

Chapter IV

GROWING NATIONS AND A WORLD WITHOUT HUNGER

As 1968 and the administration of President Johnson drew to a close, the policies and programs for international agricultural development were being implemented at an accelerating pace.

Secretary Freeman, in his address before the Food and Agriculture Organization in November, 1967, had called upon the developed world to provide by 1970, one billion additional cups daily of high protein beverage to the malnourished children of the less developed countries. The contribution of the Department of Agriculture toward achieving this goal has been through encouraging private industry to produce and market such products commercially, and through encouraging the expansion in the use of skim milk and high-protein blended foods in the donations program under Public Law 480, administered by the Department of State. 1/

Year end figures show that the Department of Agriculture purchased 100 million pounds more dry skim milk in 1968 than in 1967. This is equivalent to two billion cups or 5.5 million cups daily. Purchases of CSM, the high protein blended food designed especially to combat malnutrition, began in the latter part of 1966. They rose from 278.5 million pounds in 1967 to 415.6 million pounds in 1968. This product

1/ U. S. Department of Agriculture, Press Release 3472-67, Nov. 7, 1967.

is usually consumed as a porridge or gruel. In this form it has nearly twice as much protein per cup as dry skim milk. The quantity purchased in 1968 is sufficient to make 7.3 billion cups or one cup daily for 20 million malnourished children.

The chief obstacle to a faster expansion in the donations program is the slow growth of distribution facilities in the less developed countries. United States voluntary agencies handle much of the distribution program but foreign governments have started programs. The expansion of distribution facilities by foreign governments must provide most of the needed increase in facilities.

The Food for Freedom program placed increased responsibilities on the USDA for developing and supervising self-help measures by food-aid recipients, but no funds were allocated to carry out these responsibilities. International agricultural development work in the Department during the administration of President Johnson had been carried on under makeshift and temporary budgetary arrangements. All of the funds, authorized for this work came through transfers from the Agency for International Development. The severe cuts in Congressional appropriations for AID handicapped USDA programs despite the high priority being given by AID to agricultural development.

In preparing his final report to President Johnson, Secretary Freeman said: "I believe we should emphasize the importance of funding

IADS directly, or at least sufficiently so it will not be subject to the vagaries of AID appropriations and policies. 1/ On December 6, 1968, Secretary Freeman wrote Budget Director Charles J. Zwick:

Because we have been forced to absorb this with existing staff, it has been difficult to achieve the effectiveness we believe desirable and, more particularly, almost impossible to provide the necessary follow-through in securing compliance with the agreements once they are signed....

We can well become seriously delinquent in this area and run a serious risk of embarrassment if this situation is not corrected.

Secretary Freeman asked for the transfer of \$250,000 from the Commodity Credit Corporation to the International Agricultural Development Service to finance the negotiation and supervision of self-help agreements under Title I of Public Law 480 during fiscal year 1970. 2/

Secretary Freeman proposed, and President Johnson approved a proposal to try a new systems approach for integrating all the known necessary components of an effective agricultural development program. These include research, training, extension, coordinated supplies of production inputs, facilities for processing, storage, and marketing

1/ The Secretary to Dr. Schnittker, Dorothy Jacobson, John Baker, Dr. Wilcox, Rod Leonard, Dec. 2, 1968, in Orville L. Freeman, Chronological File, Lyndon Baines Johnson Library.

2/ Orville L. Freeman to Charles Zwick, Dec. 5, 1968 and Dec. 6, 1968, in Orville L. Freeman, Chronological File, Lyndon Baines Johnson Library.

of products, credit for both production and orderly marketing, and making consumer goods available to farmers.

This program initially would establish three demonstration projects at the local level in at least two less developed countries. The work in each area would be centered in an agricultural research and development center. Existing institutions would be utilized, complementing those which were satisfactory and supplementing by creating new in fields that were not being served. Each Center would have 5 to 15 District Development Stations as need to insure coverage of all farmers and businessmen in the area. 1/

In his last weeks as Secretary of Agriculture, Orville Freeman continued to stress the need to help the poor nations help themselves in increasing food production and promoting economic growth. 2/

1/ Integrated Foreign Agricultural Development Program, Explanatory Notes, Jan. 7, 1968; Agricultural Development (2-3) Special Report 2-3-1a, Task Force Report: "A Systems Approach to Agricultural Development," Nov. 12, 1968, Orville L. Freeman to Charles J. Zwick, Dec. 3, 1968 in Orville L. Freeman, Chronological File, Lyndon Baines Johnson Library.

2/ Orville L. Freeman, Address at the Organization for Economic Cooperation and Development Ministerial Meeting, Paris, France, Nov. 29, 1968, USDA Press Release 3716-68; Freeman Challenges Business Leaders as World Hunger, USDA Press Release 3902-68, Dec. 13, 1968.

U.S. Department of Agriculture
Office of the Secretary

The first time I was privileged to address this committee I stood here and said, "First, may I say that we all have agricultural problems."

Today, as I stand here slightly more than 7 years later, may I say -- again -- that we all have agricultural problems.

Now, 7 years in the long history of agriculture is merely the wink of an eye. But in the history of a minister of agriculture, 7 years is, indeed, a long, long time -- time measured not by the clock or the calendar but by gray hairs germinated by surpluses here, shortages there, by disparity between farm income and city income, by bad weather and sometimes good weather; by mistakes made, and, on occasion, by gains achieved that halt -- temporarily, I assure you -- the sprouting gray.

But in order to have any value, those years of wrestling with the problems of agriculture must also be measured in terms of lessons learned.

So today, as one who has collected his quota of gray hairs in government service, I would like to discuss with you some of the things that I think we in the United States have learned about our own agriculture during the almost 8 years that I have been on the hot seat.

This might be presumptuous of me, but I don't believe so for the simple reason that we do, indeed, as we did 7 years ago, all have agricultural problems, and these problems are basically the same. Therefore, it seems to me that as we grope for solutions, each of us has an obligation to offer his own experiences -- his mistakes, his achievements -- so others may better judge which paths might be best for them.

It is in that spirit, a sharing of views toward better solutions to the problems of all, that I am here.

I am going to divide my remarks into three sections:

First, the problem of abundance -- of a domestic agriculture whose capacity to produce far outstrips the effective demand for that production.

Second, the problems of trade.

And, third, the relationship of the less developed countries to the first two problems -- those of abundance and trade.

Obviously, all three of these points are closely interrelated. But basic and first to a solution of all three is the challenge and the threat of abundance to the domestic agriculture and thereby to the economic stability and progress of every country in this organization.

Address by Secretary of Agriculture Orville L. Freeman at the Organization for Economic Cooperation and Development Agricultural Ministerial Meeting at 10:30 a.m. (Paris time) November 29, 1968 in the Chateau de la Muette, Paris, France

What I said here 7 years ago, is even more true today. I said then, "Basically, problems of trade and markets have replaced shortages for most commodities. Yesterday we had to cooperate in combating hunger in Western Europe. Today we must find equitable ways to live with abundance and use it wisely. I submit to you that this is a very real challenge, and certainly not a simple one."

This meeting is being held at a most opportune time -- a time of considerable review and discussion of agricultural policies and programs in Europe. Obviously, for my colleagues from the European Community, this involves a reappraisal of the common agricultural policy. We welcome this reappraisal. We are sympathetic to and keenly interested in your struggle with some very complex problems. We realize that complex problems were inherent in constructing a common agricultural policy, and that agricultural integration was one of the steps that had to be taken in achieving economic union.

But now it appears that the agricultural integration phase has been largely completed. You are looking now for solutions to the problems that have appeared.

The future evolution of the common agricultural policy will be important to outside producers as it is to those in the Community. Most importantly, answers must be found to the problem of surpluses. It seems to me that the task now is to develop approaches that not only meet the needs of your own producers and your economies but also contribute to trade conditions of ever-increasing mutual benefit.

You do not need me to tell you that your own abundance today has become not only an agricultural problem, but a fiscal problem -- and a serious one.

We have all learned, I think -- and learned the hard way -- that the problem of farm income cannot be solved through commodity price supports alone.

That single path leads to higher prices for the farmer, yes; but it also can lead to crushing surpluses, which in turn create pressures for export subsidies and dumping, and consequently mean increased division within a world community that must cooperate if all nations are to grow and prosper in a way commensurate with their potential.

And, ladies and gentlemen, as a spokesman for American agriculture, I can say in good conscience that I am intimately acquainted with the problems of farm surpluses.

When I took office in 1961, my government owned outright more than \$6 billion in surpluses. A total of more than \$8 billion was in government hands under one program or another, and it was costing us \$1 million a day just to store and handle these agricultural commodities.

The grain wouldn't fit into our elevators and warehouses -- some was stored in the holds of old ships anchored at ports around the country. We put grain on the ground, and initiated crash programs to build make-shift storage facilities. The spectre of this surplus hung over our domestic markets as well as the markets of world trade -- and farm income was going down.

Our basic problem was that our farm program assured farmers of reasonably attractive prices for what they produced, but it only partially restrained them from overproducing.

And I might say here, that if you notice any similarity to Europe's current dairy situation, I am gratified.

Our task in 1961 was to work off the crushing, crippling surplus of farm commodities and to do so without creating havoc in world trade and at the same time to increase farm income, then only 55 percent of non-farm income in the U.S.

I am proud to say that we have, in the ensuing years, been able to whittle our inventory of government-held agricultural commodities to less than \$1 billion, that in this same period net farm income has increased by 28 percent, and that we have reduced the farm surplus and increased farm income without, in the over-all view, disrupting international trade.

What worked for us might not for you. But I think as I said, that there are enough similarities in our problems, to warrant at least a brief look at the methods and the machinery that we fashioned to meet our particular situation.

And let me hasten to add that I do not for one minute pretend that our approach and our mechanisms are perfect. Far from it. We have a long way to go, but -- and this is what is important to me -- I think we are on the right track toward living with the paradox of our agricultural abundance as a threat to the very people who produce that abundance and to the economy of our country and of the world trading community.

We began to move along the right track in the United States when we finally understood that you just cannot maintain farm prices that are incentives to producing surpluses unless you also maintain some kind of production restraints to prevent those surpluses from being created.

Basically, it is a policy that rests on the fact that you cannot, in any but the shortest term, export your farm problems. You can postpone them, perhaps, but you can't solve them in the ports of Japan or the harbors of Europe. You have got to do it at home.

This means managing your agricultural potential so that its production is keyed to effective demand -- to what can be and likely will be consumed in the normal processes of use and of orderly commerce -- both at home and abroad.

And it means managing it in ways that will maintain and improve the income of your own farmers and, if you are a responsible member of the world community, managing it in such a way that it will not hurt, and may even help, the farmers of other countries.

We have tried to do this in the United States.

Beginning in 1961, we took some important steps to bring surplus production under control. Particularly in grains, we introduced an effective program by which we paid farmers to divert large amounts of land from production into soil-conserving uses such as grassland or forest.

We brought price support levels down so they more nearly matched world market prices, and we introduced a two-price system under which farmers who grow wheat and agree to retire a prescribed number of acres out of production receive world prices for the part of their crop they export and a higher return for the portion that is used domestically.

Our cotton producers receive similar protection -- a loan rate at the world price level and differential payments to equal a fair price on cotton consumed at home, provided that a determined number of acres is taken out of production when necessary.

Our Feed Grain program also provides machinery to match production with effective demand.

These programs operate within a system of flexible acreage controls, with the national planting allotment set by the Secretary of Agriculture each year to meet anticipated effective demand and at the same time provide a carryover deemed sufficient for any national emergency.

It is not possible, of course, to predict the weather for next year, or the disease or insect infestations; so production estimates are not fool proof -- believe me, I know. But over the long term, the program enables us to forestall the wild swings in production and price by moving land in and out of production as conditions warrant.

Right now, for example, partly because of the generally good crops around the world the past two years, our supplies of grain have been creeping up. As a result, American farmers will idle about 60 million acres of cropland next year -- take it out of production in the face of the threat of supply outrunning effective world demand.

We supplement these commodity programs with the purchase of food items on the open market, for direct distribution to needy Americans. Our budget for family feeding, food stamp, child feeding and school lunch and breakfast programs next year will be well over 1 billion dollars reaching an estimated 44 million Americans.

Thus far I have talked only of commodities, but I am also proud of a new direction -- a broader horizon -- that has been created in the Department of Agriculture the past $7\frac{1}{2}$ years.

We have begun to think in terms not only of the farmer's fields but of all of rural America, farm and non-farm alike.

We have faced the fact that some farmers in this era of increasing technology and with it larger family farms just are not going to make a decent living by farming alone, that they need additional income -- but that this income need not necessarily come from the farm or from a job in the city.

A rather formidable array of legislative and administrative programs has been developed within my department designed to restore and create nonfarm economic opportunity in the American countryside -- such things as loans and grants to rural communities to help them construct sewer and water systems, recreation facilities and other services they must have to attract industry; such things as help for small farmers in setting up part-time businesses such as welding, repair shops or even barbering with which to supplement farm income, and such things as financial and technical help in regionwide planning for the best use of all the resources of an economic area for the people of that area. The volume of credit extended by my Department alone to rural America has grown from \$340 million in 1960 to \$1.4 billion in 1968.

New techniques to pool private and government resources at the grass roots are being actively pioneered.

What I like to describe as a rural renaissance is beginning to gather momentum. The migration to our cities from the countryside has slowed; the share of the Nation's nonfarm job growth is increasing outside the metropolitan areas, and off-farm income is becoming a larger portion of the income of many of our farmers.

The total personal income of our farm population was improved by approximately \$5 billion between 1960 and 1967 and \$3½ billion of this gain came from nonfarm sources of income.

During this same period the income ratio of farm to city people has been improved from 55 percent in 1960 to 73 percent. This is certainly not enough, but it is enough to convince us that we are on the right track with a system of interlocking programs of acreage diversion, program payments, purchase powers and rural business revitalization aimed at total rural income gains.

We will not be satisfied until there is full equality of opportunity and of income in rural America -- both on and off the farm. After 8 years leading the fight to accomplish this, I am confident it can be done.

Let me turn for a few minutes now from the domestic scene. Just as we have made some changes in the programs that affect our agriculture at home, we have also made important changes in our programs that involve international agriculture.

In our foreign food aid programs, we have introduced a new self-help requirement. This proviso says, in effect, that U.S. food aid will go to those less developed countries which need help today and are making an earnest effort, mainly through their own efforts and their own resources, to build a viable, dynamic agriculture in the future.

This self-help principle has been implicit in our economic assistance programs ever since the end of World War II. But it was not until 1966 that we have it formal status. At that time, Congress amended and renewed the Public Law 480 program, specifying that each food aid agreement entered into with another country would clearly indicate the improvement measures to be undertaken by that country to improve its ability to feed its own people.

As we put this self-help principle into effect, we intensified our watchfulness that we do not, through well-meant food aid, retard a recipient country's own drive toward agricultural improvement. We recognize that it is possible for outside food aid to ease a country's concern to a point that it postpones the day when it must come to grips with and seriously try to resolve its basic food and agricultural problems.

We do not intend that this should happen in our U.S. food aid programs, and I do not think it is happening now.

We are doing all we can through food, technical and economic aid to help recipient countries come to grips now, not later, with their food and agricultural problems.

I am more and more convinced that the only possible long-term solution to world hunger is for developing countries to develop their economies so they can produce more of their own food, buy more of it on the commercial market, or both.

And in most cases, the launching pad for economic development of any kind is a sound agriculture. As development occurs on farms, it begins to turn the wheels of development in the cities, as new agribusiness industries are generated in the cities to support it -- industries that supply fertilizer, farm machinery, pesticides, transportation, storage, processing and so on.

This in turn creates new buying power for the things farmers produce, creating a beneficial, self-perpetuating development cycle.

In helping other countries resolve their agricultural problems, the USDA does so as a cooperating partner of the Agency for International Development of the U. S. Department of State.

In the agricultural programs, we are using a device that we call PASA -- Participating Agency Service Agreement. Under this arrangement, the man we send to help another country does not go unaided -- he has the direct counsel and support of the USDA throughout his assignment.

We have also learned that we can help the most if our assistance is aimed at the core of a host country's problems. This means emphasis on policy formulation and program development.

Through these approaches, the Minister of Agriculture of a country we are helping -- no matter how small the resources of that Ministry -- acquires a counseling mechanism which he can use as frequently as desired to reach the specialists of the U. S. Department of Agriculture and those of our associated system of Land-Grant Colleges and Universities in the 50 States.

We have also altered our approach to foreign foods donations as we have moved through the Sixties. About one-fourth of U. S. agricultural exports are made under our foreign assistance programs. Implicit in these arrangements is the fact that we do not regard them as permanent. We think of them as part of the transition as a recipient country moves out of its aid status to a new and financially independent trade status.

Most of our shipments under food aid move under special sales arrangements but a smaller part moves under direct donations. I would like to speak about the latter.

There are at this time of history some people in developing countries who are so far out of the economic mainstream that direct donations are their only hope. They simply can't buy food and are not a factor in commercial markets.

Food is made available to them through agreements we make with their governments, through the multilateral operations of the World Food Program, through voluntary U. S. organizations such as CARE and international organizations such as those of the United Nations and FAO.

Through this program we are improving the diets of more than 48 million school children in other countries whose school lunches include food from the United States.

In 16 countries we are cooperating in food-for-work programs in which local people, otherwise unemployed, have found jobs in useful community projects, receiving part of their pay in food from the United States.

Perhaps as important a lesson as any we have learned in carrying out these food programs, has been the lesson that the quality of food a person eats may be just as important as quantity if not more so.

There is quite solid evidence that lack of a proper diet stunts not only physical growth but mental growth, that children born and raised on improper diets never can and never will become the productive members of society that any society must have if it is to grow and prosper.

We have, therefore, pushed our efforts toward providing quality as well as quantity in food for those who do not now have enough of either quality or quantity.

We have made much progress in fortifying foods to improve their vitamin and mineral content. We have devised specially formulated foods, using combinations of readily available ingredients, to upgrade diets, particularly those of children who are especially vulnerable to protein deficiency. Today under sponsorship of AID and USDA nine U. S. food manufacturing companies in 10 countries are working to tailor special protein enriched foods to traditional eating habits in the host country.

What I have been saying in this perhaps overlong summary of our experiences in the United States is that we have learned much, and done much, in the past $7\frac{1}{2}$ years to control the threat of agricultural abundance so that we might realize the promise of that same abundance.

We have much yet to learn and much yet to do.

Most of you also have been learning and doing in the past $7\frac{1}{2}$ years. You have been individually and through OECD expanding knowhow and resources to increase agricultural production in the developing countries.

The gloomy forecasts of certain mass famine of a few years ago have lessened. There is a new voice of hope and even of optimism and confidence that a far ranging new agricultural revolution is under way fostered by the new varieties of grains and nourished by the recognition of the importance of agricultural development and the willingness to give it high priority by both developed and developing countries.

But this hope, this promise, this development can never be realized except within a world framework of cooperation, of orderly production and orderly marketing, of each country doing what it can do best for the good of all.

I have never known a period of my life in which there was such need for international cooperation in agricultural matters as there is today -- or as many opportunities to achieve mutual benefits if we will only really cooperate.

Increasingly it has become apparent that feeding the world's people and advancing the world standard of living is so vast an enterprise and so complicated that no country -- no Nation's farm economy -- can afford to function outside the context of the other countries.

For unless we succeed as a world in managing agricultural production to avoid the threat of surplus and realize the promise of abundance, the welfare of our farmers and of the very economies of each of our countries can go down the drain along with the hopes of those who remain strangers to abundance but would like to have their chance to grapple with its problems.

I would be less than honest if I didn't express serious concern about the runaway production of certain commodities, especially animal fats, in the European communities, and the increased production of grain subsidized by unrealistically high prices.

There is a very real danger today, I think, that a short-term approach to agricultural policies will kill long-term gains of trade liberalization and agricultural development around the world.

Each of our countries has received tangible benefits from expanded trade with one another, and in my view anything that tends to undermine these trade relationships is not worth the candle -- whatever the short-term considerations might be.

I am enough of a realist, with enough experience on the firing line, to understand the political problems involved in agricultural policy, but I also know that over the long pull neither your nations nor mine can afford to permit domestic politics to move them away from cooperating with others to help build a world of peace and promise and progress.

And I think there is no area of endeavor that cries out louder for close cooperation in building such a world than agriculture -- the industry that is the closest of all to the people of the world, and the industry without which mankind could not survive.

UNITED STATES DEPARTMENT OF AGRICULTURE

Lindell DU 8-5643

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Washington, Dec. 13, 1968

Freeman Challenges Business Leaders on World Hunger

Secretary of Agriculture Orville L. Freeman today challenged a group of American business leaders with three "tough" questions that he said must be answered "yes" to end hunger in the world.

He called upon the group to answer them in the affirmative and then to take the lead in seeing to it that the American People, the U.S. government and private industry acted accordingly to help win the war on hunger.

The Secretary spoke at the Conference for Corporation Executives on the Food-Population Crisis at the Johns Hopkins School for Advanced International Study in Washington. He put three questions to the business leaders under the heading, are we willing to pay the price for a world without hunger?

Are we willing, he said, to pay the price:

-- In investment, which might mean to private corporations foregoing higher short-term profit for long term gains.

-- In foreign aid appropriations, which might mean higher taxes.

-- In continuing and intensifying efforts to help poor nations in the face of potential competition to certain American export commodities, and by being willing to buy some of their products so they can move toward self-reliance even when they compete with domestic production.

If we can answer "yes" to each question, he said, the emerging "agricultural revolution" can sweep the less developed countries and stimulate crucial economic growth and progress.

"This is the progress," he said, "that can mean a world of peace and plenty instead of a world of tension, hostility and danger with up to two-thirds of the world's people still going to bed hungry at night."

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The Secretary outlined progress made which he said gives promise for the future, but he warned that roadblocks loom that can only be overcome if those questions can be answered yes.

He noted that the promising "revolution in tropical agriculture", inspired by U.S. aid -- public and private -- is characterized by explosive increases in production of principal crops in Asia's larger developing countries.

But he explained that, while new high-yielding varieties of cereals triggered the revolution, a number of factors long in the making set the stage.

He said much infrastructure such as roads, dams, irrigation, research and education has been put in place by our foreign assistance programs since World War II.

He cited recent expansion and redirection of government programs, such as Public Law 480 (Food for Freedom), which has been amended to require specific self-help commitments to invest in and work to improve their agriculture from recipient countries in return for aid, and which is no longer restricted to disposing of farm surplus.

In addition, this new emphasis on self-help has been combined with a new emphasis on nutrition, which recognizes that quality of diet -- enough proteins, vitamins -- can be as important as quantity, the Secretary said.

He noted that AID and the Department of Agriculture have cooperated to significantly increase the professional talent needed to help developing countries lay the ground-work for the long-term economic growth needed to feed themselves.

Specific factors in this redirection, he said, have included new political commitments to agriculture by developed and developing countries, U.S. aid investments in such basics as farm-to-market roads, irrigation projects and agricultural research; and U.S. training of 8,000 Asian agriculturists over the past 10 years.

He said that U.S. agribusiness also has played a basic role, supplying fertilizer, pesticides and equipment requisite to increased farm production.

"As an example," he said, "an estimated two-thirds of all fertilizer plants being built in Asia, outside China and Japan, are being built by U.S. firms."

We have learned during this period, he said, that the developed countries must not try to feed the world, but rather should try to help the less developed world feed itself, either by raising its own food where it is consumed or by being able to buy what it needs or a combination of both.

Secretary Freeman said the breakthrough in tropical agriculture, such as the development of high-yielding rice, and the widespread use of new high-yielding wheat developed in Mexico, indicate that the widening gap between the developed and developing countries is becoming more one of management than technology.

"As production break-throughs take place new problems are arising", he said, "problems such as the pile up of surplus corn in Kenya, and rice in the Philippines, with no marketing structure to move it to use and little storage to hold it."

These emerging problems dramatize the necessity for balanced, systematic agriculture development programs, he said.

Freeman warned that the stakes are high for the United States, not only in terms of world stability and peace, but in long-range terms of expanding markets for U.S. products -- agriculture and other.

He cited the potential market of more than 2 billion persons in the developing countries as a "sleeping giant." This is the only big enough potential market for the explosive productivity of the American farmer, he said, and it can only be awakened if business and governments of the developed countries are willing to pay the price.

"The key ingredient in development today is management," Freeman said, "and that is one of the objectives I have in mind as I turn to the private sector after January 20."

(Freeman will become president of EDP Technology International, Inc., a Washington-based firm that will help developing nations apply computer techniques to use their resources more effectively.)

He told the businessmen that they represent a select, leadership group, with the ability and resources with which to build public understanding to influence public policy, to provide necessary investment and management -- all essential if we are to even the War on Hunger.

"The vast resources and talent of the companies you represent can be directed toward programs to overcome the roadblocks to a world without hunger," he said. "Unless we achieve this, we are threatened by violence and revolution -- our own continued progress and prosperity are threatened."

"You can contribute immeasurably to that measure of public awareness of our stake in a world without hunger that will insure that it receives the priority it deserves."

Integrated Foreign Agricultural Development Program

Appropriation Act, 1969..... --
 Budget Estimate, 1970..... \$ 4,150,000

PROJECT STATEMENT

	: 1968	: 1969	: Increase	: 1970
Integrated foreign agricultural development program.....	: --	: --	: +\$4,150,000	: \$4,150,000

An increase of \$4,150,000 to finance an integrated foreign agricultural development program.

Need for Increase

This program is a new proposal as authorized under Section 406 of the Agricultural Trade Development and Assistance Act of 1954, as amended 7(USC 1736).

The Secretary of Agriculture is directed to "...assist friendly developing countries to become self-sufficient in food production,..." and to develop programs to:

- (1) "...help farmers in such countries in the practical aspects of increasing food production and distribution and improving the effectiveness of their farming operations;"
- (2) "...to recruit persons who by reason of training, education or practical experience are knowledgeable in the practical arts and sciences of agriculture and home economics and to train such persons on the practical techniques of transmitting to farmers in such countries improved practices..." and
- (3) "...conduct research in tropical and subtropical agriculture for the improvement and development of tropical and sub-tropical food products for dissemination and cultivation in friendly countries."

The purpose of the program is to integrate these activities in a complementary package to obtain a rapid and sustained growth of agriculture as a foundation for general economic progress. [This is to be accomplished by: (a) generating a continuous flow of adaptive technology for use by farmers and farm businesses in countries with a comparative advantage in agricultural production; (b) providing an economic environment conducive to obtaining the rapid adoption of new techniques; and (c) supplementing and developing the managerial capacity of farmers and of public and private agribusiness enterprise.

The success of the program will depend significantly upon the participation and cooperation of the U.S. agribusiness community--the Land-Grant universities, U.S. farm businesses, and the USDA.

The program will be financed to the maximum degree through the use of food from American farms. A large part of the requested appropriation would be for the purchase of foreign currencies generated under P.L. 480. This portion has no impact on net budget outlays since it is offset by equivalent receipts to CCC. The host country in the interests of self-help would be required to make substantial contributions of land and existing facilities, and to finance much of the program through P.L. 480 commodity loans. In addition Title II commodities would be used as appropriate to pay for work in developing local resources and community facilities.

The program intends to build or modify as necessary all of the institutions--educational, research, and other infra-structure--needed as a base for sustained agricultural growth. It would not attempt to replace or duplicate existing institutions; rather every effort would be made to obtain maximum participation by local, U.S., and other international development groups. In other words, this program would provide the additional input of the ingredients needed for growth by building onto what exists, complementing that which is satisfactory and supplementing that which is deficient.

Plan of Work

The planning and development of the program from the beginning will be carried out on a partnership basis by agencies of the U.S. Department of Agriculture, the Land-Grant institutions, and U.S. agribusiness. Important to the success of this program is its integration into the overall economic development program of the host country and the total aid program of the United States and of other countries. This will require the cooperation of AID and other agencies with international responsibilities and consistency with the foreign policy of the United States.

The program presents a new approach in its attempt to bring into balance the essential elements needed for rapid and sustained growth; thus, it is proposed that it be limited initially to three pilot areas in at least two countries to provide the variety and range of experience needed before launching a full-scale effort.

The program would be initiated by deploying teams of U.S. and host-country specialists to select the areas within countries and to develop the basic project plans. The Secretary will be responsible for making

appropriate assignments to USDA agencies, universities and other organizations for carrying them out.

The objective of each project would be to promote intensive agricultural development within the selected area. The work in each area would be coordinated through a Center for agricultural research and development. This Center would undertake adaptive research and extension as needed for the area, it would be associated as appropriate with educational and other institutions in most countries, and it would participate in planning and directing development projects essential to the area's progress.

Each agricultural research and development Center would be associated with about 5 to 15 District Development Stations as needed to afford easy access to communities. These would be the implementing arm for all programs that are essential to local development and are not likely to be implemented otherwise through public or private enterprise. The District Stations would test and demonstrate to farmers and agribusinessmen new methods of farming and marketing, and improved varieties and breeds; they would organize local projects to develop resources and community facilities; and they would perform, when necessary, agribusiness functions in marketing, credit, and farm supplies.

A representative of the Secretary of Agriculture, located in the host country, would participate in coordinating this effort with the programs of other U.S. agencies under the Ambassador. Washington operations would require the addition of a small staff.

Assuming that a tight implementing schedule could be followed, the three pilot programs would require an appropriation of \$4,150,000 in FY 1970. However, in FY 1971 about \$12 million would be needed to complete construction and overseas staffing. In FY 1972, the first full operating year, about \$7 million would be needed. This would, however, diminish in subsequent years as local personnel became trained to take over and as agricultural production increased sufficiently to allow the projects to be self-financed.

Because of the partial offset through CCC receipts the above appropriations would have a smaller impact on net budget outlays amounting to about \$1.7 million in FY 1970, \$3.5 million in FY 1971, and \$4 million in FY 1972.

By making effective use of food under P.L. 480 and by insisting on substantial self-help this program is expected to stimulate additional investment in agricultural development of about \$7 million in FY 1970 and some \$25 million the next two or three years. This multiple could be enlarged further if assistance is solicited from other public or private agents also.

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Koenig

AGRICULTURAL DEVELOPMENT (2-3)

Special Report 2-3-1a

Task Force Report

"A Systems Approach to Agricultural Development"

November 12, 1968

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An Integrated Approach to Agricultural Development

The Problem

The problem of agricultural production in developing countries has not been resolved, even though years of technical assistance, two "miracles," and good weather have joined to reduce its severity temporarily.

Recent estimates for 21 of the major U.S. food aid recipients show that the five-year period 1970-74 will not bring forth the growth in food production that has been characterized by recent events. ^{1/} Measured from a 1963-5 base total, food grain production in these countries is projected to rise at an average rate of 4.6 percent per year to 1970. From then to 1974, however, it is projected at an annual rate of only 3.2 percent.

There has, of course, been some improvement. An outlook of 3.2 percent per year is a substantial improvement over the 2.4 percent average rate of the 1950's and early 60's.

The need for a solution to the world food problem was accentuated by the series of poor crops that plagued India, Pakistan and large parts of North Africa in recent years. But the seriousness of the problem was punctuated when U.S. wheat production dropped in 1967 so low that the U.S. could meet only its highest priority aid commitments.

The two outstanding developments that dwarfed nearly all others in agriculture were the Mexican wheats and the high yielding IRRI rice varieties with their high response to larger applications of fertilizers.

1/ Special Report 2-1-1 -- Total Grain Import Requirements of Major U.S. Aid Recipients, 1963/5-1974.

of growth that will provide food for growing populations and a basis for economic progress and world peace.

The basic problems are not going to be solved in one year, in five years or even in ten years, but a major thrust has to begin now. Progress in building institutions and training manpower for managing them is slow. But, the developing nations are impatient. They call for immediate help and a major thrust through a program that combines rapid payoff techniques with those that guarantee lasting progress.

Some Principles of Agricultural Development Assistance

Intimacy with the process of agricultural development in the United States and experience in working with developing nations in the past quarter century has deeply enriched the Department of Agriculture's understanding of the economic development process. The Department, and the U.S. Government generally, is now convinced that agricultural growth is an essential step in achieving the vigorous economy which developing nations must have if they are to become self-reliant and full partners in world trade.

The basic tenets for a sustained high rate of growth in agriculture are:

- (a) to generate a rapid and continuous flow of new technology to the farmer;
- (b) to develop the managerial capacity to use resources efficiently; and
- (c) to provide an environment conducive to growth.

To build a system based on these tenets requires a total systematic approach that will integrate the functions, resources, and institutions in appropriate proportions taking into account what now exists and modifying and building as needed to produce the proper balance.

A project of national scope for any country requires a highly detailed and integrated plan for action at the national, provincial and local levels; its implementation requires a comprehensive program that melds the old with the new; and its direction needs to be coordinated under a set of common and agreed upon objectives. Partial, sporadic or temporary actions are insufficient.

Some of the more important

[The] interrelated functions that need to be merged into a single equation for maximizing growth are:

- (a) The ~~Basic~~ ^{Basic} and adaptive research needed to develop new technology for local conditions.
- (b) The ~~Teaching~~ ^{Teaching} and extension needed to develop the managerial capacity and performance of farmers and those in related businesses. *such as land improvement for more effective irrigation, construction of farm to market roads,*
- (c) The ~~Resource~~ ^{Resource} development needed to maximize the use of inputs.
- (d) The ~~Modifications~~ ^{Modifications} needed ^{of} in the agribusiness institutions to obtain access to farm supplies and to markets for farm products.
- (e) The ~~Amenities~~ ^{Amenities} needed to improve ^{living} conditions in rural areas; and
- (f) The ~~Local~~ ^{Local} and national policies needed to induce desired levels of production, to reduce risks and to encourage farmers and managers of related businesses to adopt the new techniques and make adjustments for progress.

These functions can be combined efficiently only if they are also placed in an appropriate perspective of an overall economic effort, and if there are institutions through which they can be activated. Of course, the mere existence of plans and institutions does not assure economic growth, even if capital resources are available. The essential ingredient that binds the parts of the equation is management; this means individuals who are well trained, imaginative and capable of initiating change and adjusting to it. But good management is probably the scarcest ingredient.

Many countries also lack the institutional framework to reach the farmers, the businessmen and the officials on whom the ultimate responsibility of action for progress rests. Nearly all developing countries have planning agencies, Departments of Agriculture, agricultural research facilities, extension services and other development organizations at the national and sometimes the provincial or state levels. However, their manpower and competence is not always adequate for the task, their activities are not always coordinated completely, and their respective influences on the development process are not always optimal.

To overcome the principal deficiencies in institutions and management, assistance is required. It is suggested that the problem be tackled intensively on a unit basis, area by area and country by country, with careful regard to priorities and potentials. Each such unit would be called an Agricultural Development Area (ADA) and would contain an Agricultural Research and Development Center (ARDC) to do basic and broadly adaptive research and guide the program for agricultural development in a large but fairly homogeneous area within a country; plus perhaps 5 to 15 District Development Stations (DDS's) to ^{implement the} ~~undertake the adaptive~~ program ^{at} ~~the local levels.~~

Ideally, the program within an ADA would be coordinated with the agricultural development work of all relevant agencies in the Central and Provincial or State Governments that pertain to the area. The number of ADA's would depend upon the size of the country, its diversity in agriculture, its internal governmental structure, and the location of acceptable existing facilities. But the key to the entire approach are the DD stations; they would be the focal point for all action programs pertaining to development in the districts. The DDS's would (a) test new methods and new materials

for local application; (b) demonstrate these to farmers by suitable means including on-farm demonstrations; (c) encourage, initiate or undertake to provide access to farm supplies, farm markets and other essential community services; and (d) as appropriate, to initiate and direct food-for-work projects. To the extent possible existing cooperatives, state seed farms, and similar organizations could serve as the nucleus for the DDS's. There should be enough of these stations so that most farmers have reasonable access to it and so that the stations can deal with the intimate problems of the locality.

Ideally, a country would be divided into ADA's as appropriate to its agricultural geography and its political subdivisions. However, if funds are not available for a full-fledged national program, it would probably be more efficient and effective to concentrate on a few key areas where the potential for progress is greatest rather than to spread resources so thinly that no effective programs can be conducted anywhere. Multiple unit ADA operations would be coordinated and supported as necessary at the national level; and within each unit, coordination and direction would be achieved as suits the local political structure.

The total system would be operated by the host government, and all positions and jobs would be defined and remunerated according to its local civil service or other national employment standards if parts of the system are operated otherwise. ^{original is that it could eventually be completed} The U.S. Government would offer assistance in ^{be operated by host govt} planning, constructing and staffing the system. ^{until it is established and fully functional} The U.S. would offer to help train and recruit personnel for any management or technical position and would offer U.S. personnel for any position for which qualified local talent cannot be found. Thus, U.S. personnel in the system would not

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[have counterparts now would they] be merely advisors; they would be employed to fill key positions in the system and thus help to assure its success. U.S. employees would, however, be provided the usual protection and perquisites of U.S. employees abroad, as well as being compensated for the loss of alternative opportunities at home.

Although every effort would be made to phase out U.S. participation as quickly as possible, it is likely that some U.S. personnel will be needed to fill essential positions for many years. [Thus, it would be desirable if U.S. personnel could obtain career status in all international agricultural development activity with full rights to tenure, salaries, promotions and retirement regardless of where employed] Highly trained specialists would as now continue to be needed to fill technical positions within the system and to advise governments in the ways of planning and organizing for development. However, this system with its DD stations could also draw upon a massive supply of talent in the United States that has not yet been tapped for overseas service. Typically, the U.S. technical assistance program now draws mostly upon the scarce supply of highly trained scientists and experienced specialists for temporary assignments. Very little use has been made of new agricultural graduates with managerial potential, the practicing agriculturalists, the managers of rural businesses and cooperatives, the expert machinists and the craftsmen, all of whom have the practical skills and experiences that have made American agriculture the outstanding case. These people will, however, have to be properly prepared in language and adaptability for assignments in foreign environments so that they are able to transfer their managerial capabilities more efficiently. For this, extensive use will have to be made of land-grant universities and tropical

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training centers such as the one at Hawaii. As the program expands, an additional center might be considered in Puerto Rico.

For maximum efficiency and acceptance, it is extremely important that a system such as this be built onto existing institutions and utilize existing resources to the fullest extent. But, even more important a project must hold the promise of a sufficient increase in agricultural production so that the system can ultimately sustain itself to a substantial degree from internal tax collections. Without this, it would not be possible to phase out U.S. foreign assistance.

The USDA Role

The USDA offers to provide as a package the guidance and assistance needed to implement and operate a systematic approach to agricultural development. Initially, the program would be implemented on a pilot basis since much of the approach is new and some caution is warranted. If the offer is accepted, the Department would field planning teams in early FY 1970 to determine in detail the needs and optimum location of three Agricultural Development Areas in at least two countries.

At this time, Indonesia and the Congo are considered as possible sites for pilot endeavors, although they have been selected mainly to illustrate more realistically the program as it would be applied and to present a more precise basis for estimating costs. These two situations do not, however, represent a final selection, although they would no doubt be considered prime candidates for the program. Each has the need, each appears ready to accept the responsibility for a major thrust forward in agriculture, and each would provide the basic experience needed to extend and operate such systems in other areas and other countries. The final selection would have to be made jointly by an appropriate inter-agency group.

Legislative Authority and Funding

The program could be funded entirely under the authority provided in P.L. 480. The basic authority is under Section 406, and appropriation is requested for direct dollar outlays and for the purchase of foreign currencies generated from Title I commodity sales. However, the program would also utilize Title II commodities for food-for-work, and would draw on funds authorized under Section 204 to assist in utilizing them.

The host government would be expected to contribute heavily, but much of its contribution could be financed through Title I long-term dollar loans, and by contributing land and buildings as appropriate.

Section 406 authorizes up to \$33 million for the Secretary of Agriculture to " ... assist friendly developing countries to become self-sufficient in food production, ..." and to develop programs to:

- (1) " ... help farmers in such countries in the practical aspects of increasing food production and distribution and improving the effectiveness of their farming operations;"
- (2) " ... to recruit persons who by reason of training, education or practical experience are knowledgeable in the practical arts and sciences of agriculture and home economics and to train such persons on the practical techniques of transmitting to farmers in such countries improved practices ...;" and
- (3) " ... conduct research in tropical and subtropical agriculture for the improvement and development of tropical and subtropical food products for dissemination and cultivation in friendly countries;"

The authority directs further that, "to the maximum extent practicable, the costs of such a program should be paid from ... foreign currencies accruing from the sale of agricultural commodities under this Act ..." To the extent that this is possible the program can in effect be paid with ^{or from} commodities, and without impact upon the Department's total appropriation.]

This implies number supplied

During the next 5 years, the Department anticipates a Title I Food-for-Freedom program in the Congo ranging from \$10 to \$15 million per year and in Indonesia, one in the vicinity of \$100 million per year in the next 5 years. To the extent that the overseas expenditures are financed from Food-for-Freedom shipments it will also increase the receipts to CCC and thus will have a neutral impact upon the appropriation of the Department of Agriculture

Coordination

The ^{SC}activities authorized under Section 406 ^{should} ~~are required to~~ be coordinated with those of other agencies of the U.S. Government that have a responsibility in foreign assistance and foreign relations. Without this the program could not achieve its proper scope or its proper relationship to other aspects of the economic and social development; therefore, it is proposed that the scope and the general plan for committing U.S. resources ^{will} be determined ^{in consultation} ~~jointly by the~~ ^{with AID and US Embassy staff} ~~USDA and AID.~~

The direction and operation of the program would, however, be the responsibility of an Agricultural Development Officer--an employee of the Department of Agriculture ^{attached to the USAID mission}. He would be ^{generally} ~~directly~~ responsible to the Ambassador or the Mission Director in all ~~external~~ matters pertaining to U.S. foreign economic and political policy; but he would be responsible only to the Secretary of Agriculture in ^{matters pertaining to} the ^{internal technical and economic} operations of the program.

As a system of this type grows beyond the pilot stage, the need to coordinate the activities of the various agents responsible for agricultural development becomes increasingly important. As the scope of activity expands there is a greater and greater danger of inefficient and unnecessary duplication of effort. At the proper time, consideration should, therefore, be given to

Setting up an Agricultural Development Board, chaired by an Assistant Secretary with members from: land-grant universities, other agencies of government, private institutions, multilateral aid agencies, and relevant USDA administrators.

This board would advise the Secretary on planning, implementing, and operating the kind of program proposed. It would also coordinate the training of U.S. technicians preparing for overseas duties as well as training foreign technicians to better perform their tasks at home.

INDONESIA -- AN EXAMPLE

Indonesia is a country that appears to be ready to begin an intensive thrust in agricultural development by FY 1970. It is likely that by then significant political and economic stability will have been achieved and the country will be eager to assume a meaningful responsibility in agricultural development. Even now, Indonesia has plans for expanding research and extension; its farmers are among the more capable cultivators in the world and are receptive to new ideas; and, it has some of the institutional framework necessary to generate a continuous flow of technology for farmers and rural business. But help is needed.

Indonesia now has an agricultural research institute and 4 experiment stations. The ultimate plan would be to expand the number of experiment stations to 10 or 12 ARD centers to form the nuclei for an equal number of ADA's. Each of the ADA's could contain perhaps 8 to 12 DD stations to carry out the development program among farmers and the farming community.

The General Situation

The Republic of Indonesia is a chain of 3,000 islands off Southeast Asia which lie within 10° of the equator. It has a land area of 735,000 square miles much of which is highly fertile and much of which is mountainous and of little use for agriculture. More than 110 million people live on these islands and the population has been growing at a rate of approximately 2.5 percent per year. About two-thirds of the people live

on Java and Madura; the remainder are on the Outer Islands which include Sumatra, Kalimantan, Sulawesi, the Moluccas, the Lesser Sundas, and West Irian.

The climate which is governed by monsoons, is conducive to agriculture. In some areas where supplemental irrigation is possible 2½ crops of rice can be grown per year.

Indonesia has ample resources with approximately 21.7 million hectares--10-12 percent of total land area--in agriculture. In addition, there are available large areas of fertile land that has not been used.

Historically, Indonesia has been a major exporter of rubber, but tea and coconut products have also been important export crops. In addition to agriculture, there are alleged to be vast but unmeasured quantities of oil, tin, copper, nickel, bauxite, chromium and manganese as well as commercial timber. Generally, communications, transportation and education are below desired levels.

The economic and political situation appears to be stabilizing. The rate of economic growth has just kept pace with population and is, therefore, in need of improvement. But the government, through improved fiscal responsibility and other measures, has managed to slow down the rampant inflation that prevailed before 1966. And; the political situation, while uncertain, appears to be stabilizing under the Suharto regime which has a renewed interest in maintaining friendly relations with the West.

At present, there is close to a \$400 million foreign aid effort to Indonesia. The United States contributed about \$150 million including P.L. 480. The International Bank for Reconstruction and Development, the Asian Development Bank, Japan, and others are putting up the balance. These groups are continually reviewing Indonesia's needs and would be looked to for guidance and advice in setting up a system for an integrated approach to agricultural development.

The Agricultural Sector

Agriculture is the main support for about three-fourths of Indonesia's population; it provides more than 50 percent of the total value of exports of which rubber comprises two-thirds. Java and Madura support over two-thirds of the total population on one-tenth of the farmland area. Many food crops are grown there, although it is primarily a rice producing region. In total, one-third of the agricultural land area is devoted to rice production.

There are two kinds of agricultural operations in Indonesia--a small group of large estates that use advanced machinery and techniques, and a large group of small-holders that rely primarily on the traditional labor-intensive practices.

There are approximately 12 million farms in total with 8 million on Java and Madura averaging 0.7 hectares. The 4 million on the Outer Islands average 1.7 hectares.

The potential for increasing the production of rice, maize, and other food crops is large. Rice possibly has the greatest potential for production to increase rapidly; but there appears to be a great need to improve irrigation, provide access to fertilizer, introduce better varieties, find suitable pesticides, obtain adequate production supplies and construct appropriate marketing facilities. The potential for increasing maize production is also considered good but the acceptance of the product as a food crop seems limited. However, it could be fed to poultry or livestock if markets for those products can be found.

The prospects for increasing tea and rubber production also seem good, but a much longer time is needed since rubber trees and tea gardens are now old and need restoration. The production of coconut and coconut products has increased recently, but exports have been varied and uncertain because of strong competition from other products.

Transportation and communications of all types are grossly inadequate and the marketing system at one time operated by the Chinese, now needs modernization and improvement. It is so inadequate that local conditions of glut and famine occur. An increase in production with new crops and new varieties will bring additional strains to the marketing system and will need to be corrected. The farm supply system will probably not be able to handle the greatly increased need for inputs including credit, seeds, fertilizers and tools.

In many ways, Indonesia's problems are similar to those of other developing countries. The country is faced with economic stagnation that can be broken only by a hard and enduring effort in which agricultural development can play a primary role. Hunger and starvation are not the problem as in some countries; however, there is a caloric and protein shortage facing the growing population. Production incentives to date have been insufficient; but even so, the adaptable results of research have been inadequate to produce the technology that might have improved farm output. Even now farmers often find it difficult to move to market the small surplus which they do produce sporadically.

The current Indonesian program of farm and related research is obviously inadequate to generate more than the present rate of growth. The Agricultural Research Institute, the major facility, is located at Bogor on Java. It conducts research in plant physiology, plant breeding, seed technology, plant pathology, poultry and animal husbandry, agronomy, engineering and other farm sciences. It also provides graduate and college level training; however, the study of agriculture does not have the prestige of some other professions and, therefore, often attracts only the less capable students.

The four regional experiment stations are located at Kutoardjo, Medan, Bandjarmasin, and Makassar. Additional field trials are conducted at 18 experimental gardens which are located on different soil types and in different climates. The total staff includes 111 technical workers--15 with M.S. degrees, 35 with B.S. degrees and the others with some college training in agriculture or chemistry.

In cooperation with the research stations, the Department of Agriculture undertook last year a temporary but intensive program, the BIMAS project, to obtain quick dissemination and assure acceptance of the new high yield of rice varieties. It was staffed by 3,000 agricultural students who worked with farmers operating 500,000 hectares. The program was an immediate and tremendous success and will be repeated this year. However, this program cannot substitute for a permanent extension operation that can reach into all aspects of rural life. The students are in the farm areas only a short time at planting, and for the remainder of the year there is virtually no extension work with farmers or with rural business.

An Illustrative Program

The specific goals of the systems approach in Indonesia will be to increase agricultural production by providing and supplementing the research to provide a continuous and accelerated flow of new varieties, breeds and technology to farmers and to create an atmosphere conducive to adoption. Initially, a major emphasis will likely be placed on food crops, particularly rice, later other problem areas will receive attention to minimize the bottlenecks to progress.

The Sukamandi area is one that would seem to be suitable for an intensive development thrust. Therefore, it is ^{well} illustratively as a basis for determining the costs of this approach. It is assumed that an ARD center is located at Sukamandi about 80 kilometers east of Djakarta. It would have about 10 DD stations at appropriate locations in surrounding area.

The paucity of detail about Indonesian conditions in areas beyond West Java precludes a detailed presentation for a second pilot ADA. A second one would likely be centered at one of the existing research centers, perhaps at Medan or Sumatra. While conditions are vastly different the costs are likely to be similar to the Sukamandi area and, therefore, no specific estimate is provided. In any case, the selection and verification of either project would be subject to the recommendations of the advance planning team.

A Sukamandi ADA.

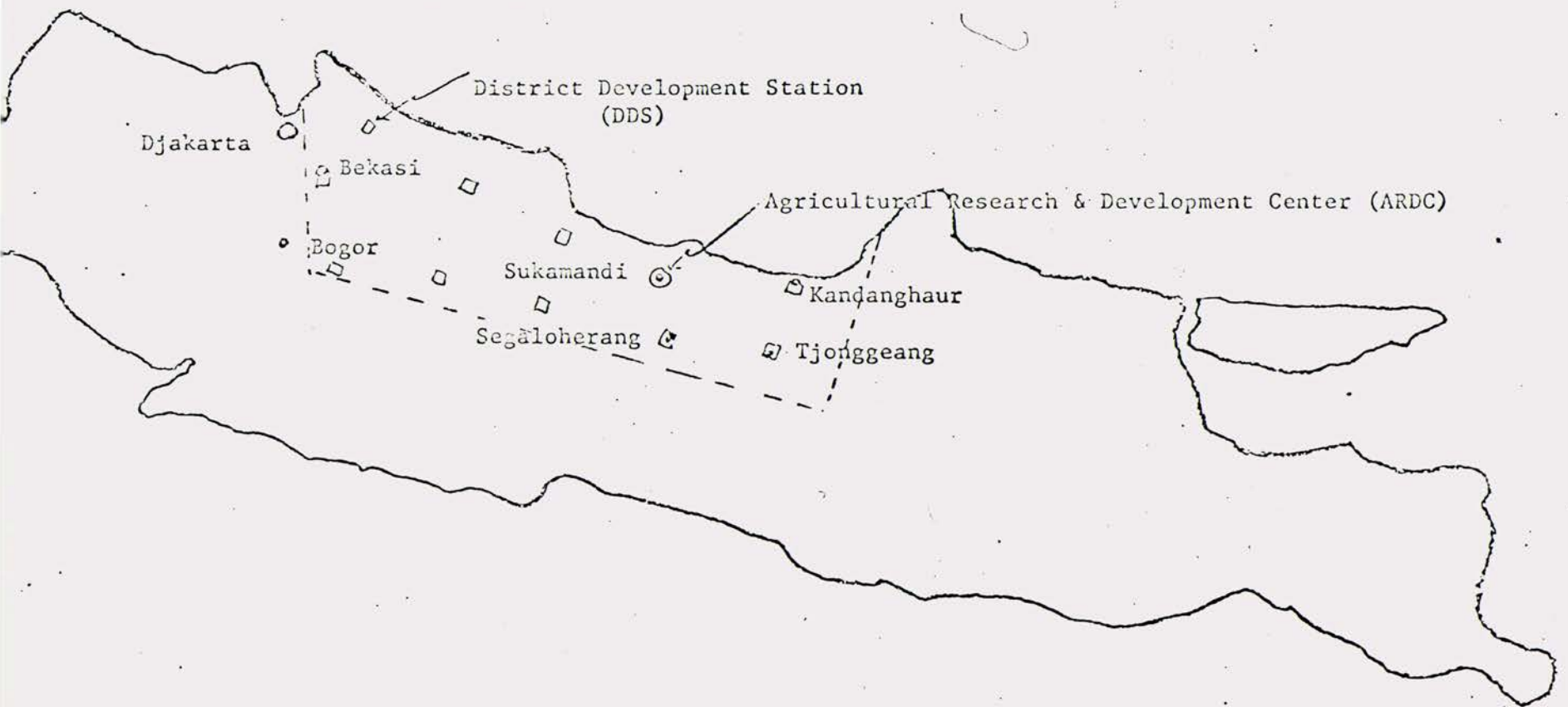
The area around Sukamandi is fairly homogeneous in climate, soil, topography and type of farming. It is quite fertile and, therefore, responsive to new technology. It is relatively close to the central rice marketing area of Krawang which is quite well developed and near to the major food deficit area, the city of Djakarta. The area's local infrastructure needs improvement but is superior to that of other parts of Indonesia.

A suitable program for this station might include: research to develop, test and adapt new varieties and breeds to surrounding conditions; experiment with fertilizer, pesticides and other new inputs on rice and other food crops; and to develop a program of multiple cropping. This station could also research in methods for extension and to advise and aid in establishing farm supply facilities. Whatever the program, it would have to be consistent with a national plan for economic and agricultural development.

Sukamandi is an old Dutch estate with suitable residences, quarters for farm workers, factories for processing rice, cassava, rubber and jute. The Indonesian Department of Agriculture is now using it as a seed production farm, but has plans to develop it as a research center. If developed as an ARD center, it could service an area embracing 1 million farmers. With 10 DD stations each unit would serve a sub-area of 16 miles square or about 65,000 hectares with 100,000 farmers. The DD stations would be located roughly in the rectangle bounded by Kandanghaur and Tjonggeang on the east, the coast on the north, Segalaherang on the south and Bekasi on the west (see map).

J A V A

Proposed Sukamandi
Agricultural Development Area (ADA)



The District Development stations are the key to the integrated system. If need be, they could be the operating agent for any rural development program of the central, provincial or local government; in all cases, they would be the point of contact with farmers and local business and would provide the feed-back for research; the focal point for coordinating extension with research and the development program; the catalysts and initiators of local agribusiness needs; or, they could be agents of government in matters such as rice procurement.

Many of the DD stations will need to obtain land, construct facilities and build residences for efficient operation. However, to the extent possible, the many government seed farms that are now operated could be adapted. It might also be possible to arrange to have the district stations operated in part or entirely on a cooperative basis.

The senior technical staff at the Sukamandi ARD center might initially consist of perhaps two plant breeders, a soil scientist, an entomologist, a plant pathologist, an animal husbandry or poultry specialist, an agricultural engineer and two extension specialists and two economists. This staff would be headed by an administrative group, possibly a director and three assistants to cover research, extension, and the other developmental functions. In addition, there would be a need for a junior research staff, general support and laborers. The latter would be provided largely from Indonesian sources. The senior technical and director's staff would also be Indonesian to the extent that adequately trained talent is available. However, it is expected that initially a large portion would be recruited

from the U.S. or other foreign sources. It is assumed for cost purposes that perhaps 20 U.S. specialists would be needed for the Sukamandi center and one other ARD center. The District Development stations would probably be staffed by at least 3 well-trained general agriculturalists covering for each of the 3 basic areas of responsibility--research, extension and economic development. In addition, there would be a station director, plus such other staff as is needed to carry out required government functions and food-for-work projects. In addition, there would be a need for about 10 less-well-trained, but highly competent personnel to work directly with farmers and local agribusiness operators and to supervise local projects.

Because of the language, most of the junior staff at the DD stations have to be Indonesian. However, the possibility for utilizing specially trained U.S. staff in the manner of the Peace Corps should not be precluded. U.S. general agriculturalists and those with agribusiness management experience could fill the senior district position for which Indonesians cannot be found. Local labor would be hired as necessary for construction, tending plots, harvesting, etc.

The training and work of the district-station personnel would vary with local needs. In addition to the obvious work, crop and livestock research and extension and other functions need to be undertaken if agricultural development is to be successful. Work needs to be done, for example, on facilities for rice drying, fertilizer, transportation and storage, corn processing, and rice processing. There is also a need for developing tertiary irrigation canals, access roads and other general development projects including credit.

The organizational structure for an Indonesian project is postulated in Chart I. It illustrates one way in which the lines of communication and responsibility might flow. The final arrangement would have to be structural and negotiated as is most suitable to the specific case.

Costs and Cost-Sharing --(2 ADA's)

The establishing, constructing and operating two Agricultural Development areas similar to the one outlined for Sukamandi would cost the U.S. and Indonesian governments jointly a total of:

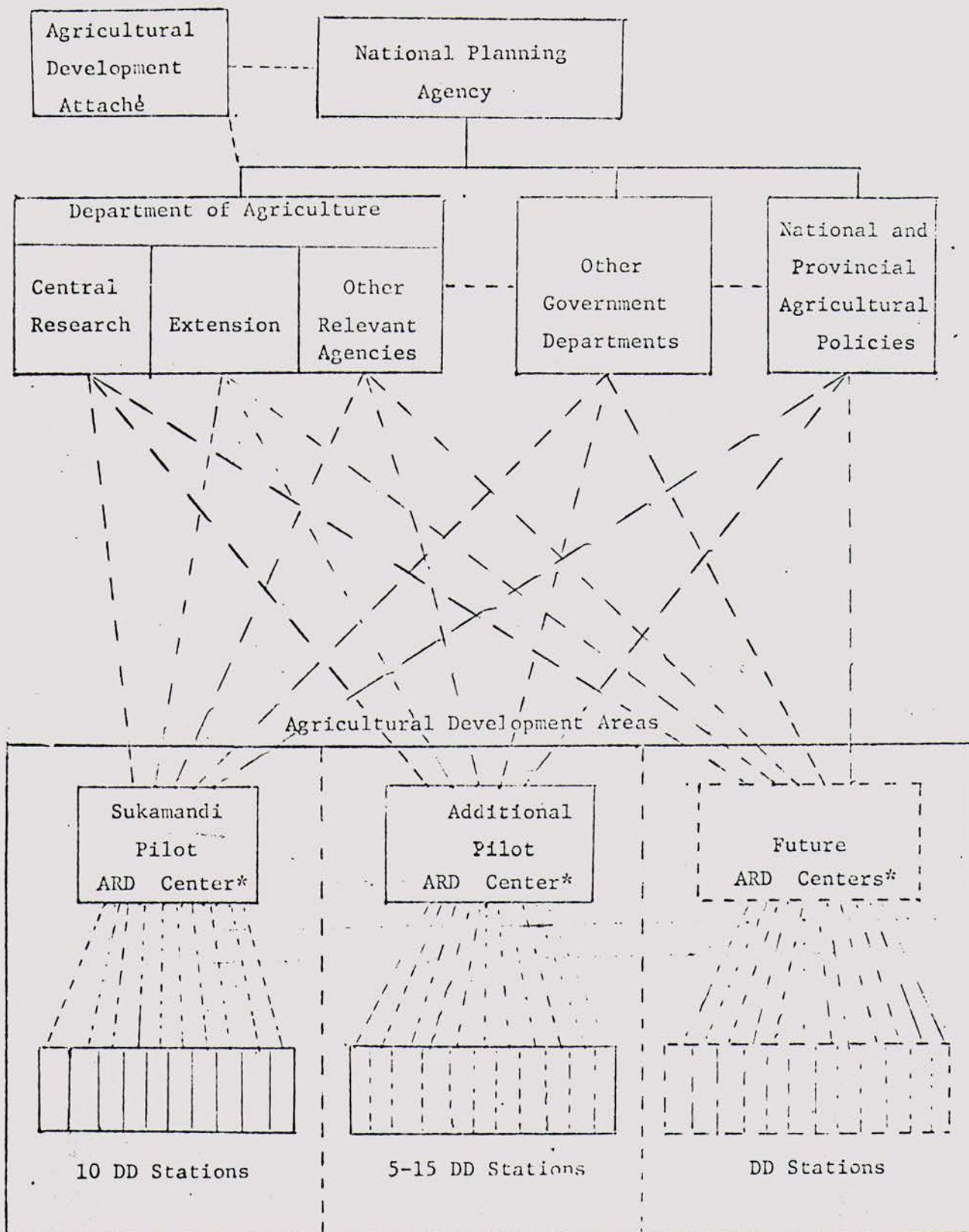
- \$5.1 million in FY 1970 for planning, initial contracting and beginning construction on 2 ARD centers and 20 DD stations;
- \$17.5 million in FY 1971 to complete construction of the above and to begin some research and extension and get underway some food-for-work projects; and
- \$15.7 million in FY 1972 and subsequent years to operate the system when it is completed (tables 1 and 2).

The Indonesian government would be expected to contribute to these total costs by providing land, and funds for construction, salaries and operations. The land the Indonesian Government now has, the funds could be provided through P.L. 480 loans. The contribution should be about:

- \$2.3 million in FY 1970;
- \$5.3 million in FY 1971; and
- \$5.4 million in FY 1972.

The GOI contribution would increase in subsequent years as more and more of the jobs become filled by Indonesians. Also, the total operating costs would decline since the cost of U.S. personnel is far higher than for Indonesia. As the system becomes effective in reducing Indonesia's dependence on imported food, P.L. 480 loans would no longer be possible. Thus, the GOI would have to turn to financing from other sources.

Chart I. -- Schematic Organization for a Systematic Approach to Integrated Agricultural Development -- A possible layout for Indonesia.



*Area Agricultural Research and Development.

The United States contribution would be the heaviest in the early years. However, the project has a built-in mechanism for reducing U.S. participation as it becomes effective in increasing Indonesia's domestic food supply and as it becomes effective in improving Indonesia's capacity to manage its own agricultural research, extension and agribusiness enterprises. The U.S. contribution would be:

- \$2.8 million in FY 1970;
- \$12.3 million in FY 1971; and
- \$10.2 million in FY 1972 and possibly through FY 1975.

In FY 1970, the entire U.S. contribution would be financed through the authority of Section 406 (table 1). About \$1.1 million of the \$2.8 million would be for direct dollar outlays and for expenditures in the U.S.; the remaining \$1.7 million would be needed to purchase rupias from "near excess" supply or from newly generated currency-use payments. The \$1.7 million is a receipt to CCC so that it would have a neutral impact on the FY 1970 appropriation for the Department.

Table 1. Sources and Obligation of Funds, Indonesia, FY 1970-1972

	1970	1971	1972
<u>GOI Contributions:</u>			
Direct (From Title I loans)	300	5,250	5,425
Value of land & existing facilities	2,000	--	--
Total GOI	2,300	5,250	5,425
<u>U.S. Contribution:</u>			
Sec. 406, Direct dollar	1,100	1,725	2,200
Sec. 406, Rupia purchases	1,700	7,800	2,500
Title II Commodities	--	2,500	5,000
Sec. 204 Self-Help	--	250	500
Total U.S.	2,800	12,275	10,200
Total Obligations	5,100	17,525	15,675

In 1971, the completion of the construction would increase the amount of appropriation needed under Section 406 to more than \$9.5 million; however, \$7.8 million again would be to purchase rupias that in turn would be credited to CCC. Thus, only \$1.7 million would be for direct dollar costs. In that year, some food-for-work projects could be started; in fact, some of the facility construction would be completed using food-for-work projects. Appropriation for this is already requested under the Food-for-Freedom program as are funds for the purchase of rupias made available under Section 204.

In 1972 and until the effectiveness of the program, causes the U.S. contribution to decline, the U.S. appropriation would stabilize at about \$4.7 million under Section 406 with about \$2.5 million--more than half--for the purchase of rupias. It is anticipated that food-for-work projects could be operated at a level of about \$6 million with about \$1 million contributed by the GOI.

Detailed Costs and Implementation Schedule

The proposed schedule is tight and assumes that recruiting and contracting can operate smoothly without important hitches. It is assumed that a crash program could put the system in operation before the end of FY 1971 (table 2). This would likely be subject to adjustment and as the implementing plans are developed by the planning team.

FY 1970, the first year, would be for negotiating with the GOI and planning and contracting for construction. First, an acceptable idea has to be negotiated with the GOI. Next a high level U.S. team would be fielded to work with Indonesian planners to specify Indonesian's goals and lay out a plan of action. The team would select the sites for 2 ADA's and the locations of the 20 DD stations if that happens to be the number determined to be optimal. At mid-year possibly one-half of the members of the U.S.-Indonesian planning teams would be replaced with specialists in business contracting and construction. They would set up the site plans and arrange contracts for construction. The remainder of the team would begin plans for operating programs.

The U.S. Agricultural Development Attaché would coordinate the operations with related technical work of the U.S. mission and of the Indonesian Government. He would be particularly active in developing operational plans and in their subsequent revision and updating.

A recruiting and training program would also have to be launched in the U.S. and in Indonesia early in the fiscal year so that some staff can be committed to begin operations by mid-1971.

	Total	Cost Sharing	
		U.S.	GOI
		\$ 000	
<u>Obligations in FY 1970</u>			
<u>Non-Recurring:</u>			
Survey & Planning (60 man-months)	350	250	100
Implement. & Contract. (60 man-months)	500	350	150
2 ARD Centers (begin construction) <u>1/</u>	1,500	1,000	500
20 DD Stations (begin construction) <u>2/</u>	2,500	1,000	1,500
Total Non-Recurring	4,850	2,600	2,250
<u>Recurring:</u>			
Agric. & Dev. Attaché & Planning Staff	100	100	--
Recruiting & Training	150	100	50
Total Recurring	250	200	50
Total FY 1970	5,100	2,800	2,300
<u>Obligations in FY 1971</u>			
<u>Non-Recurring:</u>			
2 ARD Centers (complete construction) <u>1/</u>	2,500	2,000	500
20 DD Stations (complete construction) <u>2/</u>	7,100	4,600	2,500
Equipment and machinery	400	300	100
Total Non-Recurring	10,000	6,900	3,100
<u>Recurring:</u>			
Agric. Dev. Attaché & Planning Staff	125	125	--
Recruiting & Training	150	125	25
2 ARD Centers (1/3 personnel) <u>3/</u> 11 SMY	800	400	400
20 DD Stations (1/3 personnel) <u>4/</u> 25 SMY	1,600	800	800
Capital for local dev. projects	1,750	1,350	400
Food-for-Work	3,000	2,500	500
Operating & Equipment	100	75	25
Total Recurring	7,525	5,375	2,150
Total FY 1971	17,525	12,275	5,250
<u>Obligations in FY 1972</u>			
<u>Non-Recurring:</u>			
Construction & Capital items	200	150	50
Total Non-Recurring	200	150	50
<u>Recurring:</u>			
Agric. Dev. Attaché & Planning Staff	125	125	--
Recruiting & Training	150	125	25
2 ARD Centers (salaries & operations) <u>3/</u>	2,400	1,600	800
20 DD Stations (salaries & operations) <u>4/</u>	4,800	1,600	3,200
Capital for local dev. projects	2,000	1,600	400
Food-for-Work	6,000	5,000	1,000
Total Recurring	15,475	10,050	5,425
Total FY 1972	15,675	10,200	5,475

1/ Portion of construction cost for 2 ARD centers to accommodate 32 SMY at an average cost of \$60,000/SMY.

2/ Portion of construction cost for 20 DD stations to accommodate 80 SMY and supporting junior staff at an average cost of \$60,000/SMY only.

3/ Salaries and operating expenses estimated at \$75,000/SMY

4/ Salaries and operating expenses estimated at \$60,000/SMY.

In FY 1971, construction of some of the basic facilities should be completed and equipped and ready for partial operation. Therefore, it will be necessary to purchase tools, equipment and transportation vehicles as needed for the operations to be undertaken when the initial one-third of the staff is hired.

Some food-for-work projects could be organized by mid-year to improve the agribusiness infrastructure and community facilities. However, it is possible that some of the earlier projects may concentrate on preparing or improving the facilities at the DD stations or at the ARD centers.

By FY 1972, the program should be fully staffed and in operation as appropriate to the plan.

THE CONGO (Kinshasa) -- AN EXAMPLE

The Congo is another example of a country that now appears ready to make a major move forward in agriculture and general economic development. The political structure that was so unsettled following the Congo's independence in 1960, now seems prepared to accept the responsibility.

When Belgium ruled the Congo, considerable success had been achieved in agricultural production, primarily because they had supported a large program of basic and adaptive research and were able to get the plantation owners and concessionaires to adopt the new ways. It was a system that produced a continuous flow of new technology to agriculture, much in the manner proposed in this report.

The system consisted of a large national agricultural research center (INEAC) at Yangambi on the Congo river. Throughout the country was a network of 35 to 40 research substations plus another 50 or so local adaptation stations. The system at its peak employed nearly 500 European specialists, 200 technically trained African assistants, and some 6,000 junior staff and laborers.

During the unrest of the 60's, much of a once progressive agriculture was destroyed; the research system that developed it was depleted of technical competence, the institutions that managed it lost control. The National Research Center at Yangambi and only 20 of the satellite stations are now operated with about 20 moderately trained technicians and some 2,000 Congolese workers. The firms that once undertook the management of farms and estates arranged for farm supplies and marketed farm products are no more. And the institutions necessary to continue these functions for a new and emerging system of small farms have not been built.

The General Situation

The Democratic Republic of the Congo (Kinshasa) is a huge country in the center of the African continent. The 904,747 square miles which comprise it are about equal to the land area of the United States east of the Mississippi. Its most important geographic features are the Congo River and its tributaries, which provide the main inland transportation for more than half of the country, and the extensive equatorial rain forests of the Congo Basin.

The population of the Congo in 1966 was estimated at 16.3 million with an annual growth rate of 2.3 percent. On the average, there are 17 persons per square mile, but the distribution is so uneven that half the land area has only 3 persons per square mile and some jurisdictions run as high as 65. About 80 percent of the Congolese population lives in rural areas mostly along the rivers and other transportation routes and many near the mining centers.

Kinshasa (formerly Leopoldville) is the Congo's largest urban center, with a population estimated in 1968 at 1.2 million. Another 225,000 people live in Lubumbashi (Elizabethville), 200,000 in Mbuji-Mayi, and 100,000 in Kisangani (Stanleyville).

The Congo received its independence from Belgium on June 30, 1960. After a good deal of civil strife, its present Constitution was adopted in the spring of 1967 and provides for a federal system of government with substantial power in the hands of the president and broad control over the 8 provincial governments.

The president functions also as the Minister of Defense, while others of his cabinet control Departments of Foreign Affairs, Finance, Justice, Interior, Agriculture, Education, National Economy and Industry, Transportation and Communications, and Labor and Social Welfare.

The internal economic structure of the Congo is well diversified compared with most African states. Industrial processing and manufacturing account for about 17 percent of the gross national product, another 45 percent is equally divided among public administration, commerce and transportation, and noncommercialized subsistence production, while agricultural and mining sectors accounted for 13 percent and 7 percent, respectively.

There was a severe decline in GNP in the years following 1960, particularly in the agricultural sector. As producing areas in the interior became more isolated from urban markets, there was a marked return to subsistence production and mass migration to urban areas. Cash crop production suffered so badly that the Congo now must import foodstuffs in which it was formerly self-sufficient--much of this has been under Food for Freedom.

The GNP in current prices was \$1.47 billion in 1965, and about \$1.80 billion in 1966, or \$92 per capita and \$110 per capita, respectively. This, however, represents no real improvement because prices increased enough to offset the gain.

About 26 percent of the Congo's gross national product in 1966 was exported. But the economy has become increasingly dependent upon its vast wealth of mineral resources to provide these exports, particularly copper, cobalt, and industrial diamonds. The share of mining products in exports has increased from roughly 60 percent in 1958 to 83 percent in 1966--copper alone rose from 28 percent to over 57 percent. Agricultural exports, on the other hand, fell from 40 percent of total exports in 1958, to 17 percent in 1966; this was a drop from about \$185 million to \$80 million over the same span of years.

The internal transportation system of the Congo is terribly inadequate even though there is a network of 8,500 miles of navigable rivers. The country reports about 70,000 miles of roads, but very little is paved or suitable for all weather traffic. Even the 3,000 miles of railroad are currently in disrepair.

The Agricultural Sector

The agricultural sector began to show some signs of revival in 1967. The exports of most agricultural commodities increased substantially that year, particularly in the final 2 months. Re-establishment of security in most of the agricultural areas probably provided the main impetus for this. The June 1967 monetary reform which was designed to improve the Congo's terms of trade for agricultural production for exports may also have been partly responsible.

In 1966, agriculture accounted for almost 20 percent of GDP and provided support for some 70 percent of the population. Production is divided about equally between European-owned plantations and Congolese cultivators. The plantations produce mainly for export, while the small cultivators produce foodstuffs for consumption in the domestic market. The small farm sector merges quickly into subsistence.

Palm products are the most important agricultural export commodities. Production of palm oil declined from 244,500 metric tons in 1959 to 137,500 tons in 1965. It had recovered to 178,900 tons by 1967, and is expected to continue to expand in 1968.

Coffee is the second most important export crop and it is grown mainly in the northeastern regions on plantations with about one-fifth supplied by small-growers. Production declined from 50,000 metric tons in 1959 to 19,000 tons in 1965 and has increased again to 40,000 tons in 1968.

Most of the rubber is produced on ten plantations in the northwest. Production amounted to 40,000 tons in 1959, declined to 22,000 tons in 1965, and increased again to some 32,000 tons in 1967.

Tea, cocoa, timber, rauwolfia, and bananas also have a potential for increased production and export, while cotton, sugar cane, rice, maize and manioc are important mainly for domestic consumption. Before independence fruits and vegetables were grown generally and in sufficient quantities, but now there is a substantial shortage especially in the larger population centers.

Cattle are raised by European companies using modern ranching methods and by Congolese using traditional practice. The latter have the largest total number of animals but their quality is poor and they do not contribute significantly to meat supplies because they are held primarily as an indicator of wealth. The consumption of animal and poultry products is very low.

As in most of tropical Africa, much of the food is produced by shifting cultivation. Typically, the land is cleared and planted to crops such as cassava, corn, sweetpotatoes, and yams. After a few years, its fertility drops and the land is allowed to grow back to bush or forest, while another area is cultivated.

Early attempts to clear large tracts of land for permanent cultivation proved unsuitable as the sun and rains soon leached the nutrients. Thus, even the scientific use of land requires adaptation of the traditional, although primitive, methods of cultivation.

Land settlement experiments (paysannats) conducted in the 1930's were so successful that they were given a priority role by Belgium in the Congo's development plans. By 1957, 175,000 African farmers had been allotted about 3,700,000 acres in 200 paysannats. Since then, however, very little progress has been made.

The farm marketing system tends to be poorly suited for the system of small farms. This is no government institution with a major responsibility

for marketing agricultural produce or for stabilizing producer prices. However, there are offices for inspecting and grading commodities for export.

Agricultural products for export are usually marketed by the individual large plantations, or through cooperatives. Often the Congolese farmers sell their small surplus to the plantations for subsequent processing and marketing.

Food for domestic use tends to be marketed through itinerant merchants who in turn distribute to retailers in the urban centers. To ensure a regular flow to urban centers, the Government recently established a state-owned corporation (Economat du peuple) for the purpose of selling foodstuffs and other essential consumer goods to the public at favorable prices.

The Program Objectives

Prospects for expanding agricultural production are excellent; there is much land which can be planted or grazed, ample rainfall in most areas and the terrain is suited for mechanization. Many people still believe that tropical soils are soon leached and worn out. Actually they are no more leached and have no less organic matter than many of the soils now used successfully for cropping in the southeastern United States. These soils respond well to fertilizer, lime, water control, adapted varieties, pest control good practices, and good management. It is contended that if education and the services of modern research were not available to the American farmer he would do no better in much of the United States than they do in the Tropics.

One of the obvious problems confronting agricultural development in the Congo is a critical shortage of resources especially management and technical talent needed to lead its agricultural planning, its research, its extension, and the development of related institutions to create a total agribusiness system that will produce even better results than were obtained in the 1940's and 50's under the Belgians.

The network of agricultural research stations that existed prior to June 1960 is entirely consistent with the research portion of the integrated system proposed in this document. However, its rehabilitation alone would not be adequate. The system would still lack the institutions needed to construct and operate the rural facilities needed to improve the agribusiness infrastructure. And, it would not provide the type of extension needed to lift the farmer from a subsistence or quasi-labor status to become an independent farm operator.

Recent statements by the GOC indicate that it is willing but has very little funds to give agriculture a high priority in its development efforts. The entire national and provincial operating budget is only about \$65 million, and agriculture is expected to receive about \$1.3 million. In addition to this, the Congo has an investment objective of about \$6.5 million for agriculture which, because of other pressures has not materialized fully.

Total external aid to the Congo is currently in the vicinity of \$115 million; about \$91 million is from non-U.S. sources, much of it Belgian, and \$24 million from the U.S. The latter includes about \$13 million of Food for Freedom.

Until something is done to speed up the slow and inefficient long-distance transportation system, the GOC seems to be particularly interested in stimulating agricultural production in areas near the large population centers--this makes sense

It is very possible that the objectives of the GOC could be served well by developing a system such as proposed here, initially on a pilot basis and ultimately for the entire country. The adaptability of this approach would have to be verified by an investigating team and its acceptability would have to be agreed by those who contribute the resources.

A nationwide program for developing an integrated system would possibly include: (a) rehabilitation of the INEAC research center at Yangambi; (b) rebuilding and reorienting as necessary some of the INEAC substations

as ARD centers; and (c) rehabilitating and broadening the functions of the current local adaptation stations and adding DD stations as necessary for a complete approach to agricultural development.

A pilot ADA project to begin in FY 1970 might be considered in the narrow strip of land south and west of the city of Kinshasa (see map). An alternative location or an additional one could be considered upriver on the Congo, possibly in Equateur province; there, water transportation is available to carry surplus production to the main population centers or for export. Still others could be considered in Oriental province in the areas along the border of Uganda, Rwanda and Burundi that are heavily populated. The area south and west of Kinshasa has been selected to serve as an example of how the integrated system might be adapted to the Congo. It also serves to provide a more realistic basis for estimating costs.

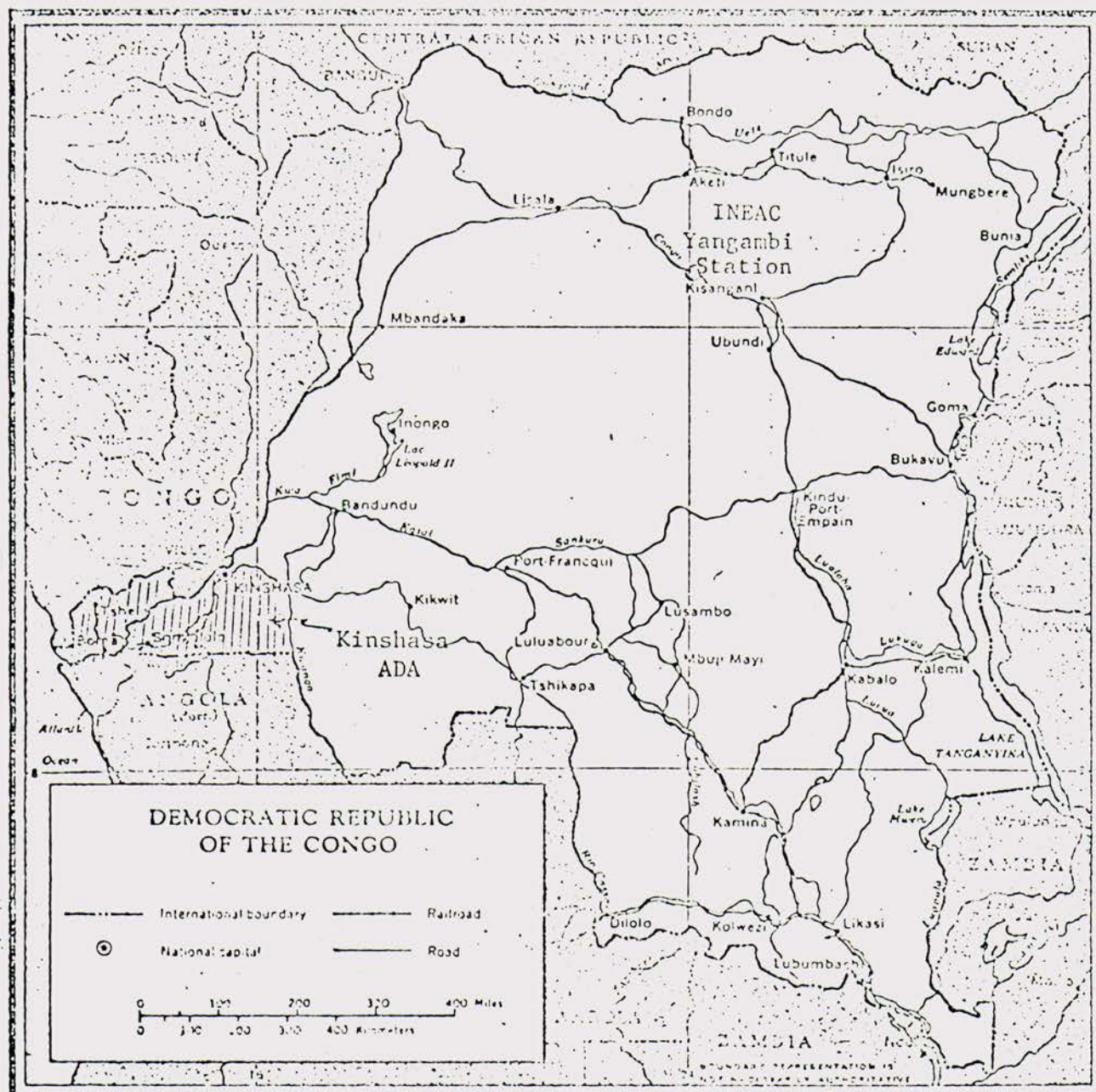
The Kinshasa ADA

The Kinshasa ADA would be roughly 250 miles long and averaging 100 miles wide. It is densely populated and agriculture is more concentrated than in most other parts of the country.

The area could likely be served by one ARD center established near Boma, Songolo or a similar site, depending on where a suitable INEAC substation is now located and where it would be most accessible and most useful for conducting adaptive research to serve the entire area.

The INEAC system contains about 7 local adaptive stations and about 4 substations. With one of the latter selected as a site for the ARD center, the other three and the 7 adaptive stations would be converted to function as 10 DD stations. It is assumed that the stations in the INEAC system were initially located so that contact with farmers and the farming community is

Chart 2. The Congo (Kinshasa) showing location of INEAC station and postulated Agricultural Development Area.



maximized; if this is not so, an adjustment would have to be made. While the DD stations would retain the adaptive research functions they once had, their scope would be broadened systematically to include extension activities and the development functions needed for an integrated approach. The system would be operated by the Congolese and would be implemented and adapted as appropriate to the environment and the governmental and political structure.

It is thought that it may be appropriate also to contribute to rehabilitation of the INEAC station at Yangambi that is proposed by the UN-FAO. While this would be somewhat outside of the immediate sphere of the proposed ADA pilot scheme, it would nonetheless be consistent with it. In addition to the long-run benefit that would accrue to all Congolese agriculture, it would provide an invaluable base for the work at the ARD center and the DD stations. Then, as the system spreads to nationwide basis, it would continue to serve as the basic research and training center for the entire system.

Costs and Cost Sharing. To establish an ADA in the Kinshasa area would cost less than for most other areas of the Congo and also less than was estimated for Indonesia. This is because the land and many of the structures needed for the ARD center and the 10 DD stations are assumed to exist in a good state of repair. Also, because of this, it is thought that the system can be made operational somewhat quicker.

Rehabilitating the INEAC station at Yangambi and developing an ADA in the Kinshasa area would cost the U.S. and Congolese government jointly a total of:

- \$2.2 million in FY 1970 for planning, contracting, remodeling and partially staffing the Yangambi stations;
- \$8.4 million in FY 1971 for equipment, full staffing of the system, and conducting food-for-work projects; and
- \$8.1 million in FY 1972 and subsequent years to operate the system at a constant and effective program level (tables 3 and 4).

Table 3. Sources and Obligations of Funds -- Congo (Kinshasa), FY 1970-72

	: 1970	: 1971	: 1972
GOC Contribution:			
Direct (From Title I Loans)	: 875	2,925	2,825
Value of land existing facilities	: -- *	--	--
Total GOC	: 875	2,925	2,825
U.S. Contribution:			
Sec. 406, Direct Dollar	: 660	1,325	1,225
Sec. 406, Foreign Currency Purchase	: 690	1,525	1,500
Title II Commodities	: --	2,500	2,500
Sec. 204, Self-Help	: --	150	150
Total U.S.	: 1,350	5,500	5,375
Total Obligations	: 2,225	8,425	8,200

* The land and existing facilities contributed by the GOC have not been evaluated.

The GOC would be expected to contribute to these costs, but much of it could be paid from long-term loans made under Title I of the Food for Freedom program. The existing land and facilities of the INEAC system have not been included but, if additional land is needed, the Congolese government would be expected to contribute that also. Of the total cost, the GOC would be asked to contribute:

- \$.9 million in 1970;
- \$2.9 million in 1971; and
- \$2.8 million in 1972.

In subsequent years, the contribution of the GOC would have to increase as more and more Congolese gain experience and are trained to replace U.S. and other foreign technicians. Also, U.S. assistance through Title I would automatically reduce when the integrated effort becomes effective and food imports decline. By then, the system should generate enough growth so that it

Table 4. Estimated Costs to Establish I ADP -- Congo, FY 1970-1972

	Total	Cost Sharing	
		U.S.	GOC
<u>Obligations FY 1970</u>		(\$ '000)	
<u>Non-Recurring:</u>			
Survey, Planning & Implement. (60 man-mos.)	400	300	100
Rehabilitate Yangambi	250	200	50
1 ARD Center (construction)	250	125	125
10 DD Stations (construction)	1,000	500	500
Total Non-Recurring	1,900	1,125	775
<u>Recurring:</u>			
Agric. Dev. Attaché & Planning Staff	75	75	--
Recruiting & Training	75	50	25
Staffing Yangambi (1/4 year) ^{1/}	175	100	75
Total Recurring	325	225	100
Total FY 1970	2,225	1,350	875
<u>Obligations FY 1971</u>			
<u>Non-Recurring:</u>			
Construction, Equipment & Machinery	300	200	100
Total Non-Recurring	300	200	100
<u>Recurring:</u>			
Agric. Dev. Attaché & Planning Staff	75	75	--
Recruiting & Training	75	50	25
Yangambi (salaries & operations)	750	500	250
1 ARD Center (salaries & operations) ^{2/}	1,125	725	400
10 DD Stations (salaries & operations) ^{3/}	2,100	700	1,400
Capital for local dev. projects	1,000	750	250
Food-for-Work	3,000	2,500	500
Total Recurring	8,125	5,300	2,825
Total FY 1971	8,425	5,500	2,925
<u>Obligations FY 1972</u>			
<u>Non-Recurring:</u>			
Construction & Equipment	100	75	25
<u>Recurring:</u>			
As for FY 1971	7,975	5,175	2,800
Total FY 1972	8,075	5,250	2,825

1/ 10 scientific man-years @ \$75,000/SMY.

2/ 15 scientific man-years @ \$75,000/SMY.

3/ 35 scientific man-years @ \$60,000/SMY.

can be taxed sufficiently to maintain approximately the investment in it. The extent to which a system can ultimately become self-supporting would be one of the principal criteria determining the feasibility of this proposal.

The U.S. contribution would be heaviest the second year, the year in which the project is first in full operation. It would cost:

- \$1.4 million in FY 1970. Less than \$.7 million would be for direct dollar appropriations under Section 406, and a slightly larger amount under the same authority would be for the purchase of Congolese currency to pay locally incurred costs--the latter would have a neutral impact on the USDA budget because it is also a receipt to CCC.
- \$5.5 million in FY 1971. About \$1.3 million would be under Section 406 to cover direct dollar costs and \$1.5 million under the same authority would be to purchase Congolese currency; \$2,500 from Title II commodities would be for food-for-work projects; and \$.2 under Section 204 to buy foreign currency for facilitating food-for-work.
- \$5.3 million in 1972 to carry on programs as required for the development of agriculture in the selected ADA.

Detailed Costs and Implementation Schedule -- The costs are based on the assumption that the Congo is an appropriate selection, that a tight implementation schedule can be followed, and that at least one ADA can be set up by the end of FY 1970 (table 4).

In FY 1970, a planning team of U.S. and Congolese technicians would study the proposal and recommend the area where the ADA program should be developed. They would also develop a work plan to be used as a guide for recruiting and to activate the program as early as possible in FY 1971. And, with some change in personnel about mid-year, the team would negotiate contracts for construction and renovation to adapt existing facilities. Some staff would be hired in late FY 1970 to assist in completing the development of an operating program.

Coordination of this work and U.S. supervision would be provided by the Agricultural Development Attaché working closely with those responsible for operating the system.

In FY 1971, recruiting would be completed with personnel appropriate to the plan of operations. Early in the year, machinery, vehicles and tools would be acquired as needed and some of the research and extension activity could begin. Food-for-work projects would also be initiated early to complete the renovation of buildings and to build the necessary land improvements at the station. If additional facilities are needed to market farm products, to bring farm supplies into the area or to provide essential community services, they could also be obtained through food-for-work.

In FY 1972, the program would continue according to a continuously revised and updated plan. Consideration would also be given at this time to expanding the program to embrace one or several more ADA's.

Appendix Table -- Costs and Cost Sharing for three Pilot ADA's -- FY 1970-1972

	:	FY	:	FY	:	FY
	:	1970	:	1971	:	1972
<u>U.S. Contribution:</u>	:		:		:	
Sec. 406 (direct dollar appropriation)	:	1,760	:	3,050	:	3,425
Sec. 406 (to purchase foreign currency)	:	2,390	:	9,325	:	4,000
Sec. 204 (to purchase excess currency)	:	--	:	400	:	550
Title II Commodities (Food-for-Work)	:	--	:	5,000	:	7,500
Total U.S. Contribution	:	4,150	:	17,775	:	15,475
<u>Host-Government Contribution:</u>	:		:		:	
Salaries and Expenses	:	1,175	:	8,175	:	8,250
Land and Facilities	:	2,000	:	--	:	--
Total Host Contribution	:	3,175	:	8,175	:	8,250
Total Program Costs	:	7,325	:	25,950	:	23,725

A NEW ERA IN WORLD AGRICULTURE

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The organizers of the annual Senator Frank Carlson Symposium on World Population and Food Supply are to be commended for their initiative in selecting this means of honoring one of the outstanding citizens of Kansas and of the United States. It is a privilege to appear as leadoff speaker at this, the first annual symposium, featuring so many outstanding authorities on the world food problem, including Senator George McGovern of South Dakota and two prominent Kansans, Under Secretary of Agriculture John Schnittker and Senator-elect Robert Dole.

The thesis of this paper is that the world has recently entered a new agricultural era. It is difficult to date precisely this new era since many of the contributing factors have been years in the making. But in terms of measurable phenomena such as the sudden sweeping advances in food production in several major developing countries, the old era ended in 1966 and the new began in 1967.

During the earlier era, spanning the two decades from the end of World War II through 1966, the less developed world was characterized by (1) accelerating population growth, (2) a sharp reduction in the

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area of new land that could be readily brought under cultivation, (3) lagging food production, failing to match population growth in some instances, and (4) increasing dependence on food aid from the United States. During the 1950's food production in the developing countries increased largely as a result of expansion in the cultivated area; but as it became more difficult to bring new land under the plow during the early 1960's, the growth in production slowed perceptibly.

The new era is characterized by explosive increases in production of principal crops in the larger developing countries of Asia. The 1968 Pakistan wheat harvest was up 37 percent over the previous record, possibly an increase without precedent in any major country. India's wheat crop this year was up 35 percent over the previous record; its total food grain harvest up 12 percent. Ceylon's rice crop has increased 34 percent during the past two years. The Philippines, with two consecutive dramatic gains in its rice crop, has apparently ended half a century of dependence on rice imports.

Favorable weather has contributed to the record harvests in some countries, such as India, but it is only one factor; these countries are now achieving takeoffs in yield per acre comparable to those achieved in the developed countries during the first half of this century. Increases in per acre wheat yields in Pakistan and India and of rice yields in the Philippines over the past two years may exceed those of the preceding several decades.

Thus far the most rapid advances have been concentrated in Asia, a region containing more than half the world's people. But countries

elsewhere -- Mexico in Latin America and Kenya and the Ivory Coast in Africa -- are also enjoying the fruits of modern agricultural technology. Within the next several years the agricultural revolution will likely spread to most of the less developed world.

The new era is dynamic, providing new opportunities for farm families, promising to bring into the marketplace literally hundreds of millions who heretofore have eked out a subsistence living, consuming all that they produce. This will broaden the market within individual developing countries, greatly enhancing the prospect for industrial development.

I. Setting the Stage for Agricultural Development

Several closely interrelated factors contributed to the growing emphasis on agricultural development during the mid-1960's, which has led to the new agricultural era. Among these are (1) the reduction in surplus grain stocks in the exporting countries, principally the United States, (2) two consecutive monsoon failures on the Indian subcontinent, affecting the food supply of 625 million people, (3) rising prices of major food grains, especially rice, both within the major developing countries and in the world grain market, (4) a consequent fear by political leaders of possible food shortages and political instability that might result, and (5) several basic changes in U.S. foreign agricultural and foreign assistance policies during the mid-sixties.

A "short tether" policy for food aid was adopted in the summer of 1965. Multi-year food aid agreements such as the 4-year, 17 million

ton food grain agreement signed with India in 1960 became a thing of the past. From mid-1965 forward, the duration of agreements with major countries was measured in months rather than years, with further agreements contingent upon efforts to "get agriculture moving."

The United States sharply increased its support for agricultural development; AID funds for agriculture rose from less than \$200 million in the early 1960's to \$520 million in 1968. Also indicative of the rising concern over the race between food and people was an increase in the AID budget for family planning from \$2.1 million dollars in 1965 to \$50 million this year.

In late 1963 David Bell, then Administrator of AID, and Secretary Freeman concluded an agreement calling for the use of USDA resources to support AID's agricultural efforts overseas. This resulted in the creation within USDA of the International Agricultural Development Service, the agency I now head, and enables us to draw upon USDA's 29,000 professional agriculturists for both long term resident assignments and for short term consultancies. Since 1963 USDA has sent 975 agricultural advisors to 54 countries, some for short term assignments of a few weeks, others for up to four years.

Partly in response to the developments mentioned above, several developing countries substantially increased the resources going into agricultural development. Imports of fertilizer into Turkey this year may exceed those of petroleum, traditionally the leading commodity import. Two years ago India expanded its agricultural budget by more than a third. The availability of fertilizer in Pakistan has increased

severalfold thus far during the 1960's and may double again by 1970. The Government of the Philippines has given unprecedented support to a crash rice production program. Political leaders began to identify with and to support accelerated food production programs.

These increased commitments to agricultural development are both a cause and a characteristic of the new era in world agriculture.

II. Engines of Change

The pronounced improvements in the economic and political climate for agricultural development and the massive introduction of the high-yielding varieties are dramatically improving the prospects for expanding food production in the developing countries. The new varieties may be to the agricultural revolution in the less developed world what the steam engine was to the industrial revolution in Europe.

Thus, the agricultural revolution now underway in the developing regions, principally Asia, is much more than just the conventional formula of using improved seeds, fertilizers, pesticides and more water. This is another characteristic of the new era. The new cereal varieties are not just marginally better than traditional ones; they are dramatically superior, frequently doubling yields, under field conditions. Their superiority is indicated by the rate of expansion in their use:

Estimated Acreage in New High-Yielding Varieties in Asia 1/

<u>Year</u>	<u>Acres</u>
1964/65	200
1965/66	37,000
1966/67	4,800,000
1967/68	20,000,000
1968/69	34,000,000

The new dimensions of the agricultural revolution now underway and the numerous sources of increased food production deriving from it make it difficult to comprehend. Some sources of potential increases in production are:

(1) Greater fertilizer responsiveness; the new varieties not only respond to much heavier applications of fertilizer but they use it more efficiently. If one pound of nitrogen fertilizer applied to the old varieties resulted in 10 pounds of additional grain production; a pound applied to the new varieties may result in 15 or, as has been recorded under very favorable circumstances, as much as 25 pounds of grain.

(2) The new varieties are aseasonal; unlike most of the traditional varieties they are not very sensitive to day length. They can, therefore, be planted at any time of the year in most of the tropics and sub-tropics where water supply permits.

(3) The new varieties are early maturing; in the case of rice, 120 days as contrasted with 150 to 180 days.

1/ Dana G. Dalrymple, "Estimated Area of High-Yielding Varieties of Grains in Ten Asian Nations," International Agricultural Development Service, U. S. Department of Agriculture, November 1968. The 1968/69 figure represents goals.

(4) Multiple cropping is increasing; both the possibility of planting year round and earlier maturity permit an increase in double or triple cropping. Farmers in India, Indonesia and the Philippines are now double cropping rice and, in some instances, even triple cropping where water supplies are adequate. Where water supplies are not adequate during the dry season, farmers are beginning to plant high-yielding grain sorghums. Sorghum, after harvest, will again tiller in the tropics, permitting a second and often a third harvest from the one initial planting. Farmers in Mysore State in India are producing three crops of corn every 14 months. In parts of Northern India and West Pakistan, rice is being grown during the summer monsoon season with wheat as the winter crop. Some farmers are able to plant a third crop such as potatoes or a protein crop like beans.

(5) Mechanization is increasing food production; new technologies require a re-examination of the feasibility of farm mechanization in densely populated, developing countries. Full use of the new technologies requires much greater inputs of labor in more careful planting, continuous weeding, frequent irrigation and the harvesting of much larger crops. Seasonal labor shortages in rural areas of Asia are becoming increasingly common. Farm mechanization will permit better seedbed preparation, enabling farmers to more fully realize the full genetic potential of new varieties. The possibility of continuous cropping throughout the year places a real premium on both rapid harvesting and seedbed preparation. My deputy, Dr. Lyle Schertz, describes this as follows:

... with the high-yielding varieties that can be grown year round, each day of delay means 1 day of lost crop production. With 120-day rice capable of yielding 2 tons per acre, almost 40 pounds of paddy (rough rice) per acre per day are at stake. ^{2/}

(6) The use of water, like fertilizer and other inputs, is rising steadily; the prospect of growing the new varieties throughout the year means that the value of water has increased sharply, particularly during the dry season. Farmers throughout Asia are investing heavily in tubewells and pumps to lift water into their fields, either from underground sources or from low flowing rivers and canals during the dry season.

The potential increases in food production associated with the new varieties are only a partial listing, but they illustrate the dynamic nature of the new technologies.

III. The U. S. Role

The agricultural revolution in the developing countries is strongly supported by the United States. Both public and private U. S. interests have combined to help launch what may be the most successful U. S. involvement overseas since the Marshall Plan.

The U.S. involvement in Asia, where the farm revolution is most advanced, is quite varied. Since 1960, AID, USDA and land grant universities have together trained some 4,000 Asian agriculturists in a wide range of agricultural and related fields.

AID investments over the past 15 years, in such activities as the construction of irrigation facilities and farm-to-market roads and

^{2/} Lyle P. Schertz, "The Role of Farm Mechanization in the Developing Countries," Foreign Agriculture, November 25, 1968, p. 3.

the building of agricultural institutions have created the agricultural infrastructure needed to support the widespread advances now occurring. Land grant universities have helped develop competent counterpart institutions in several developing countries. USDA/AID advisors have helped formulate agricultural price policies needed to provide farmers with incentive prices, making the use of modern technology profitable.

U.S. agribusiness firms are supplying a large proportion of the agricultural inputs -- fertilizer, pesticides, irrigation equipment and farm implements needed to generate and sustain this revolution in the countryside. An estimated two-thirds of all the fertilizer plants being built in Asia outside Japan and Mainland China are being built by U.S. firms, either on their own or in collaboration with local firms.

The exciting new technologies at the heart of the farm revolution -- the high-yielding varieties of rice, wheat, corn and grain sorghum -- have been developed largely by the Ford and Rockefeller Foundations.

Having identified these U.S. contributions, let me leave no illusions as to who is primarily responsible for the exciting advances of the past few years. These are due largely to the efforts of the countries themselves.

IV. Second Generation Problems

When agriculture begins to advance rapidly, as it is now doing in several developing countries, many new or second generation problems

are created. Often these are problems of success. Such is the case in a number of countries where rapid increases in grain production are overloading the existing, antiquated marketing systems.

In some areas where farmers traditionally marketed one-third of their crop, their crop increased by one-third, as a result of adopting new production technologies. This means the marketable surplus has suddenly doubled. Few marketing systems are equipped to handle abrupt increases of this size. Over the past 15 years many of the larger coastal cities in Asia have become increasingly dependent on imported foodstuffs with their populations at times living quite literally from "ship to mouth." As countries begin to generate surpluses in the rural interiors, a distribution system must be developed which will permit movement of such surpluses to the large coastal cities. ^{3/}

Another second generation problem, quickly coming into focus in several countries is the lack of farm credit. During the early stages of innovation and adoption of new production practices, the larger farmers -- usually well situated financially -- are characteristically the first to use new inputs. Once use of a new inputs such as fertilizer begins to expand beyond the larger farmers, then the need for credit becomes acute. Without it some small farmers are, in effect, denied access to the new technologies.

A third problem beginning to plague a number of countries as grain production surges ahead is declining prices. Many countries have

^{3/} For a more extended discussion of marketing problems, see Martin Kriesberg, "Marketing Food in Developing Nations - Second Phase of the War on Hunger," Journal of Marketing, October 1968, pp. 55-60.

instituted price support programs for wheat and rice during the last few years while market prices have been relatively high. As market prices now begin to drop to the support level, many governments are hard pressed to maintain the price guarantees given farmers. As production expands, countries must also wrestle with such questions as, What is a desirable price level? and, How should the internal support level relate to world market prices?

The new varieties, frequently less acceptable to consumer tastes than the familiar indigenous varieties, are often discounted in the marketplace. Over time, the discount usually diminishes as consumer tastes adjust to the new varieties or breeding efforts alter them to suit local preferences.

As new agricultural technologies are adopted, their benefits are not distributed evenly. Those farmers with the more fertile soils and the more reliable year round water supplies stand to benefit most. The economic gap between the better farms and farmers and the more marginal ones is almost certain to widen in the developing countries as it seems to have in the United States over the past half century.

This is not a definitive listing of second generation problems facing developing countries, but it does illustrate some of the more pressing ones.

V. The Renaissance in Agricultural Research

Agricultural research, an area of heavy investment within the United States over the past half century, but until quite recently

largely neglected by both the international assistance agencies and the governments of the developing countries, is now being given some of the attention it deserves. The success of the Rockefeller Foundation's wheat breeding program in Mexico dating back to the 1940's and the lack of attention to rice in Asia led the Rockefeller and Ford Foundations to combine resources to establish the International Rice Research Institute in the Philippines in 1962. The relatively quick and dramatic payoffs in rice breeding, following the success with wheat, have awakened widespread interest in agricultural research in the developing countries.

Today, the work in Mexico is being carried out under the Rockefeller and Ford-sponsored International Maize and Wheat Improvement Center (CIMMYT) at Chapingo. Two additional centers are being organized by the two Foundations: the International Center for Tropical Agriculture (CIAT) in Palmira, Colombia, and the International Institute for Tropical Agriculture (IITA) in Ibadan, Nigeria. Rather than concentrate on particular crops, these latter two centers will work on tropical agriculture more broadly.

The return to society from investment in the established centers has been phenomenal. The cost of establishing and funding the International Rice Research Institute has totaled some \$15 million to date. The value of additional rice production resulting from the spread of new rice varieties and improved cultural practices is already in the hundreds of millions of dollars. Within the next several years it could total several billion dollars!

The accomplishments of these foundation-sponsored research efforts are historic. But perhaps their most significant long term contribution will be the support they engender, and the encouragement they provide, for agricultural research in the developing countries.

Indigenous research establishments in several Asian countries have already released some exciting new varieties of cereals. Those now in use include: BPI-76 in the Philippines; H-4 in Ceylon, ADT-27 in India; and MexiPak-type wheats being released in Pakistan.

The plant breeders at the International Rice Research Institute, who developed the IR-8 miracle rice, expect that even it will be obsolete within a few years, replaced by still more efficient varieties. The Uttar Pradesh Agricultural University in India reports that Mexican-type wheats introduced only three years ago will soon become obsolete due to the development of even better varieties (Sonalika, Sona, and Chhoti Lerma). Breeding work on triple gene wheats is also very promising.

Within the past few years an informal network has developed between AID, USDA, the foundations and the agricultural universities for the exchange of germ plasm and information on research results. An effort is being made by my own agency to disseminate information in other areas, including analyses and reports of our short-term consultants, who deal with many of the problems which arise almost daily throughout the developing countries as the new technologies are applied for the first time.

Within the next few years, we can expect agricultural research to gain further impetus as the large multinational agribusiness concerns that manufacture fertilizer, pesticides and farm equipment, distribute seeds and process and market farm products, begin to invest in their own agricultural research. Such firms finance and conduct more than half of all agricultural research in the United States today.

VI. Future Production Prospects

Are the recent agricultural advances a temporary phenomenon, or a new trend? They appear to be the latter. The agricultural revolution seems to have gone too far now to be arrested. Too much is at stake, too much has been invested, the expectations of too many people have been aroused. The agricultural revolution in Asia should not, therefore, be viewed as an event but as the beginning of a process -- the eventual modernization of Asia.

Sources of potential food production increases in the future are, as indicated earlier, quite numerous. Prominent among these will be the steadily growing acreage planted to the ever more efficient crop varieties. This expanding acreage of fertilizer responsive varieties, combined with the prospective reduction in cost of nitrogen fertilizer, will broaden the profitable opportunities for fertilizer use.

Cultural practices will improve as farmers re-examine traditional practices and experiment with new ones. The development of multiple cropping as a science will greatly increase the potential food production capacity.

The production revolution, now confined largely to major cereal crops, will spread to other crops such as root crops, pulses and oilseeds. A major AID/USDA research effort designed to develop higher yielding varieties of pulses (lentils, chickpeas, etc.), and improved cultural practices are already promising some impressive breakthroughs. As this project moves ahead in both Iran and India, the prospects for raising critically low protein intake levels are improving steadily.

Opportunities exist for vast improvements in water storage and management and control facilities, particularly at local levels. Indicative of efforts to exploit these opportunities is the AID/USDA effort now underway in three states in India containing 127 million people. The trend in Asia will be toward more emphasis on intensifying production on the better land, already under cultivation, and relatively less on large-scale capital intensive reclamation projects.

Rapid production increases in a given crop are much more readily obtained as long as a country is deficit in that crop. Unless a country has a strong comparative advantage and ready access to world markets, the rate of production increases will slow down once self-sufficiency is attained. After that, production gains are likely to be a function of growth in the internal market.

The principal benefits of modern, and continually advancing, agricultural technology have yet to be realized in the developing countries. Wrong decisions can, however, slow the rate of progress. If the Indian Government, for example, fails to confront the problem of a large and growing internal deficit in fertilizer, Indian agricultural prospects

will be reduced. If the U.S. Congress fails to understand the significance of the agricultural breakthroughs of the past few years, and their potential for bringing about gains to the United States, and if in consequence it fails to provide the necessary support to sustain the developments now underway, the pace of advancement could be slowed.

VII. Economic Growth and U. S. Farm Exports

We should not overlook the role of the agricultural revolution in developing viable economies in the less developed world or the significance of this, in turn, for U.S. farm exports. It is difficult to give away farm products to people living at the subsistence level, much less sell them anything. Only as they enter the marketplace and develop some purchasing power can they be expected to buy our products. As Dorothy Jacobson, Assistant Secretary of Agriculture for International Affairs, once put it:

That market is a sleeping giant, with an almost endless capacity to consume. But this sleeping giant will awaken, and this market come to life, only when economic growth brings higher incomes and greater buying power. ^{4/}

Few, if any, countries can supply from indigenous production the wide variety of agricultural products their people will demand as their incomes rise. Not even the United States, with one of the most productive and diversified farm economies in the world, comes close to satisfying the demands of its people. U.S. agricultural imports, exceeding \$4 billion yearly, include commodities such as coffee, bananas, tea, rubber and copra which are not produced here at all.

^{4/} Dorothy H. Jacobson, "The Future of U.S. Agricultural Exports to Developing Countries," speech delivered at Upper Midwest Forum on Agricultural Export Trade, Minneapolis, Minnesota, May 18, 1966.

The countries with outstanding agricultural performances in recent years -- Japan, Taiwan, Israel and more recently Mexico, South Korea and Pakistan -- have, with the exception of Mexico, tripled their purchases of U.S. farm products over the past 8 years.

Value of U.S. Commercial Agricultural Exports ^{5/}

Country	Average	1966	1967
	1956-60 (million dollars)		
Japan	335	900	863
South Korea	10	20	42
Taiwan	4	30	68
Pakistan	5	9	13
Israel	10	44	38
Mexico	69	79	70

U.S. farm exports for dollars have climbed 80 percent over the past decade, largely because of the rising levels of prosperity in scores of countries around the world. Any really massive future expansion of U.S. dollar farm exports is dependent on the modernization of the developing economies, bringing their subsistence-oriented populations into the world market economy.

VIII. Protein and the Quality of Life

Protein malnutrition is a severe debilitating force in the tropics and sub-tropics, affecting hundreds of millions of people, particularly infants and growing children whose protein requirements are relatively higher than for adults. This deficiency exacts a heavy human toll in terms of suffering and a heavy economic toll in terms of underdeveloped and wasted human resources.

^{5/} Source: Agricultural Statistics, 1967, p. 714; U.S. Foreign Agricultural Trade by Countries, Calendar Year 1967, October 1968, pp. 1-3.

Protein malnutrition costs in several ways: it prevents people from reaching full physical development and, even more disturbing, full mental development. Stated simply, a youngster deprived of protein during the first few years of life cannot fully develop his inherited capacity for learning and for thinking.

To date, very little attention has been given to nutrition as a component of development strategy. And yet economic growth can be meaningful only in terms of developing human resources. Strategy designed to develop people as fully as possible has several components: education, nutrition, health and family planning, among others. Several advanced countries have full employment policies designed to utilize their labor forces as fully as possible. Why shouldn't a country have an adequate nutrition policy to ensure that its people have the opportunity of developing to their full inherent potential?

Dr. Eugene Campbell, with the AID Mission in Brazil, has pointed out that the economic returns on people born into a society vary widely depending on how effectively these people are developed as a resource. Taking a million people at birth in three separate locations -- Northeastern Brazil, the Sao Paulo area, and the United States -- Campbell points out that, after adjusting for life expectancy and literacy:

- the million people born into Northeastern Brazil contribute only 12 million adult-literate man years to society,
 - those born into the Sao Paulo area 25 million,
 - and those in the United States 48 million;
- a four-fold variation between the lowest and the highest.

This does not of course take into account the differences in quality and productivity of adult-literate man years contributed, which may be even greater than the variation in man years.

Alan Berg, head of the Food and Nutrition Division in our AID Mission in India, recently cited a dramatic example of a widening gap in the development of athletes. India, a country with 535 million people, failed to qualify a single track and field athlete to go to Mexico City. Not one athlete could meet the minimum qualifying standard set by the International Olympic Committee. This was a matter of training techniques, and interest among other things, but nutrition was undoubtedly a factor. 6/

IX. Increasing Protein Intake

As the role of nutrition in human development becomes clearer, the interest in expanding protein supplies rises. Several independent and widely varying efforts are now underway to expand the quantity and quality of protein available for human consumption in the developing countries.

One of these is the effort to improve the protein content of cereals through plant breeding. The discovery of high lysine corn at Purdue was one of the first breakthroughs. Corn varieties containing this gene have a protein quality far superior to conventional varieties. Within the next year or so, high protein corn varieties are to be released in the United States, Colombia and Kenya.

6/ Alan D. Berg, "On Food and Music," remarks at the Indian Association of Food Technologists, New Delhi, India, September 23, 1968.

Geneticists at the International Rice Research Institute are now giving increased attention to protein content of rice. Of the several hundred varieties tested thus far, protein content has ranged from 7 to 14 percent. The average for rice varieties now grown in Asia is probably about 8 percent. If high-yielding varieties could be developed that would raise this to, say, 10 percent, this alone would greatly increase the protein intake among Asia's predominantly rice consuming population.

Another promising effort to increase the amount of protein consumed centers around the use of oilseed proteins for human consumption. Dr. Aaron Altschul, my colleague in the International Agricultural Development Service, who is providing worldwide leadership in this exciting effort, states the case very well.

Oilseeds alone could furnish 25 million tons of protein, as much as man presently secures from animals. If protein intake per person were increased as little as five grams per day (four pounds per year) a substantial majority of the malnourished children and adults would no longer suffer protein deficiency.

Fortunately, oilseeds are strategically located in areas of need. In many countries, where meat, milk, and eggs are scarce and beyond most peoples' means, high-protein oilseed crops exist in great quantity. The world's largest coconut producers are the Philippines, Indonesia, India, and Ceylon. Among the world's larger cottonseed producers are Egypt and Chad. Egypt produces a million tons and Chad 56,000 tons per year. Today, these cottonseeds may be used for fertilizer or animal feed. But now an improved process is being tested to make edible cottonseed protein concentrate.

Peanuts are another largely unused protein source. Several African and Asian countries have large peanut crops. If a portion of these crops were devoted to peanut flour, very

rich in protein, malnutrition would be reduced. India's peanut crop alone could satisfy the whole Indian population's daily protein needs.

Soybeans can become a familiar crop in more countries as adaptive research is applied to this high-protein crop. Since soy contains close to forty percent protein, it has already become a favorite ingredient of various new protein foods. ^{7/}

With today's technology these proteins can be converted into very appealing, nutritious foods. Several firms are market testing such high-protein foods. Included in this new group of foods are Vita-soy, a soy-based beverage which claims 20 - 25 percent of the soft drink market in Hong Kong where it is manufactured. Monsanto has developed a high-protein beverage it plans to produce and market in protein deficit countries. Coca-Cola is test marketing a soya based, chocolate flavored beverage, designed to be the nutritional equivalent of milk, in a suburb of Rio de Janeiro.

Several firms, including Swift, Pillsbury, Monsanto, Del Monte, Dorr-Oliver, Archer-Daniels Midland, International Milling, Krause Milling and General Mills, have received AID market survey grants to test market protein foods in several countries, including El Salvador, Brazil, Thailand, India, Tunisia, Kenya and Pakistan.

There is an interesting parallel between the development of high-protein foods and an earlier situation in the United States. Beginning a decade or so ago many Americans began to realize they were consuming far too many calories for their health. The need to consume fewer

^{7/} Aaron Altschul, "Using Unused Protein Supplies," International Agricultural Development Newsletter, February 1968, p. 15. For further details on the work led by Altschul, see: "Combating Malnutrition: New Strategies Through Food Science," IADS, May 1968, 29 pp.; "Food Science Narrows the Edibility Gap," The New York Times, November 25, 1968, p. 46.

calories began to express itself in the marketplace, as a technology for producing low-calorie foods evolved. The result was the creation of a low-calorie food industry, now doing more than \$750 million worth of business per year.

In the developing countries the need is not for less calories but for more protein. A technology is beginning to evolve and meet this need in the marketplace. The result, in my opinion, will be the development of a high-protein food industry in the developing countries, in many ways paralleling the low-calorie food industry in the United States.

Another new technology which may figure prominently in the solution of the protein problem is the low cost synthesis of amino acids, the building blocks of protein. This makes it possible to fortify lower quality proteins such as in cereals, substantially upgrading their quality at very low cost.

The addition of four pounds of lysine -- costing \$1 per pound -- to a ton of wheat raises the quality of protein to one approaching that of casein, the dominant protein in milk. Bread sold in government-operated bakeries in several major Indian cities is now fortified not only with vitamins and minerals but with lysine as well. In nutritional terms this bread is truly a "staff of life."

X. What We Have Learned

Over the past few years we have learned a great deal about agricultural development. Perhaps more importantly we have learned to adapt and apply a great deal we already knew.

We have long known, for instance, that farmers would use modern technology only if it were profitable to do so. This was the foundation for building American agriculture. We are now beginning to apply this knowledge in the less developed countries as well. Secretary Freeman has often said,

I have met many farmers who could not read or write but never one who could not count.

The performance of farmers in the most remote areas of Asia, Africa and Latin America is demonstrating that farmers do indeed respond to profit.

We can approach any given developing country today with confidence, knowing that we can put together a combination of agricultural policies and agricultural technologies which will "get agriculture moving" -- assuming, of course, a genuine interest on the part of the recipient country. Without this interest, generating an agricultural takeoff is difficult, if not impossible.

We have learned within the past few years that it is much better to concentrate assistance efforts than to spread these efforts over a wide range of crops and activities. The prospect of a successful assistance effort increases severalfold when we select a single crop, often the food staple, such as wheat in Turkey or rice in the Philippines, and then concentrate resources -- research, credit, administrative capability, information services, etc. -- behind the effort to greatly expand production of that crop.

We failed to recognize in the earlier years of our assistance programs that an important constraint on development programs was the

shortage of administrative capability within the government of the recipient country. It is also much easier to obtain the personal interest and support of a President or Prime Minister for a single program dealing with a leading crop than for several dozen fragmented development projects scattered throughout the economy.

Another advantage of concentrating on a single crop with specific and often ambitious targets is that progress becomes quite measurable. This has a positive psychological effect on those working on the program. With specific targets, those working on the project can both derive satisfaction from their accomplishments and analyze and correct shortcomings. Concentration also helps gain support, within both donor and recipient countries, for aid programs.

We have also learned that food aid can be more than just a means of disposing of surpluses or filling hungry stomachs. It represents \$1.5 billion of leverage to bring about much-needed policy changes and agricultural reforms in recipient countries. Now we exchange commodities for commitments by governments to take specific steps to improve agriculture in the recipient countries, such as providing incentive prices to farmers, building farm-to-market roads, eliminating the import tax on agricultural inputs, or any of scores of other actions required to eliminate bottlenecks. This approach has been encouraged by the President, Secretary Freeman, and particularly the Congress which strongly emphasized it in the Food for Freedom Act of 1966. It has been a major factor in bringing about much-needed agricultural reforms.

Another lesson we have learned is that a successful U.S. assistance effort requires involvement of the entire U.S. agricultural community including USDA, the foundations, the agribusiness corporations and the land grant universities.

Recognition by AID, USDA and businessmen that the U.S. agribusiness community must be even more involved than at present, has led to the recent formation of the Agribusiness Council. Consisting of some 50 of the largest international agribusiness firms in this country, the Council, headquartered in New York, is headed by George Mehren, until a few months ago Assistant Secretary of Agriculture.

We have learned that a modest investment of our resources can often bring about far-reaching changes affecting millions and sometimes hundreds of millions of people. It is a source of great satisfaction within my agency to be able to mobilize professional competence within the Department, bringing it to bear on problems confronted by aid-recipient countries. The problems vary widely, ranging from an outbreak of bean diseases in El Salvador, a resurgence of the desert locust in East Africa, to a crash effort to devise methods of drying the new, early maturing rice harvested during the Asian monsoon.

XI. Significance of Agricultural Breakthroughs

The agricultural revolution, already underway in countries containing more than half the population of the less developed world, excluding China, has significance far beyond its more immediate effect

on the food supply. For literally hundreds of millions it is the key to the door opening into the twentieth century.

If the agricultural revolution continues to spread, encompassing most of Africa and Latin America as it now does Asia, then the entire world may be exposed to and affected by progress. Should this happen it will be the first time in history that virtually all of mankind, including the one and a half billion rural people of the less developed world, will be able to move ahead together.

The recent agricultural breakthroughs achieved by several developing countries should sharply accelerate their rates of economic growth. Not only are the rapidly growing farm sectors directly contributing much more to the overall rate of economic growth, but they are also, because of sharp increases in purchasing power in rural areas, stimulating a much more rapid rate of growth in the non-farm sector of the economy.

Successful use of the new high-yielding varieties requires farmers to use a whole new range of cultural practices, a package of new inputs. The new varieties are thus serving as engines of change, forcing farmers to break with centuries of tradition. Once rural populations break with the past in this key area, they become much more susceptible to change in other areas such as education and family planning, and more interested in progress generally.

The agricultural revolution now underway -- for which the United States can take at least partial credit -- may represent the most impressive U.S. achievement abroad since the rebuilding of Europe under

the Marshall Plan following World War II. Measured in terms of people affected, the agricultural revolution is far more important than the rebuilding of Western Europe, which affected only a small share of the world's people.

Perhaps the most significant aspect of the farm revolution is the psychological effect it may have on government leaders in the developing countries. If modern technology should enable the developing countries to solve their food problem -- a problem many considered nearly insoluble -- then it may give government leaders confidence in the ability of modern technology to solve some of their other difficult problems.

Although the emphasis in this paper has been on the agricultural breakthroughs rather than on the bottlenecks, I do not intend to imply that the food problem is close to being solved. It is not. Moreover, the new and technologically complex era in agriculture will increase -- not decrease -- the need for technical assistance from the agriculturally advanced countries.

Thus far during the 1960's the population problem has been equated with the food-population problem. This may not always be. By 1980 the population problem will more likely be referred to as the employment-population problem. People begin requiring food at birth; jobs are not required for another 15 or 20 years. It is this prospect of large and almost certainly growing numbers of unemployed in the less developed countries that poses the principal threat to political stability over the next decade or so.

The current agricultural breakthroughs, however, will buy time with which to slow population growth and to achieve some technological breakthroughs in contraceptive technology. This is imperative. For in the long run our ability to influence the population variable will determine our success in solving the food problem, the employment problem, and many of the other pressing problems we face during the remaining one-third of this century.

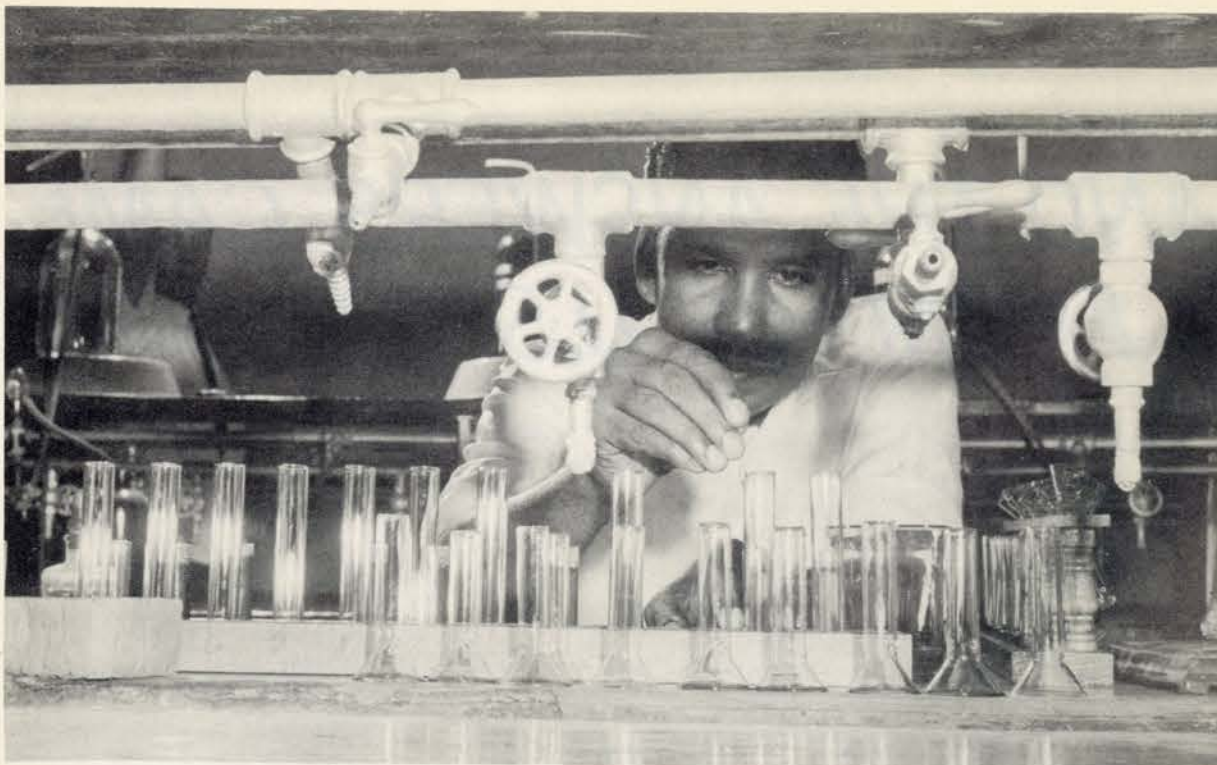
The new era in world agriculture is a dynamic one, promising much to many. Old problems are being replaced by new challenges. We must continue to recognize these challenges and respond to them.

*... AND THE ANSWERS CAME
FROM HIS U.S. TRAINING*



Picture Story 211
October 1968

U.S. Department of Agriculture
International Agricultural Development Service
Cooperating with the Agency for International Development



Developing nations must feed half the world's people. Yet they use less than 15% of the world's fertilizer, even though fertilizers are a key input for increasing agricultural production. Part of the problem is a shortage of trained people to produce, distribute and teach farmers how to use fertilizers. USDA/AID training programs are helping supply these needed technicians. India's Pulmootil Kosby Mathew, for example, learns how to make fertilizer application recommendations based on soil tests which show plant nutrient deficiencies. BN 32730

"Corn yields on these plots range from 37 to 126 bushels per acre according to the way the land has been handled," reads the sign of America's oldest experimental plots, located at the University of Illinois. Learning cultivation methods, fertilizer applications, pesticide use and other ways to handle the land to obtain highest yields is the training objective for these participants. BN38732



awake," says Secretary of Agriculture, Orville L. Freeman, noting the effect of our foreign aid programs. Through these programs we are helping put food in empty bowls and, at the same time, creating greater markets for U. S. products. "We have found that as developing countries improve their per capita income by 10 percent, their commercial imports of commodities from all countries increase by 11 percent while their commercial imports of U. S. agricultural products increase by 13 percent."

A critical shortage of technical know-how in developing countries is still a major stum-

Feeding hungry people is a world-wide problem. In some countries, it can be solved by improving distribution systems to move food where it is needed, or by increasing incomes so people have more money to buy food. But in developing countries in Asia, Africa, and Latin America, the problem is compounded because enough food isn't raised to go around. Solving this problem, therefore, means first increasing food production.

In several countries, particularly in Asia, progress toward increased food production is most encouraging. "Developing countries — sleeping giants of unmet needs — are coming



When possible, participants learn by doing. Mohammed Zaria, left, from Nigeria, receives guidance from his instructor, Don Smellie, Indiana University, as he learns a printing process for making colorful, cheap visuals. Using attractive visuals to clearly illustrate new ideas is particularly important when working with illiterates, as is often the case in developing countries. BN 32726

bling block to meeting needs, though. There aren't enough trained people to conduct the research needed to determine which crop varieties and agricultural practices give best results in each area. There aren't enough trained people to show farmers how to use fertilizer. There aren't enough trained people to build pesticide, seed, fertilizer and machinery industries.

The less developed countries have graduated less than 20,000 agriculturists over the past decade. They need 400,000 trained specialists *right now* just to bring their level of trained manpower up to the *minimum* goal of one expert for every 2000 farm people. In the United States there is one expert for every 170 farm people!

The problem is more acute when one considers that most rural people in developing nations are illiterate. Technical bulletins, farm magazines and printed instruction sheets,



Spending a few days in U. S. homes lets participants return to their countries not only with newly-gained technical knowledge, but also with a better understanding of the United States and her people. Pearle Cousins, left, of Jamaica, and her West Virginia hostess invite a neighbor to a cup of coffee, providing an opportunity to exchange recipes and to compare homemaking customs in the two countries. BN 32734

which we use so much in the U. S., have little value with illiterates. Instead, audio-visual methods of communication—picture posters, exhibits, radio, television—must be used. To teach the more complicated techniques, a technician must actually go to the farmer's home and work with him until he has mastered the new practice. Obviously, this kind of teaching requires large numbers of trained personnel.

Some progress is being made, however. The number of agricultural universities in developing countries is increasing, providing opportunities for more agriculturists to be trained. These technicians can in turn train others. But it is a slow process.

Speeding up this process is an objective of U. S. Department of Agriculture/Agency for International Development training provided as part of the foreign aid program. Over 12,000 agricultural leaders from 30 countries

Hundreds of pests share man's requisite for food—viruses, bacteria, insects, and rodents. Weeds, too, reduce the amount of food available to man by stealing nutrients, water and sunlight that crops need for highest yield. "The direct loss of food as a result of pests has been impossible to determine accurately," states the President's Science Advisory Committee's report on the world food problem, "but it is known to be large, and the minimum estimates of world losses range from 20 to 30 per cent of the total food produced." Lekong van San, Taiwan, learned to use pesticides to help reduce these losses when he took part in a special training course arranged by the USDA in 1960. He, in turn, is teaching farmers as part of his work as Tuyen Duc Province Agricultural Service Chief. BN 32728



have studied in the United States over the past 17 years through AID-financed programs developed by USDA. Some of these foreign visitors have learned how to determine fertilizer needs by soil tests. Some have studied more about livestock production. Others have learned to use radio to give farmers up-to-date information on new farming practices and the prices they can expect to receive. Home economists have studied nutrition and child care. With the help of county agents many foreign visitors have learned how to prepare educational programs which utilize the results of recent research.

When their U. S. training programs end, "participants" go home to play a vital role in their countries' development. In most instances, they provide technical know-how that would otherwise be lacking. Here are examples of what participants have done back home:

. . . In Taiwan, over 30,000 waste acres have been brought into food production with an irrigation scheme designed by Yung Chieu Chu, who took part in a field training

program arranged by USDA. Without irrigation, the area is too dry to be productive. Chu has also planned several other important projects, including three reservoirs and a flood control dike that is the largest constructed since the restoration of Taiwan. The dike protects 65,000 acres from flooding.

. . . Seven U. S.-trained Nigerians have been working since 1962 to bring vast areas of unused land into cultivation through a government sponsored farm settlement program. Each man, given the task of developing 2,000 to 8,000 acres, arranges for 30 to 50 settler families to become land owners in his area. He then advises them on modern agricultural practices so they can build sound farming enterprises that will help increase food production in Nigeria, where many people need more food.

. . . Turkey's Ahmet Bucan Varan studied credit systems in the United States in 1961 and later became Director of the Agricultural Bank in Denizli. Upon returning home, he began helping farmers prepare long-range plans, including crops to be produced and credit needed for supplies. This has



Each year, plant diseases and pests destroy over 25% of the crops in Turkey. To learn how to detect and combat these, Turkey's Dr. Fahrettin Tosun took part in the 1959 pasture and forage training arranged by the USDA. Dr. Tosun, Director of the Research Institute of Ataturk University, is shown here teaching his students some of the plant disease symptoms he learned in the United States. BN 32727



Participants are supported back home by AID technicians working in their countries. Here, Ellis Baker, USDA/AID advisor in Nigeria, and 1965 participant Mustapha Kano work together to teach Kano's assistants how to use engineering instruments to lay out a soil conservation project. BN 32731

resulted in over 2,000 farmers becoming landowners through loans from his bank. The supervised credit planning program was so successful in Denizli that it is now used in 15 other Turkish Provinces.

. . . Joseph Ndegerige, Kenya, studied U.S. 4-H programs in 1961 and returned to his country to establish a similar national youth program which now has 35,000 members. Over 1400 volunteer adult leaders have been recruited and trained to work with Kenya's youth groups.

. . . In Thailand, some areas have too much water for good crop production, while others have too little. A participant who studied soil conservation in 1959, Thunya Phosombut, is using his U. S. training to correct this situation. He supervises six water diversion projects to eliminate excess water on 153,000 acres, and three flood control projects freeing 109,000 acres from the dangers of unpredictable floods. He introduced modern irrigation farming in the dry areas and built 133 small reservoirs for these purposes. Through demonstration farms he has taught how crops other than rice can be grown under irrigation.

. . . Turkish participant Recip Boztok, trained in horticulture in 1958 and now Director of Horticulture in Turkey, surveyed the mountainous region of Ismir and found it best suited for fruit production. Over the past 10 years he has converted wastelands and areas planted in less profitable crops into fruit orchards, with 40 per cent of the million acres of cropland now covered with fruit trees.

. . . Raphael O. Opeke, who completed his training in 1967, now teaches 115 students at the Ibaden School of Agriculture in Western Nigeria. About 60 per cent of these students will be employed by the agricultural extension service to teach farmers improved practices.

. . . Yookti Sarikaphuti, Thailand, used his U. S. experience to organize a national agricultural leaders conference. This conference influenced the Government of Thailand to allocate 1.5 million dollars to guarantee a minimum price for rice in 1966, which provided a strong incentive for farmers to increase rice production. Previously, farmers had often been forced to accept prices that were so low they hardly paid the costs of producing the crop. This price support program affected production so much that 2.5 million dollars were allocated to the project in 1967.



Leighton Watson, left, West Virginia University, working under AID auspices, helps 1956 participant Raul Prado expand the use of radio in agricultural extension work in El Salvador. The shortage of trained manpower in developing countries, often coupled with poor roads and transportation facilities, has made radio a valuable medium for getting development information to the grassroots level, to the farmers. BN 32520

Before deciding which crops to produce, farmers need to know which products are in greatest demand. At harvest time, they need daily information on supplies, demand, and prices of their products in different areas so they can most efficiently decide when and where to sell their products. Having this information available brings more profit to producers and provides consumers with a more uniform supply of food with less fluctuation in prices. Brazil recently initiated a market news service to provide this information, much of the technical expertise coming from U. S. training programs. Here a market reporter, Waldemiro de Carvalho, left, interviews a poultry and egg dealer in the Rio de Janeiro wholesale market. BN 28641



... Taiwan is using U. S. trained agricultural participants to assist other less-developed countries. Some 353 agricultural technicians from 28 countries have been trained in the past two years with the help of Taiwan's U. S. — trained technicians.

... Grace Wageman studied home economics at Howard University in 1963 and returned to Kenya to help set up Home Economics courses in the 18 farmers' training centers. There are now 32 home extension assistants teaching in these centers, with over 60,000 women receiving instruction in home improvement, poultry keeping, home gardens, and nutrition during 1966. Miss Wageman also started a two-week home extension course for women who volunteer to help others in their own communities. Over 350 women community leaders have now received instruction in vegetable growing, nutrition, principles of cooking, infant care and general hygiene.



Carmen Fortin, left, Head of Honduras Home Economics Extension Work, uses education principles she learned in the U. S. to teach nutrition in a two week training course for all Honduras home economics extension agents. BN 32729

Learning About the U.S.

Participants in training programs tend to gain much more than technical knowledge, though. They also take home a better understanding of the United States and her people. They see the intangibles that cause things to happen in the U. S. They can tell their fellow countrymen of community spirit, or of credit systems or cooperative efforts. They see the free-enterprise system in action, and learn the role of agribusiness and how fertilizers, pesticides, and other products are produced and distributed so they are available when and where farmers need them. They see how government and private industry work together for mutual benefit. And even more important, perhaps, they learn to know Americans and see that Americans have many of the same feelings and aspirations they have.

Programs vary. Some participants are trained by government technicians while others receive regular classroom work or special training at universities. Many receive instruction from business firms; over 500 private companies and organizations were

involved in 1966-67 programs. Don Tuttle, Radio-Farm Director at radio station WGY, Schenectady, New York, for example, gave Joel Chivwema, Zambia, practical training in radio work by having Chivwema go through his daily routines with him. DeKalb Agricultural Association, DeKalb, Illinois, taught Dhananjaya Rao, India, how to produce hybrid seed corn.

The objectives of the training are the same, however . . .

... Helping developing nations help themselves through a larger cadre of trained manpower.

... Helping developing nations learn more about the United States and helping the U. S. learn more about the rest of the world and its needs.

Developing nations are asking questions. They have heard that they can increase their food production and they want to know how. Through USDA/AID training programs, the United States is helping supply the answers.

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These scattered, water-starved plants will never help feed this African country's ever-increasing population. Proper water management would turn the area to luscious cropland, however, and a capable person is now being selected to study irrigation methods in a USDA/AID training program. As he uses the U. S. training to make this dry land productive, we will be able to say with pride . . . "And the answers came from his U. S. training." BN 32733

UNITED STATES DEPARTMENT OF AGRICULTURE

Avery DU 8-2887

McDavid DU 8-4026

Washington, Nov. 8, 1968

USDA Assesses Agricultural Impact of Nile River Dams:

Current dam projects in the Nile River Basin of the United Arab Republic and Sudan will open new cropland which, if used only for domestic food output, could erase the area's food deficit, according to a U.S. Department of Agriculture report.

The report by USDA's Economic Research Service notes, however, that export crops--notably long-staple cotton--will likely account for a good share of the new land to be brought under cultivation, especially in the Sudan. A sizable expansion of cotton acreage in the Nile Basin over the next decade will have a decided impact on world and U.S. cotton prospects, according to the report.

Much of the newly acquired agricultural potential in the United Arab Republic will likely be used to produce food crops. Even so, the UAR probably will still be deficit in wheat, according to the report.

Development of the Nile Basin will foster trade competition for other agricultural products. The United Arab Republic will likely have larger quantities of rice for export. The Sudan is projected to become a surplus producer of feed grains, offering competition to U.S. feed grain sales to Western Europe. Development also points to potentially increased competition to U.S. exports of oilseeds, citrus, and vegetables.

Most assumptions of increased output in the Nile Basin are based on the opening and developing of new cropland by virtue of irrigation and power generated by three major projects underway--the Egyptian High Aswan Dam and the Sudan's Roseires and Kashm El Girba Dams.

Completion of these dams will expand the Nile Basin's cultivated area by approximately 3 million acres, according to the report.

Single copies of "Agricultural Development and Expansion in the Nile Basin," FAER 48, are available free on postcard request to the Office of Information, U.S. Department of Agriculture, Washington, D.C. 20250. Please include your zipcode.
