net grain deficit (excluding Argentina) from 82-99 million tons (low and high income projections, respectively) to 74-86 million tons.

1985, but these countries should have no problem in paying for them. The non-OPEC "middle income" group now accounts for over half of the deficit. These countries are likely to increase their grain imports by 20 to 30 percent, but most of these countries are able to finance their grain imports from rapidly rising export earnings. There are some exceptions, e.g., Egypt. It is mainly the poorest countries which give rise to concern. These countries now account for about one-fourth of the LDC grain deficit, and on present trends, their grain imports will double by 1985. These countries, with a projected population of some 1.2 billion people—three-fourths of them in South Asia, most of the remainder in tropical Africa—include practically all of the world's 400 million undernourished people (1).

Everyone who has tried his hand at projections of this sort realizes that they have to be taken, not with a grain of salt, but with several million tons of it! Experienced model builders stipulate explicitly a number of alternative scenarios embodying different basic assumptions. Unfortunately some of the most important determining variables—notably the policy variables—are not easily quantified.

Let me discuss briefly, largely in qualitative terms, some of the factors that could make a difference.

First, production: Even a modest acceleration of the rate of growth of production—from 3 percent to 3½ percent annually—could sharply reduce the deficit.

Most developing countries have the capacity to greatly increase their production. Grain yields in these countries are less than one-third of those in the industrial countries. The use of fertilizer is less than one-fifth that in the United States, one-tenth that in Western Europe and Japan. Even in South Asia, where irrigation was always important, less than one-third of the economically usable water is actually used, and that at only about one-half the efficiency that could be achieved. Nor have these countries exhausted their land potential—particularly if we keep in mind the unexploited possibilities of double and triple cropping in a warm climate. Given the best technology presently known, many developing countries could increase their food production several times over. Even in the densely populated countries of South Asia, crop production could probably be quadrupled in the next 50 years.

Clearly it is not a question of limited resources but a question of how fast these resources can be developed.

The long-term growth of grain production has been, if anything, a bit more rapid in the third world than in the more advanced countries—about 3 percent for the developing countries as a

whole, 2.5 percent in India—slightly ahead of population growth. But it proved to be rather difficult to speed it up. Even the “green revolution”—the successful introduction of high-yielding varieties of wheat and rice—caused only a ripple in the long-term trend of total foodgrain output in India.

There is reason to expect *some* acceleration in this trend. Foreign aid commitments to agriculture have doubled since 1973. But the impact on food production will be only gradual. Major investments in land improvement, irrigation, and fertilizer production require long lead times. The economic, educational, and institutional impediments to the adoption of new technologies are very great. So we should not look for immediate, dramatic results.

While food production in the poor countries may increase at a somewhat faster rate than in the past, this is equally true of the demand for food—not only in the newly affluent oil exporting countries but in other developing countries as well. Income growth shows signs of accelerating, despite the oil crisis. But this income growth tends to be localized in the small, modern sectors of the economy where it generates a demand for food which is not necessarily matched by a commensurate increase in food production.

Aside from market demand caused by increased incomes, the governments of some of these countries are likely to be faced with continuing pressures to increase—and subsidize—the rations of the urban poor and, at the same time, with growing resistance to government procurement in the agricultural surplus regions. We have seen this happen in India in years of short crops. Distribution problems of this kind increase the need for food imports.

On balance, therefore, it is likely that the demand for food in the developing countries will continue to run ahead of production, even if current efforts to speed up agricultural development meet with a measure of success. Internal distribution problems may add to the need for imports. I conclude that in the absence of increased balance-of-payments constraints, a projected developing country grain deficit of 60 million tons-plus is probably not far off the mark.

A 60-million-ton grain deficit would represent 12 percent of projected developing country grain consumption—about the same percentage as in the past few years. (For low-income countries, the import dependence is likely to increase, however, from 6 percent to about 10 percent of grain consumption.) Do imports of this magnitude involve an uneconomic use of developing country resources? The answer to this question will vary a great deal from country to country, and it will depend importantly on alternative development

opportunities in agriculture and industry and the assumptions one makes about export markets. Suffice it to say that the economic case against developing country grain imports is not self-evident.²

EXPORT TRENDS AND PROSPECTS

Non-OPEC Developing Countries

The foreign exchange cost of grain imports of 60 million tons would be of the order of \$7 billion in 1976 prices—up from about \$4.5 billion at present. Non-OPEC countries will account for about \$5.5 billion of this.

This amount should be viewed in the context of current and prospective export receipts of the non-oil exporting developing countries. Total exports of goods and non-factor services (tourism, travel, shipping) of these countries are currently running at about \$130 billion. There are, of course, many pressing claims on these receipts: \$15 billion are required to pay for petroleum imports; \$18 billion go for debt service; the total balance-of-payments deficit currently exceeds \$40 billion—up from \$11 billion in 1973. Grain imports do not loom as large in this picture as the food crisis debate would imply.

In fact, if we look only at the agricultural sector, we find that developing country agriculture produced a healthy \$6 billion foreign trade surplus in 1974—the same as in 1961, despite much higher prices of grain imports in 1974. The agricultural exports (\$13 billion in 1974) reflect the comparative advantage enjoyed by developing countries by virtue of climatic conditions or low labor costs. Producing coffee, cocoa, tea, sugar, cotton, oilseeds, pineapples, tomatoes or strawberries for export may be a more effective way of procuring foodgrains than using the same land for grain production.

What about the future? Projections of developing country exports are fraught with uncertainties at least as great as those affecting projections of food imports. But the trend is encouraging. Exports of non-oil exporting developing countries have been growing at a rate of 7 percent, in real terms, during the past two decades. Exports of manufactured products have been rising at twice that rate and now represent more than one-third of the total (compared with

²Contrary to the widespread belief that developing countries can produce grain more cheaply, it appears that their incremental production costs seem to be quite high despite low labor costs, compared with those in the major grain exporting countries, particularly where irrigation is required. Increased energy costs have not changed this relationship appreciably.

one-tenth in 1955). If we project the trend, developing country exports would reach \$225 billion, in terms of 1976, by 1985. If export growth slows down to 5 percent, exports would still approach \$200 billion, in terms of 1976 purchasing power, by 1985—a gain of \$70 billion. In this case, the projected grain deficit, valued at \$5.5 billion, would amount to only 3 percent of projected export proceeds—about the same as at present. Overall, therefore, the balance-of-payments burden would be no greater than it is now.

The Low-Income Food Deficit Countries

Prospects are less favorable, however, for the low-income developing countries (incomes of \$200 per capita or less in 1973).

Total exports of goods and services of this group of countries are currently running at only about \$15 billion. The foreign exchange cost of their current "trend" grain deficit of about 10 million tons amounts to about \$1.2 billion or 8 percent of total export proceeds—a significantly heavier balance-of-payments burden than the 3 percent for non-OPEC developing countries as a whole.

More work needs to be done to assess the income and export growth prospects of this group of countries. For the group as a whole, per capita income growth was much slower in the past 20 years than for the middle-income group of non-OPEC countries (1 percent as compared with 3 percent). This is also true of total exports (2-percent growth as compared with 9 percent) and their exports of manufactured products (6 percent as against 18 percent). Even assuming a substantial acceleration of income and export growth, these countries will still be poor 8 years from now, and balance-of-payments constraints will continue to be severe.

POSSIBLE GAINS FROM TRADE LIBERALIZATION

Holding the Line Against Trade Restrictions

A crucial assumption underlying the projections of developing country export earnings discussed in the preceding section is that the industrial countries keep their doors open to a rising volume of imports of agricultural and manufactured products in which the developing countries have a comparative advantage. Quantitative analyses and historical precedents (Japan, Korea, Taiwan, etc.) suggest that this is indeed the most important single contribution

that the industrial world could make to help close the productivity and income gap between developed and developing countries.

Unfortunately, this assumption cannot be taken for granted. Exports of labor-intensive manufactured products by developing countries have hardly begun to make a serious impact in the markets of the industrial countries, but domestic pressures have already led to tighter import restrictions on textiles and clothing, footwear, etc. (some of these discriminate selectively *against* certain developing countries). Thus far these measures have not noticeably slowed down the rising trend of developing country exports, but there can be no doubt that domestic pressures for import restrictions will increase as more developing countries enter world export markets on a significant scale. In the agricultural sector, the major problem areas are products in which developing countries compete significantly with temperate zone production (sugar, tobacco, vegetable oils, beef, fresh and processed fruits and vegetables, and wood products). The resulting adjustment problems are not unmanageable, but it will take major efforts in the industrial countries to cope with them.

All the various proposals that have been put forward to improve the international trading position of the developing countries are second in importance to the task of holding the line against further import restrictions.

Further Liberalization

William Cline (5) has attempted to estimate the effects on developing country exports of further liberalization on a most-favored nation (MFN) basis. Cline concludes that complete liberalization would increase developing country exports of manufactures, excluding textiles, by \$2.7 billion, based on 1974 trade. Inclusion of textiles would raise this figure to \$6.7 billion. This would represent a 22-percent increase in total developing country exports of manufactures in 1974. Complete liberalization would enable developing country exports of manufactures to continue to grow at an annual rate of about 13 percent; without it, World Bank economists expect the growth rate to drop to about 10 percent in the next 10 years.

While the formulae currently discussed in the Multilateral Trade Negotiations fall considerably short of complete liberalization, they would still provide significant benefits for developing country exports of manufactures. According to Cline, full use of the U.S. authority (60-percent reduction) would yield \$2.4 billion in additional developing country exports; the European Community formula, iterated three times, \$1.4 billion.

In the agricultural sector,³ Cline estimated that complete liberalization would add \$2.5 billion to 1974 developing-country exports. The trade effect of a 60-percent tariff cut could be \$1 billion, and that of a 60-percent cut in the tariff equivalent of nontariff barriers, about \$0.5 billion.⁴

Developing countries would thus reap substantial benefits from general trade liberalization by the industrial countries, but the possible gains are relatively modest compared with the cumulative effects of developed country income growth on developing country exports, particularly in the manufacturing sector.

Trade Preferences

The developing countries have pointed out that they would benefit even more if liberalization were confined to imports originating in developing countries. An estimate by Iqbal (7) of the trade effects of unrestricted preferential non-reciprocal liberalization indicates a 31-percent increase of developing country exports of manufactures, based on 1971 trade. This may be compared with the 22-percent increase estimated by Cline for full liberalization on a most-favored-nation basis.

The trade effects of the existing preference system are much smaller because they are severely limited by exceptions, quantitative restrictions, tariff quotas, "competitive need" limitations, and other devices.⁵ Two estimates of the effect of the existing generalized systems of preference on developing country exports of manufactures, by Iqbal and by Baldwin and Murray, based on 1971 trade put the developing country trade benefit at \$380 million and \$480 million respectively (7, 9).

Both studies indicate that the trade creation effects of the preferences far outweigh the trade diversion effects. The implications are twofold. Introduction of the Generalized System of Preference (GSP) has no significant adverse effect on

³Including processed foodstuffs, developing countries including Argentina.

⁴Assuming that the trade volume doubles in 10 years this would be equivalent to \$5 billion by 1985, in terms of constant 1974 prices. Recent estimates by the World Bank staff covering 37 primary commodities, of which 26 compete with production in developed countries, indicate a possible gain from liberalization by 1985 of \$6 billion (1975 prices). Nearly half of this is contributed by two commodities: beef (\$1.6 billion) and sugar (\$1 billion). An earlier estimate by Wouter Tims (6) covering nine primary commodities suggests a gain of \$7 billion (1974 prices) by 1980 if these products were completely liberalized.

⁵These constraints become more severe as more and more products come up against the ceilings as a result of normal market growth. See (8 and 9).

the exports of industrial countries. Conversely, the effect of a narrowing of the preference margin on developing country exports resulting from most-favored-nation tariff reductions would not be great. In fact, Baldwin and Murray show that the loss would be more than offset by benefits to developing countries as a whole⁶ resulting from the presumed absence of value limits and the broader product and country coverage in the case of most favored nation tariff cuts.

Importance of Nontariff Distortions

It is important to keep in mind the increasing role of nontariff measures in distorting international trade. Manufactured products in which developing countries have a comparative advantage are particularly affected by import quotas and "voluntary" export restraints. Their agricultural export opportunities are severely limited by farm support policies in the industrial countries, regardless of the particular technique employed (import quotas, variable levies, production and export subsidies, etc.). For textiles, footwear, and agricultural products, tariff reductions will have little meaning without a simultaneous attack on nontariff barriers.

POSSIBLE GAINS FROM INTERNATIONAL MANAGEMENT OF PRIMARY COMMODITIES

Exporter Cartels

Like American farmers, farmers in developing countries have long clamored for "parity" between prices of primary commodities which they sell and prices of manufactured products which they buy. The demand for "indexation"—i.e.: the stabilization of real prices of primary products at the most favorable base-period level that can be found—is the current manifestation of this line of thought. Candid advocates of the New International Economic Order will admit that the real objective is to *improve* the terms of trade of raw material exporters (10).

Developing country enthusiasm for this approach has been boosted considerably by the spectacular success of OPEC. Analysis of the characteristics of various commodity markets

⁶The authors point out that the GSP is of greater interest to the smaller and poorer developing countries which are not affected by the value limits. The larger and more advanced developing countries would benefit more from successful most-favored-nation (MFN) tariff reductions.

revivals, however, that there are few other primary commodities which meet the criteria for successful producer cartels. Among major products, coffee, cocoa, tea, and some metals have these characteristics: inelastic demand and the absence of satisfactory substitutes, and a relatively small number of like-minded supplying countries. Even in these cases, attempts to force up prices by means of production quotas will face the risk of price cutting by new entrants and by participants dissatisfied with their market share. The cartel potential of most other primary commodities is severely limited by the availability of substitutes (copper, cotton, tin, hard fibers, jute, rubber, oilseeds and vegetable oils: now also sugar) or because industrial countries unlikely to join in a cartel are important producers who could increase their output (phosphates, sugar, cotton, oilseeds). In these conditions, any attempt to rig prices is likely to backfire sooner or later as it will stimulate production by nonparticipants and the development of substitutes.

The possibility that producer cartels will be formed cannot be ruled out. In some cases, the short-term rewards could be substantial. Their magnitude is suggested by the upsurge in exporter earnings of over \$10 billion—\$6 billion in real terms—which accompanied the recent shortfalls in world production of coffee, cocoa and sugar.⁷ It is more likely, however, that the developing countries will continue to press for international agreements designed to stabilize and, if possible, increase their export earnings with the consent of importing countries.

Producer/Consumer Agreements

Attitudes in the industrial countries toward international commodity agreements have become more favorable in the wake of recent upheavals in world commodity markets. The belief that basic commodities can safely be left to the unfettered play of market forces has been shaken. There is a growing conviction that extreme instability is undesirable and should be avoided. Shortages and high prices of food, fuels and raw materials have been major factors in the worldwide inflation of the past 4 years. Structural changes have made the industrial economies more inflation-prone and hence more vulnerable to external shocks originating in commodity markets. The inflationary effects are irreversible as they get locked into the wage and price structure

of the remainder of the economy which is flexible only upward. Shortages are compounded by the fear of export restrictions. Excessive price instability tends to perpetuate itself through lagged supply responses and investment cycles. As a result there is now greater interest among importing countries in buffer stock agreements to stabilize supplies and prices.

While the climate for negotiating international commodity agreements is more favorable than in the past, it is too early to tell whether enough common ground can be found between exporter and importer interests to permit successful negotiations. The industrial countries naturally emphasize features of interest to them such as stabilization and supply assurances. They may be expected to continue to oppose developing country demands for price support at higher than long-term competitive levels. It is for this reason that they have thus far resisted pressures to establish a centralized political, administrative and financial structure in the United Nations designed to predetermine and control the policies of the various commodity councils. They will undoubtedly continue to be wary of attempts to prejudice the outcome of specific commodity negotiations.

What can the developing countries expect to get out of the commodity negotiations under these circumstances?

Clearly they cannot expect the industrial countries to ratify floor prices deliberately set to transfer sizable monopoly profits to a producer cartel. In fact, the industrial countries should insist on safeguards against such action. But consumer acquiescence in the establishment of floor prices that imply a modest improvement in the long-run terms of trade may possibly be secured in some cases in return for guarantees against unilateral producer action. For commodities competing with domestic production in the industrial countries (e.g., sugar), developing country exporters may be able to negotiate improved market access. Greater stability of prices and export earnings would seem to present advantages for exporting countries in that it should facilitate long-term planning and investments and, in some cases, improve the competitive position of primary commodities exported by developing countries vis-a-vis more expensive but more stable substitutes. In any event, the attractions of greater stability are perceived more clearly by producers when prices recede from their peaks.

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COMMENT

by
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I want to congratulate both Mr. Josling and Mr. Sanderson for presenting interesting and perceptive papers. Each has dealt with a set of complex issues which could be extensively discussed and debated. I will leave that to open discussion at the end of the session. I want to make only one comment that is directly related to Mr. Sanderson's paper, but it also has broader application.

In common with other assessments of the food picture that will face poor countries by 1985 or 1990, no issue is made of the effect of price on potential deficit levels. Grain prices in most poor countries will be strongly influenced by international trading prices. If the United States and Russia, in particular, have a series of good crops and if wheat starts flowing into world markets at \$2 per bushel f.o.b. Gulf ports, this will have a quite different implication for output expansion in poor countries than if a series of poor crops results in a price of \$5.00 per bushel. A second aspect is the degree of variability around any overall level that prevails.

My experience in poor countries, though limited, is sufficient to convince me that even the most illiterate farmers respond to favorable price conditions. There would also be some demand effect, particularly where grain is fed to livestock. Though I know that data problems are severe, I would encourage attempts to incorporate this

variable into assessments of developing food deficits.

What I will spend my remaining time on is something that a number of recent events have led me to ponder. The papers by Mr. Sanderson and Mr. Josling reinforce my feeling that there is a need to increase dialogue on the question of how the United States should approach the problem of agricultural trade policy formulation.

First it is clear that the problem facing the United States in formulating international policy for agriculture has changed greatly during the seventies. This is in part a result of change within U.S. and world food markets, and in part it reflects a new linkage between the world economy in general and the functioning of the U.S. economy. This new relationship reflects a greatly increased degree of interdependence that has many dimensions. In agriculture, the rapid expansion of export sales has led to a situation where U.S. farm and food markets are dependent on economic and other policy considerations and weather conditions around the world, and over which we have no control. We have become highly dependent on petroleum imports and are increasingly dependent on imports of a number of other raw materials. Our competitive position on a substantial range of products from shoes to television sets has continued to deteriorate.

Changes in economic structure have been accompanied by changes in the power structure that affect international commercial relations. The most striking of these during the seventies is the formulation of the OPEC and its ability to impose a fourfold increase in world oil prices. This, in turn, has provided a rallying point for the world's poor countries who have retained an amazing cohesiveness and have become a major force in international policy fora. The European Community expanded to nine members and despite substantial internal conflict on economic policy matters manages a united front vis-a-vis the United States in trade matters—especially in agriculture.

The meaning of these conditions is that the United States faces an unprecedented challenge of leadership in developing international trade policy. We no longer can view trade policy as a separate entity related to the domestic economy only through its impact on special interest groups who may gain or lose through actions that are taken. We need an approach that seeks to define and implement the international aspects of a composite domestic-international economic policy. Any such policy should be grounded in a set of objectives that recognize the national interest of the United States and not those of selected groups who have political power.

Formulating objectives for U.S. trade policy is a major task that will require the input of many groups and involve the most difficult of political processes. Without any pretense of completeness, I want to suggest some elements that are of particular relevance to agriculture.

First, in light of current conditions of interdependence and uncertainty in world markets, achieving a greater degree of market stabilization is a central objective that should be sought. Wide price swings have been generated that affect consumers, especially those who are poor. Producers face great uncertainty in making production decisions. Land prices have skyrocketed, and through what has come to be called the "ratchet effect" food prices have contributed to inflation. Longer term implications flow from their potential effect on investment in agriculture and growth in production both in industrial and poor countries.

Second, agricultural trade policies should be geared toward assisting development in poor countries. The less developed countries (LDC's) are asking that their development interests be considered and that instruments be devised that serve this end. They argue that simple trade liberalization and multilateral reduction in barriers will not serve that end and that policies are needed that perform a redistributive function. Whether the objectives of development can, in the

long run, be best served by policies that increase their foreign exchange through such means as preferences and international commodity arrangements, is not clear. Nonetheless, assisting development is a significant objective held by the United States that should be considered in formulating a comprehensive trade policy.

Expansion of world food production is another central concern that should be reflected in U.S. agricultural trade policy. The role of trade policy was passed over lightly at the world food conference, presumably because this is the business of the GATT negotiations in Geneva. Existing trade constraints inhibit output expansion in the United States and a number of other countries with potential, many of them developing countries. Beyond this, the question of expanding production in food deficit poor countries contains a set of trade-aid policies of great complexity. LDC's have repeatedly asked for additional means of resource transfer and greater access to industrial countries' capital markets.

A fourth objective that needs to guide U.S. agricultural trade policy is our increasing concern with retaining access to supplies of raw materials and commodities. The extent of dependency of the United States on foreign sources for many raw materials has increased sharply, and this, along with our declining influence in foreign economic policy, creates a vulnerability not heretofore experienced by the United States. Both import and export policies become relevant to implementing this kind of objective. The increasing power of nations that control raw materials and the recent proliferation of export controls by a large number of countries for a variety of reasons have become a major new dimension of international policy.

As a final point and somewhat repetitive of some of the objectives stated above, food and agricultural trade policy must seek to contribute to resource use efficiency and should not undermine the economic well-being of the United States. It is important that policies assure the continued strength and stability of the U.S. food system. Consumer interests must be protected through assurances of a continuing and adequate supply of food from domestic and international sources. Abrupt shifts in policy that create an undue cost on either consumers or producers need to be avoided.

Trade policy can also serve as a deterrent or stimulus to already strong inflationary forces through direct impact on prices. More fundamentally, in an economy with increasing industrial concentration, trade measures can be used to improve the competitive environment and stimulate adjustments to more efficient and lower cost production.

At the international level agricultural trade policy needs to be developed with a recognition of its implications for the objectives of overall U.S. foreign policy, and the increasing role that the American food system plays in protecting the integrity of the U.S. international financial position.

Though these objectives may seem obvious and are not necessarily comprehensive in scope, it is important that we seek to clearly specify the foundation upon which future policy is built. Only within such a framework will it be possible to arrive at a workable set of instruments that minimize conflict among alternative objectives and best serve the composite domestic and international interests of the United States. A total strategy which weighs each policy instrument in terms of its effect on alternative objectives is required. The problem of formulating trade policy in this kind of framework is obviously very complex. A wide range of instruments and strategies related to multilateral trade negotiations, food reserves, food aid, preference arrangements for LDC's, commodity agreements, and other dimensions of the new economic order as proposed by the LDC's are involved.

There are alternatives to the U.S. approach to these problems. Central to this is the philosophical difference that has existed between the approach of the United States and that in most other parts of the world. As pointed out by Warley,¹ this difference is deeply rooted in the economic and political systems of the countries involved and will not be easy to overcome. Basically, it results in the United States continuing to place heavy reliance on the free market while other countries seek to move in the direction of governmental organization of international markets. This position is strongly held both by the European Economic Community and by the less developed countries. This impasse will have to be broken before really comprehensive international negotiations can occur.

There are other important constraints to achieving effective trade policy. One of these is the resurgence of economic nationalism and neo-mercantilism that has occurred since the end of the Kennedy Round trade negotiations. Protectionism within the United States has become more important as the result of a deterioration in our competitive position in a fairly wide range of industrial products. This has led to a strong protectionist position on the part of labor unions, an obvious political force, and the call for import

quotas by a large number of industrial and commodity groups. There are political and economic elements in the question of economic nationalism. The gains from international trade have been spelled out for a long time. The problems that arise through increased uncertainty, the sometimes disruptive impact of interlinkage of economies, and the longer term implications, particularly for depletion of nonrenewable resources, are now just being discovered.

Another impediment stems from the complexity of the interactions that exist and our ability to evaluate the implications and workability of various policy thrusts that currently are being considered. The conditions under which workable commodity agreements or an effective food reserve system can be established and managed are not clear. We have little information on the effective protection levels that exist for agricultural commodities in most countries and hence are not really in a position to assess the effects of potential decisions that might be made. The relationship between various international policies promoted by the developing countries and achieving development is not clear. Much of the intellectual and empirical work needed to develop and support a comprehensive policy by the United States has not been done.

A final problem is simply the question of how decisions are made within the U.S. Government. The General Accounting Office recently reported that no less than 24 agencies and 36 congressional committees currently are involved in some aspect of agricultural and food policy. It has been clear in recent years that decisions related to international food policy have been made in various departments, in some cases without linkage to, or consultation with, other relevant agencies or with Congress. The role of the Department of Agriculture and agriculturalists clearly has diminished. This represents a challenge that can be overcome only through establishing a solid information base and by adopting a broadly oriented and comprehensive focus on the problem. The greatly increased complexity of the policy process due both to the much more diffuse linkage of the U.S. economy and the food system to the international economy, and the fragmented decision process within the U.S. Government leads to uncertainty about our capacity to formulate a comprehensive and coherent policy. This can become a critical factor in determining whether the United States is able to effectively perform its traditional leadership role in formulating international commercial policy.

I don't want to end on a completely negative note, so let me comment on the positive side. First, there is some evidence of flexibility in the philosophical position held by the United States.

¹T.K. Warley, "Agriculture In International Economic Relations", *American Journal of Agricultural Economics*, Vol. 58, No. 5, December 1976.

We are more willing to discuss organized trading arrangements. Hopefully this will lead to concessions by our adversaries and some movement toward formation of more reasonable trade policy for agriculture. Second, the analytical capacity to support formulation of a trade policy for agriculture is available and needs only to be organized

and directed. If this is accomplished, and I have considerable optimism, it should affect decision processes. The only place I remain completely pessimistic is on the question of pressures for increased protection. They will likely increase and become a more difficult part of the problem of formulating a logical agricultural trade policy.

COMMENT

by
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Fred Sanderson's paper about the problems and perspectives of developing countries and Tim Josling's paper on the conditions of trade in major temperate zone products are largely complementary, and offer a rich menu of topics. My comments will explore some of Mr. Sanderson's implications about developing countries and then raise a question about Mr. Josling's paper. Basically, I will not be contradicting any major points presented in either paper.

Financing Rising Grain Imports in Developing Countries

Josling and others have suggested that the costs of rising grain imports are perhaps the most significant constraint to developing countries ability to import grain. Sanderson's paper takes this into account by analyzing the food gap not only with regard to agriculture, but in relation to the overall trade position of various countries, a perspective that is often ignored in many discussions.

If taken at face value, the magnitude of food deficits projected for the developing countries as a group is frightening. And it is true that food imports to developing countries have accelerated over the recent past. However, there are other facets to the problem. For example, when the food and oil import costs are compared with total national imports, in several food-deficit countries for which data were readily available, food imports as a share of total national imports rose only 1 percent between 1971-72 and 1974. On the other hand, fuel's share of total imports jumped 8 percent during the same period (1). Thus the ability to finance needed food imports might depend more on nonagricultural factors such as oil prices than on the prices and/or production of agricultural commodities including grains.

Moreover, as Sanderson points out, the relationship between food deficits and trade prospects varies in each country. These individual

country situations must be examined in the context of a world food trade strategy. How essential this strategy will be to increasing food supply in the developing countries will depend to a large extent on the specific relationship between the food deficit and trade prospects in these countries.

Researchers at the International Food Policy Research Institute are currently developing a country typology of developing countries, based on the degree of food self-sufficiency, balance of payment position, per capita income, and production trends. Based on this typology, the potential benefit of trade liberalization to the developing countries is being explored. The analysis shows remarkable differences among selected countries in their potential for financing food imports (2).

For example, as one would expect, there is one group of countries that require no food imports (Argentina, Thailand, Brazil). A second group has minor food import requirements that can be financed by agricultural exports (this group includes Pakistan, Ethiopia, Indonesia, and the Philippines). The third group has a sizable regular food import requirement, although these countries have relatively good agricultural production levels. Only some of these countries, for example, Egypt and Malaysia, are likely to need financial assistance because of the size of their food deficits. The fourth group consists of countries that have performed poorly in terms of food production per capita and will probably depend on financial aid for part of their needed food imports. This group includes Tanzania, India, Bangladesh, Ghana, and Sri Lanka. Finally, there are a number of food importing OPEC countries and semi-industrialized food-deficit countries that are clearly in a sufficiently strong balance-of-payments position to purchase commercially whatever level of food imports they might require (e.g., Korea, Taiwan, Nigeria, Venezuela, and Algeria).

Although the balance of payments problems created by financing food deficits are more pressing in South Asia, they are not restricted to that region; some African countries might also face a serious balance-of-payments situation. For some of these countries, the financial requirements needed to pay for their food deficits seem unrealistically high relative to their export sectors. The main point is that, given the limits of finances or food available, we must try to identify our "target group." For this purpose, economists can generate the relevant criteria, apply them to available information and specifically identify those developing countries' concessionary terms in order to finance food imports.

Multilateral Trade Negotiations and Potential Benefits to Developing Countries from Trade Liberalization

Sanderson concludes that one of the most important contributions that rich nations can make to less developed countries is to reduce trade barriers for less developed country exports. I concur. However, I believe that by far the major potential benefits in terms of foreign exchange earnings would come from semiprocessed and manufactured goods rather than agricultural goods—although on the aggregate, potential benefits for developing countries from agricultural products are not insignificant. These benefits would, on one hand, be highly concentrated in a few already export-oriented countries, such as Argentina, Brazil, the Philippines, Mexico, and Taiwan, and other countries that are for the most part not food-deficit. But perhaps more relevantly, potential benefits from trade liberalization of agricultural products relative to the size of each country's external sector are "significant" for only a few countries. Unfortunately, the relative gains could be trivial for most of the developing countries, including most of the food-deficit countries.

Therefore, for most developing countries, significant benefits from trade liberalization would be more likely to accrue from semiprocessed and manufactured labor-intensive commodities. Unfortunately, these benefits would not be captured by all of the poorest of the developing countries; however, large food-deficit countries such as India could make significant gains in these commodities.

Performance of International Commodity Markets

In addition to his excellent discussion of performance of international commodity markets, Professor Josling usefully links the question of market instability with degrees of production. In

the case of grains, Josling is relatively optimistic when he argues that the present round of Multilateral Trade Negotiations (MTN) offers a good opportunity to improve trade conditions in the major temperate zone products.

I share his opinion that there has been a change in attitude among the major actors (OECD members) in recognizing the need to reduce market instability and improve food security. Building grain reserves seems to be a mutually acceptable objective among trading partners. However, it is not clear that the EC countries and Japan, as major grain importers, have had a significant change in attitude about a reduction in their trade barriers. Can we realistically expect a change in domestic policies—which Josling and Johnson have linked so well to the trade policies? Let's explore it very briefly.

As Josling points out, market instability and trade barriers are related, and moreover, improved security in world markets will facilitate adjustments in domestic policies in developed countries. In this same vein, Dale Hathaway suggests that greater security would improve the prospects for reduced trade barriers. I agree, however, the existence of stocks to reduce price fluctuations does not necessarily imply a reduction in trade barriers, although it might facilitate such a reduction. It does necessarily imply changing the prevailing system, or the forms of trade barriers (i.e. variable levies, or variable import quotas), but without necessarily reducing the average level of protection.

Other than market instability, are the circumstances in the mid-seventies so different that the major trading partners have real incentives that did not exist in the sixties to make adjustments in their domestic policies? From a consumer oriented viewpoint, the EC and Japan would receive important gains; however, typically, concern about trade balance effects tends to dominate negotiations. In this sense, trade liberalization could present difficulties to the EC and Japan while it offers good opportunities for Canada, the United States, and Oceania.

Another barrier to liberalization is that the "real" cost of farm programs—real meaning the welfare costs in terms of resource allocation losses plus consumer losses—are quite small in absolute terms, or as a proportion of national income (3, 4). Further, the budgetary cost of the programs does not seem to be intolerably high for the rich countries with a small and declining farm sector. In the past, the trade-disruptive effects of the income support policies centered on product prices has hindered approaches to trade liberalization. Moreover, a reduction in protection in Japan and Western Europe would benefit primarily farmers in North America and Oceania.

So, for those countries with potential export gains, the incentive is clear. Nevertheless, for the potential importers, reductions in barriers imply major domestic structural adjustments (*i.e.*, employment effects). Given the problems of structural adjustments implied in his paper, Josling does not clearly present the change in circumstances that supposedly will provide an incentive for the EC and Japan to significantly reduce the degree of effective protection for farming activities.

This is, I believe, a relevant issue, and I would be interested in Josling's impressions about the circumstances changing attitudes about and creating incentives for a reduction of trade barriers in the EC and Japan.

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INTERNATIONAL FOOD SECURITY: ISSUES AND ALTERNATIVES*

by
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ABSTRACT

Food security in the low income countries has improved significantly during the past century. Much of the improvement has resulted from changes in communication and transportation. Three alternatives for further improving the security of food supplies for the low income countries are considered. Trade liberalization for agricultural products would contribute to greater price stability in international markets and make it easier for low income countries to import food when domestic production is adversely affected. Grain reserves, whether held by an international consortium or by agreement among the major exporters, could contribute to price stability, but without trade liberalization it is very difficult to estimate the size of reserves required. Given that trade liberalization is either unlikely or will require a long transition period, a grain insurance proposal is presented. Under this proposal all production shortfalls below trend in excess of 6 percent would be met by the United States or a group of donor nations. This would minimize the hardship arising from variations in food production in the low income countries.

World economic growth and its associated technological changes have greatly increased international food security over the past century. Substantial—one might say revolutionary—improvements in the speed of communication, the almost universal availability of rapid means of communication, and the reductions in the costs of

and time required for transportation have significantly decreased the hardships and suffering resulting from shortfalls in food production in specific geographic areas. These dramatic changes in communication and transportation have enormously expanded the extent of the market from which food supplies could be drawn for almost any local community or region in the world. Only a century ago in many parts of the world, food 100 miles away was no more available to relieve the impacts of crop failure than if the food were on another planet. There remain a few areas of the world that are so isolated that relief in case of need may be delayed because of limited communication facilities and high transport costs. But such areas involve but a tiny fraction of the world's population. And even in these cases if an early warning system were created, most of the suffering from food insufficiency due to natural causes could be avoided.

Two other factors have operated to improve international food security, though both together are probably much less important than the changes in communications and transportation. The first is that the variability of grain production for the world has declined significantly during the past century. This statement cannot be proven beyond a reasonable doubt because of data inadequacies, but we do know that in specific regions of the world, variability of grain production has been substantially reduced. The second is that with the increases in per capita incomes for a considerable fraction of the world's population, there have been created reserves of food that could be and have been drawn upon. I refer to the substantial increase in the amount of cereals fed to livestock, other than draft animals, that has occurred in the twentieth century. In recent years, more than a third of the world's grain production has been fed to livestock and most of this to animals other than draft animals. As a part of the same change in the structure of food production and consumption, the inventories of animals also provide a significant food reserve.

*This paper is based in part on research supported by grants to The University of Chicago by the National Science Foundation and the Rockefeller Foundation. Dan Summer, Chung Ming Wong, and Gabrielle Brenner have participated in the research. The views expressed are entirely my own responsibility.

It is true that during the past century the world's population has almost trebled. But the changes referred to have been sufficient to improve the food security for the much larger population of the world. Instead of the incidence of famine having increased over the past century, it has declined substantially.¹ This is a remarkable achievement that appears to have gone largely unrecognized in recent and current discussions of world food problems and world food security.

But the changes that have occurred in technology and the world economy have a potential positive impact on world food security greater than has so far been realized. The means now exist to prevent nearly all deaths and most of the hardships due to food production shortfalls in any and all parts of the world. This may seem like an extreme statement, but it should be noted that it addresses only one part of the problem of food insufficiency and malnutrition. The statement does not refer to the interrelationships between poverty and the inability to acquire adequate food for good health and normal work activity. But I am serious in saying that it is no longer necessary for food production shortfalls in any part of the world to result in serious human hardship due to food insufficiency.

CAUSES OF INTERNATIONAL FOOD INSECURITY

The primary reason why we have failed to achieve the degree of international food security that is now possible is not nature but man. And the aspect of man that is responsible for our failure is not man as a farmer or scientist or extension worker or grain marketer or food retailer but man as a politician. I use the term politician very broadly to include all of those who have influence with respect to decisions that affect production, pricing, and trade involving food.

Variability in the world's production of grain may be used, I believe, to give an approximate indication of variability of world food production. Since 1970/71, there has been much concern expressed about climatic variability, but the maximum negative deviation from trend in grain production appears not to have been in excess of 3 percent. The positive deviations may have been

¹See the article on *Famine* in the *Encyclopedia Britannica*, 1970-73 issues. The article is not in the most recent revision.

rather larger, perhaps as much as 5 percent in two of the last 6 years.²

With any reasonable assumption concerning the price elasticity of demand for grain for use or consumption, the negative deviations from trend cannot be considered to be large. A negative deviation of 3 percent and a price elasticity of demand of -0.1 would result in a price change of 30 percent—assuming that stocks remained unchanged. Even if the price elasticity of demand for grain in the world were as low as -0.05, it would have required only a 35-million-ton reduction in stocks to have held price increases during recent years to 30 percent. But the price changes in international markets for grains between 1972/73 and 1973/74 and 1974/75 were substantially larger than this in real terms.

In two previous publications I have argued that the substantial increases in international grain prices in the years following 1971/72 could not be explained primarily by production shortfalls plus a variety of other factors such as the decline in fishmeal production, the Russian grain purchases, increased affluence (including business cycle effects) and the devaluation of the dollar.³ After the effects of these variables upon international grain prices were taken into account, there remained a substantial part of the rise in grain prices between mid-1972 and 1973/74 that had to be attributed to other factors.

The primary factor responsible for price increases over and above those explained by the reduction in grain production and the other changes noted was the policies of most governments of the world that affected the pricing of grain within their national boundaries. In countries that consumed well over half of the world's grain, prices were not permitted to reflect the changes in the world demand and supply situation that had occurred. Domestic prices paid by consumers and received by producers in these countries were stabilized by control of net grain trade. This was the effect of policies followed in the Soviet Union, in China, in the European

²These estimates are derived from world grain production estimates of the U.S. Department of Agriculture. The deviations are estimated from a linear trend line and thus may underestimate the absolute magnitude of the negative deviations and overestimate the positive deviations. However, it is highly unlikely that the maximum negative deviation from trend exceeded 4 percent. Due to variations in stocks of grains, the deviations of world grain consumption from trend levels were smaller than for grain production.

³*World Food Problems and Prospects*. Washington, American Enterprise Institute, 1975, ch. 3. and "World Agriculture Commodity Policy and Price Variability," *Am. J. of Agric. Econ.*, 57, no. 5 (Dec. 1975), pp. 823-28.

Community, and in most other countries in Western Europe. Thus, consumers were given no incentive to economize in the use of grain, and producers were given no incentive to expand grain production. The consequence of these policies was that all of the adjustments to the changed conditions were imposed upon the international grain market and those countries in which domestic and international grain prices were permitted to vary together. This meant that most of the adjustments had to be made by the United States and many developing countries.⁴

There is considerable resistance to accepting the view that it was man and not nature that was responsible for a large fraction of the substantial increases in international grain prices that occurred after mid-1972. To accept this view means to conclude that much of the human suffering that occurred in the low-income countries of the world due to higher food prices in international markets was the result of human action and not the inevitable consequence of the adversities imposed by nature. I am not arguing that the adversities imposed upon poor people were the intended effects of the policies followed. In other words, I am not saying that the decisionmakers in the Soviet Union or the European Community intended to reduce the food supplies available to South Asia or Central Africa. But I do hope that I have made the point that national policies that insulate domestic prices and consumption from the effects of world variations in demand and supply have inevitable and, at times, adverse effects upon others. And often those who are adversely affected are much, much less capable of coping with the consequences than those who are being protected by the policies.

⁴An unpublished study by Thomas Grennes, Paul R. Johnson, and Marie Thursby—"Devaluation, Foreign Trade Controls, and Domestic Agricultural Prices" (North Carolina State University, 1976)—provides estimates of the effects of the changes in domestic price and trade policies of Canada, Australia, Argentina, Europe, and Japan upon the U.S. internal prices of wheat between 1972/73 and 1973/74. While my conclusions were based upon some rather simple demand-supply relationships, their study was based on a quite sophisticated world wheat model. They found that approximately a third of the actual increase in real prices between the 2 years was explained by changes in production and world demand and by changes in trade with the rest of the world. Approximately a sixth of the increase in the U.S. internal wheat price was explained by the change in the EC variable levy and approximately another sixth was explained by policy changes that occurred in Canada, Australia, and Japan. I believe that these results are reasonably consistent with my rough calculations, though my references were to total grains rather than to wheat. Included in the changes in exports to the rest of the world were the policy changes in the Soviet Union, China, and Eastern Europe.

ALTERNATIVES FOR INTERNATIONAL FOOD SECURITY

I shall consider three approaches for improving international food security—liberalization of barriers to trade in agricultural products, grain reserves, and a grain insurance program for the developing countries. I shall discuss these alternatives primarily in terms of their contributions to food security for the poorer people of the world.

There are interrelationships among the approaches, especially between trade liberalization and grain reserves. The appropriate sizes of grain reserves for the world are significantly affected by the domestic price and trade policies affecting food products. Because of these interrelationships, I use some of our work on grain reserves to show the potential effects of trade liberalization on food security.

Trade Liberalization

The conventional argument for a grain reserve is to offset uncontrolled variations in production. While this argument may be valid for an individual country that does not engage in international trade, it is not a valid explanation for the holding of reserves significantly in excess of working stocks for the world as a whole.

We have made estimates of optimal reserves for individual countries, for regions, and for the world as a whole, and these estimates will be used to indicate the effect of free trade upon the appropriate size of grain reserves.⁵ Since these results depend upon the assumptions that we have made, let me first briefly describe what we have done.

Optimal grain reserves are defined according to a storage rule in which the expected gain from adding an amount to reserves equals the expected cost of holding that amount of grain until it would be withdrawn.⁶ In other words, the amount of storage is based upon the expectation that investment in holding reserves would yield a normal or usual rate of return on that investment.

⁵For a presentation of the theory, empirical assumptions, and some estimates of reserves, see D. Gale Johnson and Dan Summer, "An Optimization Approach to Grain Reserves for Developing Countries," *Analyses of Grain Reserves, A Proceedings*, compiled by David J. Eaton and W. Scott Steele, Economic Research Service, Report No. 634, Aug. 1976, pp. 56-76.

⁶Put another way, the assumption is that the change in price for the grain from the time the grain is added to the reserve and when it is removed from the reserve equals the costs of holding the grain for the period of time.

As with all other investments, there is no certainty that when grain is added to a reserve that the investment will yield the expected return, but over a period of time the actual return should be approximately the expected return. In our estimates we have assumed that the physical costs of storage were \$7.50 per ton-year and that the real rate of interest was 5 percent.

The estimates of optimal grain reserves presented below are based on two assumptions that must be borne in mind. One is that only production variability has been taken into account; demand variability can also affect the size of optimal reserves and has not been taken into account. For food grains, however, demand variability is very small and would have little effect on the estimates though the same cannot be said for feed grains. The second assumption is that for the country and region estimates, there is free trade in grain within the country or region but net grain trade among countries or among regions is held constant at the 1970 level. Since changes in imports and exports of grain are alternatives to storage for a given country or region, the assumption of constant net trade results in an overestimate of optimal reserves for all countries and regions except possibly North America.⁷

Estimates of optimal reserves (in excess of working stocks) are given in table 1 for some individual countries, certain regions, and the world as a whole. The top part of the table indicates the optimal reserves for six individual countries and all other developing countries of the Far East (except China). The sum of the optimal carryover levels for the individual countries at a probability level of 0.50 for the Far East is 14.8 million tons.⁸ However, if there were free trade within the Far East, the optimal carryover at the same probability level would be just 3.0 million tons. It may also be noted that if there were free trade among all developing regions (excluding China), the optimal carryovers would be very small. Thus, the developing countries could—if they made the effort—achieve a remarkable degree of food security by trading

freely among themselves. It should be noted that if transportation costs were included in the model, optimal carryovers for the developing regions would be increased somewhat for regions, or countries that vary between being net importers and net exporters. However, the effects of this modification would be small.

The estimates of optimal carryover levels for the world indicate the striking effects of free trade upon food security. At least half of the time, optimal carryovers would be nil; in only 1 year out of 20 would such reserves (in excess of working stocks) equal or exceed 18 million tons. Thus, a low cost means of achieving a significant degree of supply and price variability would be free trade; for the developing countries the free trade would not have to be with all countries but only the other developing countries.⁹

The previous discussion has been in terms of free trade in grains in the world or within large regions. Actually, the assumption of free trade is not necessary for meeting the objective of increased stability of international grain prices. It is not trade interferences per se that increase instability of international prices but the forms of trade interferences. The Common Agricultural Policy results in a high average degree of protection for grains produced in the European Community (EC), but it is not the degree of protection that increases the instability of international grain prices. The EC-induced instability of international grain prices results from the implementation of a policy of internal price stability that results in variable degrees of protection for domestic production. The protection is high when international prices are low and increases as international prices decline; the protection is low (or negative) when international prices are high and decreases further as international prices increase. If the same average degree of protection over a period of time were achieved by the use of constant ad valorem (fixed percentage) tariffs, producer and consumer prices in the EC would reflect changes in international grain prices. Net grain trade of the EC would thus be responsive

⁹Perhaps a word of explanation is in order about the implications of estimates of nil or low optimum stocks to price stability and food security. If optimal carryover levels are nil half the time, this means that there is a very small probability that the price increase from one year to the next is expected to exceed the cost of storage. With grain at \$100 per ton, this would mean that price increases from one year to the next are likely to be less than 12.5 percent in real terms. As reserves become larger, the probability of price increases being greater than the costs of storage for one year increases. However, when the optimal reserves for the world are equal to or less than 1.5 percent of world production in 19 years out of 20, price variability would be held to plus or minus 25 percent with a very high degree of probability.

⁷North America may be an exception because of the great importance of net exports in total use of grain produced. Our research is now concentrating on the effects of variability of export demand on the optimal size of reserves.

⁸The optimal carryover levels for 1975 indicated for that year are not meant to imply carryover levels for a specific year. The carryover levels given are based on the distribution of possible supplies (carryin and production) at the beginning of a year. In an actual case, the available supply would be known at the beginning of the year and the optimal carryover level could be estimated. All references are to metric tons.

Table 1--Optimal carryovers for selected countries and regions, 1975

Country or region	1975 trend: production:	Cumulative probability levels		
		0.50	0.75	0.95
-- Million metric tons --				
A. Demand elasticity $n=-.10$:				
Burma	6	0.3	0.7	1.2
India	100	6.5	9.5	13.5
Indonesia	16	1.6	2.9	4.4
Pakistan-Bangladesh	23	1.4	2.4	4.2
Philippines	6	0.1	0.2	0.3
Thailand	13	3.5	4.7	6.2
Other Far East	19	1.4	2.1	3.1
Africa	46	1.5	3.0	5.0
Far East	184	3.0	7.5	12.5
Latin America	78	2.5	5.0	8.5
Near East	48	2.5	4.5	8.5
All developing regions ..	353	2.5	7.5	15.0
Europe	231	1.3	5.5	9.5
North America	270	10.0	18.0	33.0
Oceania	18	8.0	10.5	15.4
USSR	199	28.0	41.0	49.0
World	1,304	0.0	2.0	18.0
B. Demand elasticity $n=-.20$:				
India		2.0	4.0	7.5
Africa		0.0	0.5	2.5
Far East		0.0	1.0	7.0
Developing regions		0.0	1.0	7.0
North America		1.5	8.5	22.0
USSR		13.0	24.0	37.0
World		0.0	0.0	7.0

to international prices, while under the current policy it shows little or no responsiveness. Consequently, it would be possible to achieve a high degree of international food security with substantial degrees of protection to domestic agriculture if the form of the protection were appropriate.¹⁰

Grain Reserves

There is no question that grain reserves could

be managed to minimize fluctuations in available supplies and prices of grain for the world. But

¹⁰The conclusion that fixed ad valorem tariffs do not contribute to international price instability is exactly correct only if the grain demand function has a constant elasticity. With other types of demand functions the conclusion would be affected somewhat. With a linear demand function an ad valorem tariff would limit the price increase from production shortfalls (compared to free trade) and would increase price declines from above average production, for example.

once this is said, it must be noted immediately that given the agricultural and trade policies followed by the nations of the world, no one knows what the appropriate reserve rules should be. The work that we have so far done on optimal carryovers does not provide the answers nor does any other of the numerous studies of grain reserves. It is our hope that we will have some answers, but at the moment it is not obvious that we can adequately measure the international demand destabilizing effects of domestic policies of grain price stability. Without further research work, it is not possible to estimate either the distribution of optimal reserve quantities or the size of reserves required to hold price variability within a given range with a specified probability of success.

It is, I believe, fairly obvious that with the current governmental interferences with trade in grains, a grain reserve, whether operated by the major exporters or an international consortium of both importers and exporters, with the objective of holding international grain prices within specified limits would have a high probability of exhausting available supplies unless the price limits were very wide. If nothing else, this lesson can be learned from the experience of 1972 and 1973.

Obviously, there is some size of grain reserves that would be large enough to compensate for the demand variability induced by national policies as well as the production variability. But it is certain that the costs of such a reserve would substantially exceed the revenues realized by the stockholding agency. But would this represent an efficient use of economic resources? Are the gains, however evaluated, from the added price stability large enough to compensate for the unrecovered costs? In my opinion, there is an alternative program that would make a significantly greater contribution to food security for that part of the world's population that most needs assistance. I refer, of course, to the people of the low income countries.

A Grain Insurance Program

The proposal for a grain insurance program is a simple one. It is that the United States, either alone or in cooperation with other industrial countries, guarantee to each developing country that in any year in which grain production declines more than a given percentage below trend production that the shortfall in excess of that amount would be supplied. This would permit each developing country to achieve a high degree of stability in its domestic supply of grain,

and such stability could be achieved at a relatively low cost to the donor nations. If the developing nations were willing and able to adopt a modest storage program of their own, year-to-year variability in grain supplies could be held to levels within 3 or 4 percent of trend production. Thus, a substantial degree of internal price stability could be achieved at low cost for each developing country.

The selection of percentage shortfall from trend production that would trigger the transfer of grain should reflect two considerations—the incentive for holding reserves in the developing countries and the effect of the insurance payments on the output behavior of the producers in those countries. If the percentage is too low, say between 1 and 2 percent, there would be no economic incentive for holding reserves and the magnitude of the grain transfers would be large enough to significantly reduce the average expected return to local producers and thus lower the rate of growth of domestic grain production. By a process of trial and error, I have concluded that the most appropriate criterion would be 6 percent—all production shortfalls in excess of 6 percent would be met.¹¹

The primary objective of the proposal is to assist the developing countries to hold year-to-year variations in grain consumption to a reasonable or acceptable level. In my opinion, this is the most meaningful definition of food security. The proposal should constitute the primary form of food aid provided by the countries that participate in the provision of the grain insurance. If nothing else, I believe that the insurance feature of the proposal constitutes the most reasonable rationale for food aid to the developing countries.¹² The proposal provides a solution to an important problem confronting many developing countries—variability of food availability at times so extreme that significant hardship results. I know of no similarly important objective that has

¹¹I have called the proposal an insurance program. An insurance program usually implies the payment of a premium. Elsewhere I have briefly discussed the possibilities of charging premiums, at least for some of the higher income developing countries. See "Increased Stability of Grain Supplies in Developing Countries: Optimal Carryovers and Insurance," Jagdish Bhagwati, ed., *The New International Economic Order: The North-South Debate*, Cambridge, MIT Press, 1977, p. 258.

¹²I do not mean to imply that the insurance program should be the only form of food aid but only that it should be the primary form. There are natural disasters, such as the earthquake in Guatemala, that can be partially alleviated by food aid. And some food aid can be effectively utilized in particular development projects or in special nutrition programs. By being "effectively utilized" I mean that the food aid would approximate the effectiveness of an unrestricted cash transfer.

been met by most of the food aid that has been distributed over the past two decades.

The proposal is not put forward as a solution to the long-run objective of expanding per capita food production and consumption in the developing countries. Neither this proposal nor any other form of food aid can make a significant contribution to the expansion of food production. But I am confident that the insurance proposal will not have significant negative effects upon the growth of food production and the same cannot be said about other methods of distributing food aid.

Table 2 presents estimates of the annual payments that would have been made under the insurance program for 1954 through 1973. The countries included in the estimates are all developing countries that produce more than a million tons of grain annually. Developing countries are defined to include all the countries of Latin America, Africa and Asia excluding Japan, South Africa, Argentina, China, North Korea, and North Vietnam. The limitation of the analysis to countries producing more than a million tons of grain was done to limit data collection and processing and has little effect on the results. Some countries, such as Iran and Chile, are included that no longer merit the classification of developing countries, if that concept is synonymous with low-income countries.

The average annual payment for the 19 year period would have been 4.0 million tons if the insurance payment covered all shortfalls in excess of 6 percent for each developing country producing more than 1 million tons. The largest payments would have been 14.8 million tons in 1966 and 13.4 million tons in 1973. The average annual payments under 5-percent and 4-percent programs would have been approximately 13 percent and 30 percent larger, respectively.

The grain insurance proposal requires reasonably accurate data on annual grain production—for the current year and for enough prior years to permit the calculation of the trend level of production for the current year. The proposal does not require data on stocks held in the recipient countries.

The accuracy of data on grain production in many developing countries leaves something to be desired, to put it mildly. The existence of the insurance program could provide an incentive to a government to minimize its estimates of grain production in a given year in order to increase the grain actually transferred. Over time, this practice would be self-defeating since estimates of trend production for future years would be affected by such underestimates. However, since many governments may have a brief expected life, this

self-correcting feature may not be of much value in some cases. It might be necessary for the insurance agency to have the right to obtain grain production estimates from an organization that was independent of both the developing country and the countries providing the grain. It should be noted that for most countries, there will be time within any crop year to adjust and revise production estimates. The insurance payments would normally be spread out over the crop year and in most cases would not be required in the months immediately following the harvest as long as it was known that the shipments were to be forthcoming.

It should be recognized that there are populations in developing countries that rely on food products other than grains for a significant part of their caloric intake. The grain insurance proposal could be adapted to these circumstances and probably should be. It would be possible to translate manioc and potato production, for example, into grain equivalents and include such products in the production data. Unfortunately, the production data for such products are less reliable than for grains. In addition, some recognition should be given to the small populations that depend upon livestock products for a major source of calories. The malnutrition and deaths that occurred in the Sahel were due primarily to the devastation of the livestock herds and not to a reduction in grain production.

CONCLUDING COMMENTS

At the beginning of this paper, I said that it was now possible to prevent nearly all deaths and most of the hardships due to food production shortfalls. If it were not for the existence of civil strife and wars, I believe that it would be possible to essentially eliminate all deaths due to the direct effects of food production variability. If achieved this would be a remarkable accomplishment, one that could not have been imagined as recently as the beginning of this century. The objective cannot be reached solely through the efforts of the United States and the other high-income countries. It requires the cooperation of the governments of the developing countries and, particularly, their willingness to participate in early warning efforts of actual or possible crop failures. While communication difficulties can now be overcome at modest cost, there are still some areas of the world where transport is slow and costly. Where transport facilities are limited, it is essential, if hardship due to weather hazards is to be minimized, that early warning be obtained of pending difficulties.

Table 2--Insurance payments to developing countries for different programs, 1955-73

Year	6 percent	5 percent	4 percent
-- Million metric tons --			
1955	2.2	2.4	2.8
1956	1.0	1.2	1.6
1957	4.5	5.8	7.3
1958	3.0	3.6	4.4
1959	2.8	3.1	3.4
1960	3.3	3.7	4.1
1961	2.9	3.2	3.6
1962	0.1	0.2	0.3
1963	2.1	2.4	2.7
1964	1.0	1.1	1.3
1965	8.1	9.3	10.5
1966	14.8	16.3	18.1
1967	2.2	2.5	2.8
1968	2.2	2.3	2.5
1969	0.6	0.9	1.2
1970	1.2	1.5	1.9
1971	3.6	4.4	4.9
1972	7.9	8.7	10.3
1973	13.4	14.5	15.7
Total	76.9	87.1	99.4

My statement that it is now possible to prevent nearly all deaths and most of the hardships now caused by production shortfalls assumes that governments will use part of the insurance payments to directly benefit agricultural producers whose output is adversely affected. Unless this is done, limiting price increases in the national market may be of little benefit to many food producers. Further, food production shortfalls can be very large in limited areas of a country and hardship—perhaps even starvation—could result from income loss. However, if the area adversely affected is relatively small, the probability is quite high that the population will make sufficient adjustments to prevent starvation.¹³

I wish to repeat that the grain insurance proposal is not intended as a panacea or solution for the long-run problem of food insufficiency, malnutrition, or undernutrition. It would not eliminate hunger due to poverty or general insufficiency of food in any economy. The proposal has an important but limited objective—to minimize the hardships that can and do arise from

fluctuations in food production in the low-income countries. It is important that the progress the world has made in this century in reducing the incidence of famine be continued. The food insurance proposal and further improvement in communication and transportation would contribute significantly to that end.

My final comment is that the grain insurance proposal is inferior to a liberalization of trade in agricultural products as a means to achieve world food security. Trade liberalization would not only contribute to stability of prices and supplies of

¹³I especially commend a remarkable article by Morris David Morris, "What is Famine?" *Economic and Political Weekly*, Vol. IX, No. 44 (Nov. 2, 1974), pp 1855-64. He provides an excellent analysis of the means used by Indian farmers to adjust to famine conditions, especially in areas subject to a high probability of drought. These range from choice of crops, storage of water, accumulation of gold and silver (often in the form of jewelry), to migration. Morris quite rightly points out that great care must be exercised in designing relief efforts for areas subject to periodic rain deficiency in order that the local mechanisms designed to preserve life and activity will not be destroyed.

food, but would also increase the per capita real income of the low-income countries. The most

reliable means for reducing food insufficiency among poor people is to increase their incomes.

INTERNATIONAL FOOD SECURITY: THE ISSUES AND THE ALTERNATIVES

by
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I. Introduction

International or world food security can be broadly or narrowly defined. At its narrowest point it centers on food reserves, especially cereal reserves, which are *the* basic food. At its broadest point it encompasses practically every dimension of the world food system, including balanced food production, food aid, food reserves, emergency food assistance, nutrition programs, marketing and distribution of food and of the inputs to produce food, food trade, and systems of information about food production and consumption.

The issues and alternatives before us are fairly clear. The most critical, immediate issue, which I shall return to later, is whether a grain reserve will be established and if so, how large will it be and how will it be managed, financed, and held. The more fundamental issues involve (1) whether the world food system will be restructured so that food production is more directly related to demand and needs, regionally, by country, and within countries; (2) whether a serious effort will be undertaken to reduce malnutrition and hunger in the world; and (3) whether the world food trade system will be restructured to facilitate the above and provide greater diversification of food supplies and more stability and security in food markets.

Let me turn first to these fundamental issues because they determine, in important respects, the need for and the dimensions of a grain reserve. But before doing so, I want to be clear on one point, my bias if you will: a grain reserve is *the* basic pillar of any system of food security. A grain reserve is necessary now and one will be in the future, even with maximum improvements in the world food system. The need for a grain reserve springs from the basic economic relationship that affects cereals: the inflexibility (inelasticity) of the demand for basic foods and the inconsistency of the supply of the basic foods. It is depressing that in the last quarter of the

twentieth century this well-known characteristic of the demand and supply of basic foods is so poorly understood. Its relevance is simple and direct: without grain reserves, fluctuations in grain supplies, which are unavoidable, result in greater than proportional fluctuations in prices. These disproportionate fluctuations in prices—the extremes of which were demonstrated in 1972-76—balloon outward to the rest of the economy which is linked to grains—not only consumers of other foods and livestock producers, but the whole structure of the economy including government expenditures, and they feed back to producers, giving distorted signals to increase production or to reduce it. Especially significant is the impact on poor consumers—in Bangladesh and in New York—who spend much of their income on food and much of that on basic foods (flour, bread, rice and beans). Upward movements in grain prices have an immediate detrimental effect on the food consumption of these poor consumers, many of whom already suffer from inadequate diet.

II. A Better Balance Between Food Production and Demand

True world food security depends on a better balance between food production and demand in the world as a whole. The imbalance which has long been recognized and has been worsening since 1950—increasing food deficits in developing countries and persistent food surpluses in many developed countries—is producing a progressively greater degree of food insecurity because of the dependence of one part of the world on the surplus food production of another. Any disruption of this system, as happened in 1972-74, immediately reduces the food security of the dependent element. Moreover, the dependent element—the poor, food-deficit developing countries and especially their poorest consumers—is especially vulnerable since

in times of food scarcity and high prices, its command over available food supplies is much weaker than that of the higher income developed or developing importing countries, and the exporting countries can and have restricted exports to protect internal supplies.

One of the issues to be faced, therefore, is the degree to which efforts will be made and resources expended to increase the food production of those developing countries, and of those producers in them, which do not now produce sufficient food and cannot be reasonably expected to provide for their food supply through imports. The "food gap" of the developing countries has been variously described as having grown from zero in 1950 to around 20 million tons by 1970 and to around 45 million tons in 1974. Projections place the gap at 80 to 100 million tons by 1985, and at substantially larger quantities thereafter, unless past production trends are reversed. In truth, however, the "food gap" of major concern is about half these amounts, the proportion accounted for by those developing countries which cannot depend upon food imports.

An alternative has been proposed that the world should, or will inevitably, become progressively more dependent on the major food exporting countries. But this "alternative" is hardly realistic. Certainly the growing world demand for food requires continued increases in food production in the developed countries, but it is out of the question that food transfers of the magnitude projected could take place. Also, it has been evident since 1972 that many producing countries are unwilling to continue to produce surpluses. A more fundamental reason why this is not a realistic alternative is that food production is the core of economic, social, and human viability in the poorest, food-deficit developing countries. Employment and income possibilities in these countries depend to a very large extent on the development of their food and rural sectors.

Thus, the issue is not whether food production should be increased in the developing countries, but how it can be increased, especially among these producing groups where the need is greatest. The extent and degree to which resources and efforts are directed toward this end, by the developing countries involved and by the rest of the world, will therefore be a major determinant of world food security in the future.

III. The Malnourished—Where Food Insecurity is Greatest

Another fundamental determinant of world food security is the degree to which the goal of the World Food Conference, to "Eradicate Hunger and Malnutrition," is seriously undertaken on a

national and international basis. Governments at the World Food Conference considered this undertaking feasible within a decade, although since the World Food Conference little has been done to indicate that a serious intent to commence this process is underway.

Nevertheless, the major objective of any system of world food security should be to secure the food supply of those human beings who do not have enough food to eat. The World Food Council is considering this June some basic elements necessary to undertake a systematic reduction in malnutrition. These elements consist of a combination of food production, food aid, nutrition, and belated efforts directed at the hungry and malnourished, in association with rural development and basic needs programs combined with socio-economic reforms. To the extent that such an effort is supported, the element of world food insecurity which lies outside the "effective demand" spectrum can be progressively reduced and food security thereby improved.

While the idea of attempting to eradicate or significantly reduce malnutrition is often considered a pious hope at best and ridiculed at worst, it is in fact both realistic and feasible. There are countries and economic systems which have done it and it can be accomplished by all systems. Moreover, it would make little sense to talk about world food security in a world where something like 500 million people are daily unable to obtain an adequate diet. Therefore, any serious consideration of achieving world food security must include a combined effort, on a substantial scale, directed at increasing food production among malnourished farmers, and increasing employment and income among those malnourished who are not farmers. In the meantime, however, and that "meantime" is probably 10 to 20 years even with a massive effort, rapid reductions in malnutrition will require large amounts of food aid (substantially larger than now exist) and major nutrition improvement programs.

IV. The Food Trade and Marketing Components of Food Security

To the extent that food, like other commodities, moves freely, rapidly, and efficiently between communities, within countries, and between nations, and to the extent that all consumers are effectively able to command a basic food supply, the degree of food security is maximized, so long as the food supply is not disrupted.

It is often argued that liberalized food trade and improved marketing and distribution systems for food would greatly reduce the cost of food and improve world food security. This is undoubtedly correct, but food has proven to be an especially

difficult commodity to deal with in international trade negotiations. Developed countries, both food importers and food exporters, have systems of protection for their food sectors which greatly distort the pattern of world food production and seriously limit the possibilities for improving food security through trade liberalization. Furthermore, the absence of food reserves in recent years has greatly reduced the limited degree of world food security that existed before 1972.

The poor food production performance of the developing countries over the past two decades and the resurgence of efforts to achieve food self-sufficiency since 1972 cannot be disassociated from these phenomena. Limited export markets for food, further reduced and made more unstable by the disposal of surpluses in international markets, reduced the incentive to produce food and agricultural products in the developing countries. The unattractiveness and instability of food export markets, combined with the relative abundance and low cost of food in international markets, due in part to subsidized production, contributed to the development policies of many developing countries which emphasized industry and gave a low priority to food and agricultural production.

In a world where the availability of food through imports is neither stable with respect to price nor secure with respect to quantity, as has been the case since 1972, the tendency of many countries to be as self-sufficient as possible in food is reinforced. In addition, the greater the degree of instability and insecurity that prevails in the world, the greater is the need for large and locally maintained food reserves to overcome these high degrees of instability.

V. The Relevance of Food Reserves to World Food Security

While the above mentioned changes in the world food system are necessary components of any fundamental system of world food security, attention has centered upon a grain reserve because with the existing system of food production and distribution in the world, a grain reserve would at least ensure continuity in the supply of basic cereals within that system. For largely unintended reasons, the major grain exporting countries accumulated and maintained grain stocks after World War II which were more than sufficient to overcome any disruption in the world grain supply. As a result, little attention was given to the role of grain reserves as a stabilizing and food security-providing device benefiting producers and consumers and exporters and importers. These stocks were maintained and financed by the grain exporting countries, and

while they came into being originally to assist producers, they gradually came to be looked upon by both producers and consumers as a large and unnecessary financial burden. In the late 1960's, decisions were made to reduce the burden of large stocks, and production, especially of wheat, was cut back—sharply in the United States, Canada, Australia, and Argentina—and grain prices to users were allowed to fall to extremely low levels, stimulating the use of wheat for livestock feed and other nonfeed uses.

The effect of this action, in conjunction with large imports by the Soviet Union and production shortfalls in 1972 and 1974, is still not adequately recognized as a major contributor to the world food crises of 1972-74. The production shortfalls of 1972 and 1974 would have had little impact on the world food system had production and stocks not been deliberately reduced.

Since the catastrophic undercutting of world food security which took place in the late 1960's and early 1970's, there have been a flood of proposals for and analyses of grain reserves and systems of world food security. The most comprehensive is that proposed by FAO in 1973 and supported by a resolution of the World Food Conference in 1974, which calls for a system of nationally held stocks, developed along voluntary guidelines, visualizing regular consultations among countries regarding the adequacy of existing stock levels and assistance to developing countries to build up their own stocks. The proposal also continued provisions for an improved food information system.

But this proposal, as well as numerous others, has received scant attention in the face of the absence of grain stocks, short grain supplies, and high grain prices which characterized the period from mid-1972 to mid-1976. But things have changed now and it is time to change our attitude about a grain reserve.

VI. Improved Opportunities for a Reserve

Since 1972, discussions of a grain reserve have been largely academic. The positions between conflicting groups within countries and in the International Wheat Council (IWC) and the General Agreement on Tariffs and Trade (GATT) have been immobilized by the distortions in grain markets; and since there were no stocks there seemed little possibility of creating a reserve. But this situation has now changed drastically. For the first time since 1972, the question of grain reserves can be taken up in an atmosphere in which the stocks from which reserves must be built exist.

Discussions at the IWC—which could lead to a formula for negotiations within GATT or the

United Nations Conference on Trade and Development (UNCTAD)—have been stymied by two issues. First, the preference of the United States for quantity rather than price indicators, which was resisted by other interested parties. Recently, the U.S. Secretary of Agriculture has expressed the belief that some sort of "price corridors" might be agreed upon, thereby signalling the prospect that this key issue might be resolved. Second, the European Economic Community (EEC) has taken the position that the grain reserves question should be taken up in the Multilateral Trade Negotiations (MTN's) instead of the IWC. In view of the central role of wheat in any reserves agreement, and of the close relationship of any such agreement to any economic provisions of a renewed wheat agreement, it would seem that the IWC—with its established specialization in wheat—would be the appropriate body in which to continue these discussions, recognizing that official negotiations over the results of these discussions could be moved to the MTN's or UNCTAD. *Of critical importance is to seize the present opportunity, with ample current stocks of wheat at low prices, to establish some reserves as insurance against any repetition of the disaster of 1973-74.* This opportunity must not be lost in protracted discussions over which is the proper agency or which is the proper indicator—every government, and especially those of the major importing and exporting countries, should bring to intensified reserve negotiations a fresh spirit of compromise born out of the replenishment of world stocks.

World carryover stocks of cereals are presently some 40 million tons larger than they were a year ago. FAO estimated a world carryover of 109-112 million tons in April 1976. The estimated carryover for this crop year was 155 million tons, which—apart from the possibility of further upward revisions—does not take account of the much-improved Soviet crop and the improved stocks situation which that strongly implies. The stocks recovery from the depressed level of recent years is shown in figure 1. The major improvement has been in wheat stocks, which in April 1976 were forecast to be 48 million tons, and in March 1977 were forecast to be 83 million tons, for 1977. World carryover stocks of wheat, even excluding stocks in China and the Soviet Union, are projected to be the highest in history, higher even than in the late 1960's. Export prices of wheat have been at or below \$110 per ton since November 1976, compared with \$144 a year ago, and \$221 in February 1974. But these prices in current dollars do not reflect the full picture of wheat price levels. In terms of the U.S. cost of production, wheat prices have declined signifi-

cantly from the level prevailing in 1970, before the food crisis.

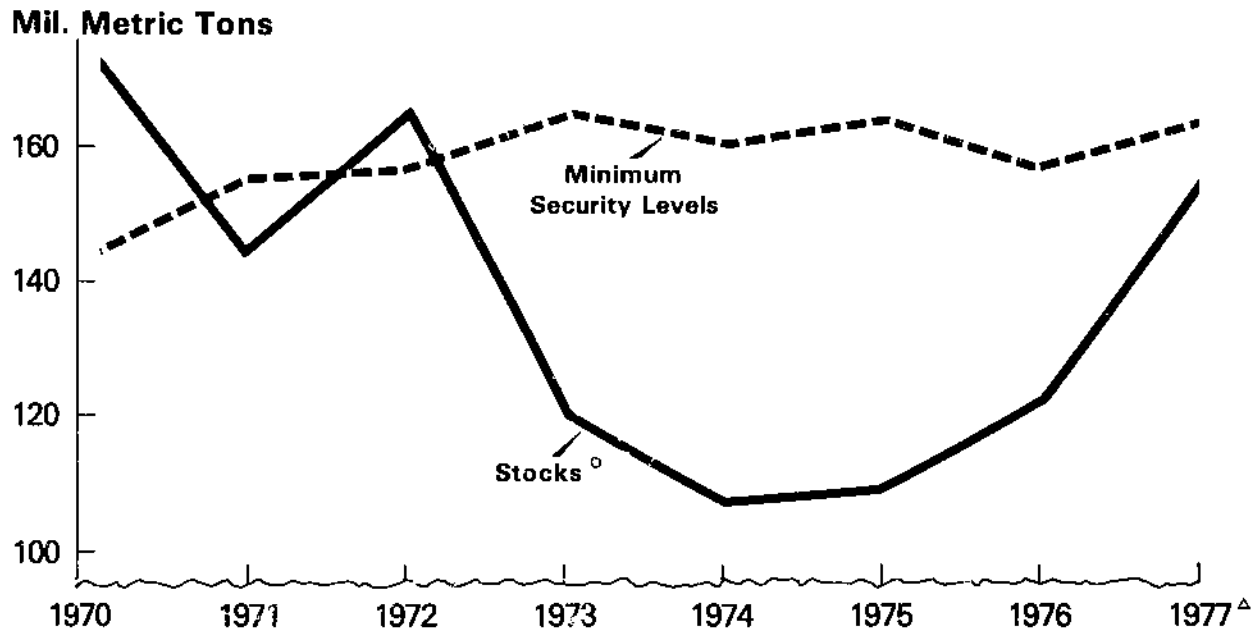
Since 1971, wheat prices first rose dramatically and have subsequently declined to a current farm-price level of \$2.40 per bushel (\$88 per metric ton). Meanwhile, the index of prices paid by (all) U.S. farmers for production inputs has doubled since 1967 (table 1). Even though productivity gains may have partially offset the rise in the cost of production, the current wheat price level (only 20 percent higher than the level of the decade ending in 1971) is *much* lower than the 1971 price relative to production costs. A similar pattern of price relationships is evident in data of other major grain exporting countries. Moreover, export prices of wheat are currently lower than those for corn; which means that wheat is being priced as animal feedstuff because of insufficient commercial demand for wheat as human food—a relationship which is historically rare. In several respects, wheat is actually cheaper than it was in 1970: relative to the cost of production in the major exporting countries; relative to other cereals; relative to the unit value index of agricultural exports of developing countries; and relative to the unit value index of all their exports, excluding petroleum. In consequence of the 1976 record wheat crop, imports have declined by 10 million tons, and most of the stocks above current consumption requirements are held in the major exporting countries.

At the end of the current crop year, the world is expected to have some 40-50 million tons of wheat over and above current requirements. *What happens to this wheat will have a greater impact upon world food security than any other single event within the power of man.* Judging from past history, one of two courses might be taken, either one of which could invite disaster. The governments of the exporting countries could view this wheat as a *surplus*. If this occurs, efforts could be made by governments to dispose of the wheat (through export subsidies, price wars, indiscriminate increases in food aid, conversion to nonfood uses, etc.) in order to avoid the costs of holding it. Moreover, if this wheat is seen as surplus, efforts to restrict production could ensue. The margin against disaster which now exists could be deliberately reduced because of the immediate economic problem caused by surpluses in the exporting countries. Without a shared sense of responsibility among producers and consumers and exporters and importers alike to create a reserve now, these "surplus" problems could take precedence over the disaster which is uncertain in its later timing and which will be largely felt elsewhere.

The other course which could prove equally disastrous would be for governments to take no

WORLD CEREAL CARRYOVER STOCKS AND MINIMUM SECURITY LEVELS

(Excluding USSR and People's Republic of China)



◊ WHEAT, COARSE GRAINS, AND MILLED RICE. Δ ESTIMATED.
SOURCE: FOOD AND AGRICULTURE ORGANIZATION.

Figure 1

policy initiatives at all with regard to this wheat, leaving its eventual utilization to the whims of the market or the weather. This would leave the world in its present unstable and critically dangerous state of food insecurity. A repetition of the 1972-74 disaster would only be a matter of time. With grains, especially wheat, relatively low prices, their use for less essential purposes would be stimulated and the incentive to produce them reduced. If this were to happen and if the coming year produced important grain shortfalls, the world would again be without stocks and prices would rise sharply.

VII. The Urgent Need for a Grain Reserve

The *third* course of action is the only one which does not court disaster. That is for governments to exert the political will, now, while the wheat is available, to acquire and hold a substantial portion of the carryover as a reserve against well-defined emergencies and commercial contingencies, and to earmark part of these reserves for the needs of low-income, food-deficit developing countries. Even the most optimistic

prospects for trade liberalization and agricultural adjustment cannot accomplish, in the short run, what can be accomplished by converting some current stocks into reserves; namely, assurance that the price convulsions and supply distortions of 1973-74 will not be repeated again.

It is critical that governments recognize the influence of relatively minor changes in the level of world carryover stocks upon cereal price levels and therefore upon world food security and decisions to produce or use grain. World carryover stocks at the end of the current crop year are projected to be not more than 50 million tons above the 1973-74 level (excluding stocks in China and the Soviet Union). This is less than 4 percent of total world production. Fifty million tons equals the *change* in North American production between 1974 and 1975 owing to weather; and it is less than the change in production in the Soviet Union between 1975 and 1976 owing to weather. It represents also only 2 years' production from the area that the major exporters held *out of production* in 1970. Thus, 50 million tons can easily be lost to production restrictions or to

Table 1--Prices paid by farmers, United States, index numbers,
annual 1970-75 and December 15, 1976

Year	All production costs	Tractors etc.	Other machinery	Fertilizer	Fuels	Interest	Living costs
	1967 = 100						
1970	112	116	116	88	104	135	114
1971	120	122	122	91	107	147	118
1972	126	128	130	94	108	164	123
1973	149	137	139	102	116	189	133
1974	169	161	159	167	159	227	151
1975	186	195	197	217	177	265	166
1976	201	<u>1/</u> 224	<u>1/</u> 233	<u>2/</u> 177	191	302	<u>3/</u> 174

1/ Sept. 15, 1976.

2/ Oct. 15, 1976.

3/ Nov. 15, 1976.

Source: Current Economic Indicators, U.S. Department of Commerce.

weather fluctuations. Fifty million tons is thus a small quantity of cereals. But it also represents more than one-third of world cereal exports and about one-half of the minimum carryover stocks required (the FAO estimate is 105 million tons, excluding stocks in China and the Soviet Union). Because of the significance of 50 million tons at the margin, its leverage effect upon price is greatly magnified. The difference between having and not having the marginal 50 million tons—worth only \$5-\$6 billion at current prices, costs which could be largely recovered when these grains are used in times of shortfall—can mean many billions of dollars in the internal food bills of developed as well as developing countries, and many billions of dollars in the balance of payments between importing and exporting countries. Fifty million tons is also approximately the amount by which 1976 world cereal production will exceed its (1960-75) trend value, as it did also in 1971 and 1973. But those abundant harvests (no other grain crops have so greatly exceeded the trend value) were not managed so as to ameliorate the impact of subsequent shortfalls. Opportunity has knocked once again, and this time governments must respond.

VIII. Elements of a Reserve

If the stocks exist out of which to build a reserve, do we know enough about one to get started? I think we do. The analysis is extensive on the quantities needed, alternative forms of participation, the costs and how costs might be shared, release mechanisms, and the location of a reserve. The alternatives have been spelled out rather clearly. The vast majority of analytical efforts center around three different types and levels of reserves:

- (a) an insurance reserve of around 20-30 million tons;
- (b) a stabilization reserve of around 60 million tons; and
- (c) a combined food aid-emergency relief—contingency reserve — ranging between 30 and 60 million tons.

The general case for an insurance reserve of from 20 to 30 million tons has been presented in a number of studies (1-4). The advantages of an insurance reserve are that the quantities involved are moderate, as are the costs, and considerable room is allowed for market forces to reflect demand and supply within wide price bands. Such reserves would not become available until prices or production or consumption shortfalls had reached predetermined levels. The intent is that individuals and countries would absorb some fraction of their shortfalls in grain availability, while the insurance reserve would become effective to halt the extreme

of such occurrences. The costs of such a reserve are minimal.

Studies with the objective of determining the size of a reserve needed to offset deviations in trend production or consumption, with the underlying objective of providing a high degree of stability to grain prices and supplies and offsetting a large fraction of grain shortfalls, arrive at quantities in the neighborhood of 60 million tons (5-7).

Proposals have also been made during the past 2 years, when action on a reserve was hopelessly deadlocked and stocks were precariously low, of linking minimum levels of food aid (10 million tons), emergency relief (500,000 tons), and some minimum contingency reserve (15 to 20 million tons), forming a package which would provide some measure of food security to poor developing countries and some measure of international grain stability within wide price bands (8 and 9).

These approaches are mutually consistent. Depending on what a reserve is expected to accomplish, the level would need to be somewhere between 30 and 60 million tons.

All countries should participate in a reserve, at least the major importers and exporters. But, if this is not possible, those not participating should not benefit from a reserve at the expense of those who do. A wide variety of cost sharing arrangements have been proposed based on relative GNP, share in exports and imports, or contributions to fluctuations in supply or demand. Ability to pay and relative contribution to instability or dependence on stability seem to dominate as a basis for cost sharing, with broad general agreement that poor, developing countries should not be required to contribute or should contribute at a reduced rate.

Even on the issue of the release mechanism, there seems to be a convergence of agreement that prices are the relevant indicator, although some supporting production indicators might be employed. Whether stocks should be held in a few countries or many has also been explored extensively, with the general conclusion that if supply is assured the bulk of the reserve could be held in the major exporting countries, but that some reserve capacity is needed in vulnerable developing countries.

An international reserve would be preferable because of the cost effectiveness and flexibility such a reserve would have. But in the face of the political complexity of working out an international reserve, a system of national grain reserves worked out in the IWC and negotiated in GATT or UNCTAD seems feasible now. But, if this is not possible, then a system of national reserves, along the lines proposed by FAO is preferable to no reserve (10).

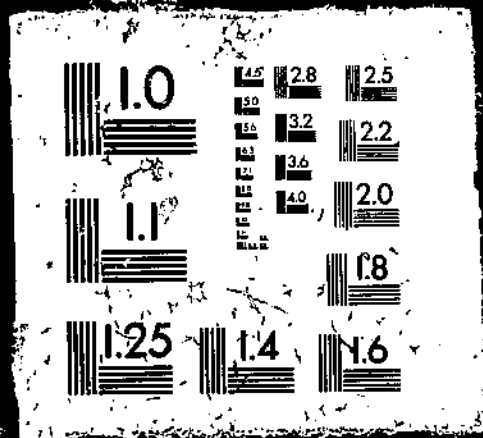
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FAER-143 INTERNATIONAL FOOD POLICY ISSUES: A PROCEEDINGS, / JOSEPH.
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A disturbing note that persists in the discussion of grain reserves is that they impose a large financial hardship. A number of studies have pointed out that, once established, a 22-million-ton wheat reserve in the United States would cost annually about \$300 million, and a 30- to 40-million-ton stock of coarse grains and wheat, \$400 to \$600 million. To establish such reserves would, of course, initially involve substantial outlays, but these would be recovered when the stocks were released. Also, the annual costs would fluctuate substantially because in some years large accumulations would take place while in other years there would be releases. An insurance reserve of 22 million tons, once in operation, would cost substantially less, around \$200 million annually, while a stock of 60 million would cost between \$650 and \$750 million (3, 4, and 7).

In my opinion, the high cost of grain reserves is a phantom. Relative to the cost of *not* having a grain reserve, the only reasonable conclusion is that the operating costs of either an insurance reserve of 20 to 30 million tons or a stabilization reserve of 60 million tons are modest. The cumulative cost to the developing countries of not having a grain reserve was nearly \$12 billion during 1973-75 (8 and 9). The costs to consumers in all countries where international price changes are reflected internally would be substantial multiples of the costs to the developing countries.

Certainly there will be costs involved in holding a reserve. But the relevant question is, are the costs justified by the benefits? If the benefits are properly calculated, rather than simply concentrating on the costs of stocks as such, the phantom of the "burden" of maintaining reserves could be set aside.

IX. The Advantages and Disadvantages of a Reserve

The advantages of a reserve as usually given are providing for unexpected contingencies, providing for emergency relief, and lending stability to grain markets. The first two advantages are fairly obvious, but the advantages of stability are often overlooked. Stability in grain prices greatly reduces the risk of grain production, speeding the adoption of new technologies and encouraging new investments. Also, stability discourages hoarding and smoothes out the supply of grain, especially in developing countries where both private and public action tend to distort price movements in periods of both shortage and surplus. And there is also an important "humanitarian" element deriving from stable prices of basic foods. In periods of food shortages and high food prices, it is the women and children of the

already malnourished population who must survive with even less food. The longrun value of making sure this does not happen cannot be calculated, but it would be hard to argue that it was less than \$300 to \$600 million a year.

Unstable world grain prices also do not give the right signals to farmers, especially developing country farmers, the very people who must increase their food production. The high prices of 1973-75 had a tremendous effect on stimulating grain production in 1975 and 1976, as did the efforts to induce the "green revolution" in the late 1960's through subsidies and assistance. But what will happen now as grain prices are dropping rapidly, and what happened to the "green revolution" as prices fell and subsidies were withdrawn in the late 1960's and early 1970's?

The disadvantages of a grain reserve are usually given as the "burdensome costs" mentioned above. Recently, much stress has been placed on the depressing effect on production of large stocks overhanging the market and being used in surplus disposal programs facilitating price depressant policies in developing countries. These are important criticisms and nobody would want to see a return to the indiscriminate buildup and use of stocks that characterized the 1960's. But there has been a tendency to lose sight of why the policies that eventually gave rise to these surpluses came into existence. They were intended to benefit producers by providing stability to them, and especially guarding them against deep price declines. That the stocks which accumulated were not properly used and that they did depress prices in developed and developing countries and resulted in indiscriminate uses of food, is now, I think, well recognized. But to conclude that producers will always benefit from low reserves seems to me to overlook the evidence of the past 40 years.

There has been an overemphasis in recent years on the gains and losses to producers and consumers and to exporters and importers from a reserve. This, in itself, could be considered one of the costs of not having a reserve: an enhanced concentration on the acquisitive aspects of dealing in basic foods. But the time frame has been short. Until the end of 1975 the benefits of no reserve largely favored producers and grain exporters and these short-term advantages have been reinforced by the widespread panic since 1972 that the world was running out of food and that the future would be one of a persistent tendency toward supply shortage.

But it should be clear by now that consumers and importing countries benefit from a reserve, probably more than producers. The analytical evidence points in this direction (1). But there still

seems to be limited recognition of this among consumers and importing countries, largely because of the failure to demonstrate forcefully the costs of not holding reserves.

X. Conclusions

To me the conclusions are obvious. A grain reserve can be created this year because the stocks exist to do so. That reserve can either be of an insurance type of 20 to 30 million tons or a major stabilization reserve of 50 to 60 million tons. In either case the costs, when measured against the costs of not holding stocks, are modest. All major developed countries, both importers and exporters, including the Soviet Union, should share in the costs of these reserves, and governments should recognize that the maintenance of such a reserve is for the general welfare and proper management should benefit both consumers and producers.

The most effective way of achieving a reserve rapidly is for those countries which have the stocks to create their own reserves now and return to the IWC and work out the details of how such a reserve would be managed internationally through a new grains agreement.

It is imperative that wheat production not be reduced now and that new subsidies not be introduced. There are people in the world who are hungry. The poor, food-deficit developing countries have not, with a few exceptions, commenced the needed increases in their own production and it will be some years until they are able to. Therefore, any surpluses in grain production beyond those needed for a reserve should be directed toward improving nutrition and stimulating development through food aid. Only when a reserve has been achieved and these development and nutrition objectives have been satisfied should consideration be given to modifying efforts to expand cereals production.

While it is desirable that an international grain reserve with equitable cost sharing be achieved, a reserve cannot be foregone because

some countries refuse to accept their obligations. The benefits of a reserve are so substantial and the need for world food security so great that reserves should be established in all countries willing and able to do so, and the willingness to create these reserves should be used, if necessary, as a moral wedge to convince other countries to join in a broader based reserve.

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COMMENT

by
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In his address to the World Food Conference, convened in this city in 1963, then President Kennedy said "... We have the ability, as members of

the human race. We have the means, we have the capacity to eliminate hunger from the face of the earth in our lifetime. We need only the will."

Since then, much the same point has been made by many speakers in many conferences, and the 1974 World Food Conference reduced the time period to 10 years. Just now Professor Johnson has said, "The primary reason we have failed to achieve the degree of international food security that is now possible is not nature but man." This is a point we need to keep very much in mind as we continue our quest for food security. Given the political will to do so, on the part of both developed and developing countries, the world's population could be adequately nourished, at least today and for some as yet undetermined time into the future.

As a first observation, I want to elaborate on Harry Walters' reference to the comprehensive system of world food security proposed by FAO. FAO has learned, from a number of unsuccessful attempts in the more than 30 years of its existence, that an internationally managed reserve scheme is not a politically acceptable approach to world food security. In 1973, we became more modest, or politically realistic, and presented to our Conference the *International Undertaking on World Food Security*. It has subsequently been endorsed by the World Food Conference and accepted in principle by 71 countries, not, unfortunately, including the USSR and the People's Republic of China.

The *Undertaking* provides a statement of principles and guidelines for *voluntary national action*, and international cooperation and coordination, in establishing national reserves and a variety of other measures for achieving food security.

The essence of the *Undertaking* is agreement on seven points on the part of accepting governments:

(1) To recognize that world food security is a common responsibility of *all* nations, and to *cooperate* with each other to ensure the availability at all times of adequate world supplies of basic foodstuffs, primarily cereals, so as to prevent acute food shortages in the event of widespread crop failures or national disasters;

(2) To sustain a steady expansion of production, to reduce fluctuations in production and prices, and to adopt national and international measures to ensure more rapid growth of food production and, in particular, to assist the developing countries; it is on this expansion of production, as several speakers here have recognized, that the greatest emphasis must be placed for achieving longrun security for the poorer nations.

(3) To adopt national cereal stock policies *which take into account the policies of other countries and ensure a minimum safe level of basic cereal stocks for the world as a whole, i.e.,*

to establish stock targets or objectives which maintain stocks in each country at least at the levels necessary to ensure continuity of supplies (including provision for emergency situations) and also to ensure that such stocks are replenished whenever they have been drawn below such minimum levels. Incidentally, FAO, through its food security assistance scheme, is helping less developed country governments develop their stock policies and establish stocks.

(4) In periods of acute shortages, to make available for export, on reasonable terms, any stocks in excess of minimum safe levels for meeting domestic needs and emergencies, and to earmark, where possible, stocks or funds for international emergency relief;

(5) To promote the active participation of developing countries in the *Undertaking* by assisting the agricultural production and stock programs of these countries;

(6) To furnish all available information on national stock levels, stockholding programs and policies, current and prospective export availabilities and import requirements of cereals, and on all relevant aspects of the supply and demand situation;

(7) And to consult together, through the FAO Committee on World Food Security, on the progress achieved in implementing the *Undertaking* and on action required to resolve urgent food security problems.

I would end my reference to the *Undertaking* by stating that the FAO Committee on World Food Security, which met in Rome last week, noted the currently improved supply situation but also noted the fragility of the security associated with the limited progress in expanding production in the poorer countries and the absence of any international agreement on actual establishment of reserves.

Now, for several quick further points relating to the presentations by Professor Johnson and Mr. Walters:

Perhaps Professor Johnson moves too far toward creating an attitude of complacency when he speaks of the decreased variability in world grain production and the lessening incidence of famine. The absolute numbers of under and malnourished would appear to be increasing. Given the knowledge and means at our disposal today, surely concern must be with improving nutrition and not solely with preventing starvation in emergencies. While Professor Johnson's insurance scheme is a welcome step in the right direction, something more is needed to achieve some degree of price stability and thus keep poorer nations and consumers in the market.

It is also worth noting that such variability in production as does occur is mainly weather induced and thus largely uncontrollable. In the absence of grain reserves, the variability on the downward side and associated price upswings still pose an unacceptable burden for poor nations and unnecessary suffering for poorer people everywhere. There is also the danger that temporary upswings in production and associated downward pressure on prices may serve as disincentives to badly needed continuity of production increases.

Professor Johnson suggests that, "If an early warning system were created, most of the suffering from food insufficiency due to natural causes could be avoided." By way of a commercial, I should say that such a system does exist in FAO. Its output consists of four types of reports:

- (1) Food Outlook (quarterly),
- (2) Food Information (monthly supplement),
- (3) Food Crops and Shortages (monthly), and
- (4) Special Crop Reports and Special Reports on Import Requirements of the Most Seriously Affected Countries.

Last week's meeting of the Committee on World Food Security expressed satisfaction with the system. Within FAO we are less satisfied and continue efforts to improve the comprehensiveness, timeliness, and accuracy of the system's output. Information generated by the system goes to all participating governments, of which there are now 86, and to EC and SIECA.

Professor Johnson expresses the view that his insurance proposal constitutes the most reasonable rationale for food aid. While accepting that this is indeed a commendable use of food aid, I would join earlier speakers and suggest that the use of food aid for development projects, establishing national reserves, and nutrition programs should not be downgraded. A review of the achievements of the World Food Program in these areas would, I believe, support my suggestion. Another rationale for food aid, which merits strong consideration, is Dr. Timmer's suggestion yesterday that food aid could be a politically acceptable way of expanding transfer of resources to the poorer countries.

The case for a food reserve scheme is usually made on the basis of its benefits to the importing nation. What has not come out very strongly in our discussions is the possibility that such a scheme would assist, perhaps even be essential, in simultaneous achievement of stated U.S. policy objectives such as: ensuring continuity in supplies to domestic consumers at prices reasonable to them; serving as a reliable source of supply for

commercial importers; meeting food aid commitments on a continuing basis; ensuring continuity in markets for farmers at prices reasonable to them; and through avoiding extreme year-to-year adjustments in patterns of production thereby achieving more efficient use of resources.

Professor Johnson's definition of optimal reserves for individual countries is an example of a narrow view of costs and returns. While it is obviously necessary to know the direct costs and returns from storage as one of the elements in making a policy decision, I would suggest that such knowledge must be supplemented by the broader considerations Mr. Walters has presented. My own view is that neither the United States nor the rest of the world can afford the broader economic, moral, and political costs of not holding reserves.

While on the subject of storage, I should like to make one other observation. Mr. Walters refers to the general conclusion that if supply is assured, the bulk of the reserve could be held in major exporting countries. These countries certainly have the facilities and know-how and could probably assure the lowest direct costs. It must also be observed, however, that some storage facilities are required in the poorer countries both to provide producer incentives for continuous expansion of production and to help prevent the very considerable loss of grains after harvest. This prevention of post-harvest losses is probably one of the lowest cost means of enhancing food security. It is one to which FAO is giving considerable attention.

The liberalization of trade so strongly advocated by Professor Johnson is supported, but as one element in the quest for food security and not as a substitute for reserves. I do want to wholeheartedly endorse the proposition that the most reliable means for reducing food insufficiency among poor people is to increase their income. Improved terms of trade, expanded financial assistance, more innovative technical assistance, food aid and reserves are all part of the package. Most important of all are the tough political decisions that the poorer countries themselves need to take to effect more equitable access to resources and services, to expand employment, and generally to achieve improved distribution of income.

To conclude, I want to join Mr. Walters in saying now is the time to stop talking and get on with the job of actually establishing reserves. With ample current stocks of wheat at low prices, the world cannot afford to miss the opportunity to provide some insurance against the disaster which looms the next time major producing areas simultaneously experience a bad crop year.

COMMENT

by
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The connection made by Professor Johnson between agricultural trade barriers and price stability is an important relationship. When supplies are short and prices high, an open trading environment in which prices to end users are free to fluctuate and to help ration available supplies will minimize the extent of the price variation. Today, the rationing must occur in only a few consuming areas of the world, with the result that the price distortion must be large to obtain the desired reduction in consumption.

An important example of this price rationing occurred in 1970 and again in 1974 when corn supplies were reduced in the United States and yet exports were maintained because of price rationing in the United States, as cattle were fed more grass and less grain. The price disruptions could have been reduced if this form of rationing could have occurred in other countries.

The converse of this situation may be of even greater importance. If prices to end-users could more fully reflect large supplies and depressed prices, this would ease the problem, in the United States and elsewhere, of low farm income and high direct payment costs that result in premature programs to idle productive cropland. If world buyers were encouraged to stockpile some additional supplies when prices were depressed, it would be doubly helpful in stabilizing prices.

In my work at the Brookings Institution, I was surprised to see the effect that full production in U.S. agriculture had on the required size of a reserve stockpile to protect against a given variation in production shortfall from trend consumption in consuming countries. When U.S. cropland can be kept in production, the danger of running short of food is greatly reduced. An important dilemma of food supply stability remains: (1) The U.S. policy of all-out production of grain and U.S. stockpiles are of major importance to food supply stability, but (2) the United States is not politically able to continue full production and carry a very large stockpile of cereals. Discussions in the U.S. Senate this past week indicate a desire to return to cropland set-aside at the first sign of a stock buildup, despite the fact that soybeans are trading at or near \$10.00 per bushel.

If a more open trading environment can be negotiated that would permit low prices to be reflected to end-users and thus stimulate demand

or storage and assist in keeping U.S. acreage in production, an important contribution to food supply stability could be made.

In this regard, one of the major impediments to trade in agricultural products today is our discriminatory trade policy against the USSR. The USSR has been, and remains, a major source of uncertainty in export trade and should be encouraged to proceed with its elevator construction program and to buy grain when it is in surplus and prices are low. This would simultaneously assist in maintaining full production in the United States and provide the USSR with additional stocks for times of production shortfall.

Our refusal to grant most favored nation status to the USSR and to insist on quantitative agreements leaves the United States in an untenable position of encouraging the Soviet Union to vary their procurement practices to accumulate stocks in times of surplus.

Professor Johnson's discussion of a grain insurance program fails to mention how such a commitment would be fulfilled in times when world supplies of cereals are in short supply. In looking at deviations from trend production in India, it appears that between 1960 and 1976 a production of cereals less than 6 percent below trend occurred in only 2 years—1965 and 1966. But in those 2 years, the shortfall below 6 percent was of the magnitude of 9 million tons per year for that country alone. If the United States and others were to seriously commit to such a program, the question of where these stocks would come from would have to be resolved. A reserve stockpile to provide such a guarantee would have to be 20-30 million tons as a minimum. The holding of such a reserve off the market if food becomes scarce and inflation fires are strong would be no small political trick.

Turning to Mr. Walters' paper, I agree with his point that we need adequate stocks of grain and that we need somehow to convince other nations to assume some responsibility in carrying those stocks. I disagree that such stocks have to be government-owned or controlled by an international body.

Mr. Walters' is critical of the fact that productive land was idled in the United States in the late sixties and early seventies, but does address the political problem of how to maintain full production in the United States either during that

period, or more importantly, during the years immediately ahead.

He argues for the establishment of a grain reserve this year and eventually does not consider the 1.1 billion bushels of wheat carryover currently in the United States as a reserve. This is because the government does not own or control the stockpile.

One, however, should question whether it is in fact less a reserve because it is held by farmers rather than an international body. Are we sure that governments can do a better job of allocating scarce supplies than can the marketplace? Are we sure that an internationally managed reserve will forestall the set-aside of productive cropland more than would a farmer-held reserve?

The answer to these questions may be yes, but our experience suggests that it is not.

In 1972 and 1973, the allocation of a nationally held wheat reserve administered by government officials was not well handled. I feel certain that, under those conditions, the market forces could have done a much better job of feeding wheat carryover supplies into the market than did government officials.

To suggest as Mr. Walters' does that government officials can be immune from the political pressures that arise when food becomes scarce and inflation is rampant and outperform the market as an allocator of these supplies is by no means clear.

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