DOCUMENT RESUME

02862 - [A1933001]

Restrictions on Using More Fertilizer for Food Crops in Developing Countries. ID-77-6; B-159652. Jujy 5, 1977. 35 pp. + 11 appendices (30 pp.).

Report to the Congress; by Elmer B. Staats, Comptroller General.

Issue Area: Facilities and Material Management: Requirements for Equipment, Spare Parts and Supplies (702); Facilities and Material Management: Building, Buying, or Leasing Federal Facilities and Equipment (706);International and Military Programs: U.S. Development Assistance Overseas (603).
Contact: International Div.
Budget Function: International Affairs: Foreign Economic and Financial Assistance (151); International Affairs: Conduct of Foreign Affairs (152); Agriculture (350).
Organization Concerned: Agency for International Development; Department of Agriculture; Department of State; Department of the Treasury.
Congressional Relevance: House Committee on International Relations; Senate Committee on Foreign Relations; Congress.
Authority: Foreign Assistance Act of 1961, as amended, sec. 103(b).

Developing countries could produce more food by using more fertilizer. Although steps have been taken to produce more fertilizer, its use is often hindered by the individual countries' policies and institutional constraints. Findings/Conclusions: Farmers in many developing countries find it difficult to use more fertilizer due to such governmental policies as the maintenance of artificially low food prices for urban populations which discourage farmers from using high cost agricultural products. Fertilizer use should be considered along with other methods of increasing crop yield and as part of a needed effort to increase food crops in developing countries. Recommendations: The Secretaries of State, Agriculture, and the Treasury and the Administrator of the Agency for International Development should work for concerted action by all countries and institutions that provide fertilizer assistance to: (1) induce recipient governments to revise policies which act as constraints and to adopt a strategy to increase the use of fertilizer on food crops; and (2) incorporate, where appropriate, a requirement in new agreements with recipient countries for food, financial, and technical assistance that affirmative action be taken by developing countries to remove constraints to greater agricultural production, including constraints to increasing the use of fertilizer. (Author/SC)

REPORT TO THE CONGRESS

BY THE COMPTROLLER GENERAL OF THE UNITED STATES

Restrictions On Using More Fertilizer For Food Crops In Developing Countries

Department of State and Other Federal Agencies

Developing countries could produce more food by using more fertilizer. Steps have been taken to produce more fertilizer, but its use is often hindered by the individual countries' policies and institutional constraints.

The U.S. should work with other donors of fertilizer assistance to

--induce recipient governments to revise policies which prevent increasing fertilizer use on food crops and

--incorporate, where appropriate, a requirement in new agreements for development assistance that developing nations take affirmative action to remove such constraints.

ID-77-6

JULY 5, 1977

COMPTROLLER GENERAL OF THE UNITED STATES
WASHINGTON, D.C. 20548

B-159652

To the President of the Senate and the
Speaker of the House of Representatives

This report is part of our continuing effort to recommend ways U.S. agencies can better help developing countries to improve their food situation. The report discusses the need for governments receiving foreign economic assistance to revise policies which act as constraints to increasing the use of fertilizer for food crops.

We made our review pursuant to the Budget and Accounting Act, 1921 (31 U.S.C. 53), and the Accounting and Auditing Act of 1950 (31 U.S.C. 67).

We are sending copies of this report to the Director, Office of Management and Budget; the Secretaries of State, Agriculture, and the Treasury; and the Administrator, Agency for International Development.

Comptroller General
of the United States

COMPTROLLER GENERAL'S
REPORT TO THE CONGRESS

RESTRICTIONS ON USING MORE FERTILIZER FOR FOOD CROPS IN DEVELOPING COUNTRIES Department of State and Other Federal Agencies

D I G E S T

The world is experiencing a food crisis. The United Nations estimates that about half a billion people are underfed or malnourished in a hunger belt which stretches across Asia, Africa, and portions of Latin America. Yet, the populations of these regions are expanding more than twice as rapidly as those of North America and Europe. (See p. 1.)

Fortunately, the countries with the least food have the greatest capacity for increased production through use of more fertilizer. Fertilizer is a key to high agricultural yields, which could enable farmers to increase their standard of living and to help their countries attain self-sufficiency in food production. (See pp. 1 to 3.)

However, farmers, especially small farmers, in many developing countries find it difficult to use more fertilizer because of policies and constraints within their own countries. For example, governments of many developing countries choose to maintain artificially low food prices for urban populations. This discourages farmers from using high cost agricultural products such as fertilizer. (See pp. 5 and 6.)

Fertilizer demand is greatly affected by other agricultural production disincentives--the subject of a prior GAO report, "Disincentives to Agricultural Production in Developing Countries" (ID-76-2, Nov. 26, 1975). Fertilizer use should be considered (1) along with other methods of increasing crop yield, such as water, high-yielding seed varieties, and pesticides, and (2) as part of a needed effort to increase food crops in developing countries. (See pp. 5 to 12.)

ID-77-6

Developing countries use much less fertilizer than developed countries, and most of what they use is imported at prices much higher than those before the energy crisis. In many developing countries fertilizer is used to produce crops for export rather than food crops for domestic consumption. (See pp. 12 and 13.)

The Secretaries of State, Agriculture, and the Treasury and the Administrator, Agency for International Development, should work for concerted action by all countries and institutions that provide fertilizer assistance to

--induce recipient governments to revise policies which act as constraints and to adopt a strategy to increase the use of fertilizer on food crops and

--incorporate, where appropriate, a requirement in new agreements with recipient countries for food, financial, and technical assistance that affirmative action be taken by developing nations to remove constraints to greater agricultural production, including constraints to increasing the use of fertilizer. (See p. 14.)

In commenting on these recommendations, the agencies were opposed to incorporating into new agreements a requirement that developing countries remove constraints to greater agricultural production and use of fertilizer.

GAO does not suggest that this is appropriate in all new agreements for assistance to developing countries. The requirement should be incorporated when recipient countries do not make bona fide efforts to respond to U.S. and other donor attempts to induce them to revise policies which act as constraints. (See pp. 14 to 17.)

International organizations and developed countries are providing assistance to help ease some of the constraints to increasing the use of fertilizer. However, a proliferation of such organizations in recent years

has resulted in overlapping functions and the inherent need for more coordination among them. (See p. 18.)

For example, the recently established International Fertilizer Development Center provides technical assistance, a function of the U.N. Industrial Development Organization. The Agency for International Development, which sponsors and funds the Center, is having problems getting additional donors and obtaining political acceptance of the Center as an international organization. The Agency's funding of the Center totaled about $15 million through fiscal year 1977. (See pp. 18 and 27 to 29.)

The Administrator of the Agency should terminate support of the Center and make arrangements for transferring its programs and activities to existing international organizations. Before funding any new organizations or programs in the fertilizer assistance area, the Administrator should determine that their functions would not overlap or duplicate those of existing organizations or could not be assumed by existing organizations. (See p. 31.)

The Agency for International Development said that the International Fertilizer Development Center was created as a result of the world food crisis and that controlling the proliferation of multilateral agencies is desirable, but should be sought judiciously. The Agency said that the Center is needed because it fills a serious gap in the international development effort which should be underwritten by the U.S. until additional support can be enlisted.

The Center's basic problem, the virtual lack of international financial participation, remains unsolved. Had the international community considered support for the Center a matter of high priority, it would have provided financial backing, as it accepted and financed the International Fund for Agricultural Development, also created as a result of the world food crisis. (See pp. 31 to 34.)

Contents

ABBREVIATIONS

AID	Agency for International Development
FAO	Food and Agriculture Organization of the United Nations
GAO	General Accounting Office
IFDC	International Fertilizer Development Center
OPEC	Organization of Petroleum Exporting Countries
TVA	Tennessee Valley Authority
UNDP	United Nations Development Program
UNIDO	United Nations Industrial Development Organization

CHAPTER 1

FERTILIZER AND THE FOOD SITUATION IN THE DEVELOPING COUNTRIES

The Food and Agriculture Organization of the United Nations (FAO) estimates that about half a billion persons are underfed or malnourished in a hunger belt which stretches across Asia, Africa, and portions of Latin America. The populations of these regions are expanding more than twice as rapidly as those of North America and Europe. Presently, four of every five births occur in the developing countries. According to U.N. statistics, the annual population growth rates of Africa and Latin America are 2.7 percent and that of Asia is 2.1 percent, compared to 0.9 percent for North America and 0.6 percent for Europe.

To feed these burgeoning populations, the developing countries have moved over the last 20 years from being net grain exporters to being net grain importers. In 1974 Asia spent $3.9 billion, Latin America $2.5 billion, Africa $1.5 billion, and the Near East $2.1 billion for grain imports. In 1971 and 1972 the food grain imports of these countries amounted to only $2 billion.

At the present growth rate of 2-1/2 percent a year in food output, the gap between the developing countries' food needs could rise from 25 million to between 60 and 100 million tons by 1985. It is not likely that developing countries will be able to provide for their increasing food needs through either purchases or donations. Developing countries neither produce, nor have the foreign exchange to buy, enough food to feed their rapidly increasing populations. Together with a long-term effort to moderate population growth, developing countries could alleviate the problem by realizing their food production potential.

THE ROLE OF FERTILIZER

Generally, the nations with the most rapidly growing food deficits also have the greatest capacity for increased production. For example, they have 35 percent more of their land in grain production than do the developed countries, but they produce 20 percent less from this land. A solution to the developing countries' present imbalance between food supply and demand requires an immediate increase in land area under cultivation and in the productivity of land now

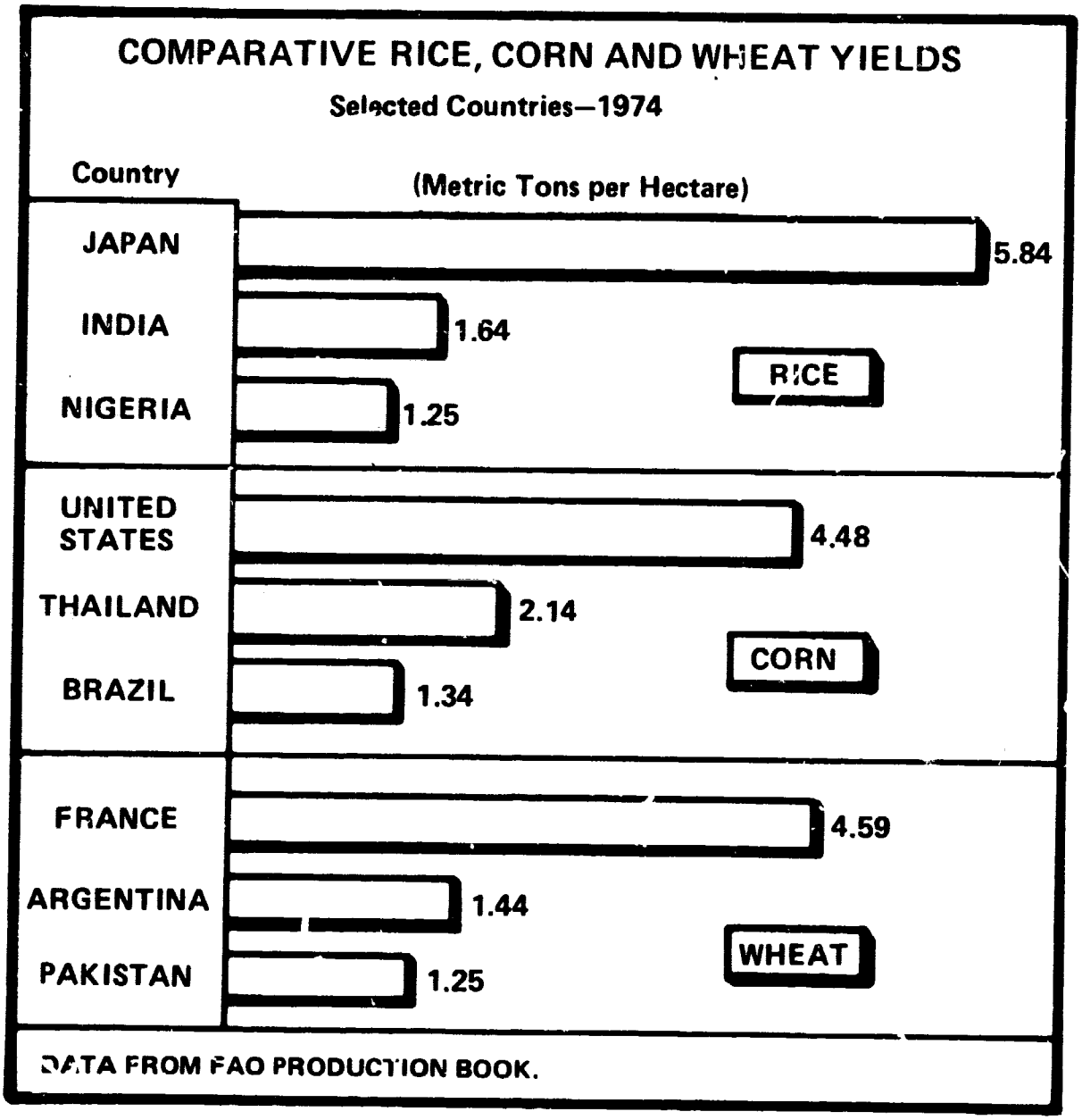
being used. In both cases, efficient fertilizer use will be essential for obtaining high productivity.

There are three main categories of manufactured fertilizers: nitrogen, phosphate, and potash. Each has distinct supply and use characteristics, and none is a substitute for another. Nitrogen fertilizers, mainly the products of oil-based or natural gas feedstock, are especially important to less-developed countries, because crop yields are closely related to the amounts applied during the growing season. Phosphate and potash fertilizers are produced from mineral deposits located mainly in North Africa and in developed countries. They are also essential to crop production but more tolerance in application is feasible because of their more gradual effect on crop yields.

A paper prepared for the first meeting of the Consultative Group on Food Production and Investment in July 1975 (see p. 24) states that fertilizer is the most important single purchased input in the program launched by the World Food Conference to increase food production in the developing countries.

Its importance can be demonstrated in several ways. For example, studies in the United States, Japan, and several European countries concluded that, over a period of 10 to 20 years, about 40 to 50 percent of agricultural production could be attributed to increased use of fertilizer. On the other hand, the non-Communist developing countries, which still use relatively little fertilizer, have much smaller yields. (See apps. I and II.)

That developing countries can sustain increased crop production from intensified, rational use of fertilizers and other inputs has been amply demonstrated. In Taiwan and South Korea, output of food grains averages 3,000 pounds per acre or more, a figure comparable to output in developed countries. Similar yields have been achieved in parts of Pakistan, India, Mexico, and other "Green Revolution" countries. However, in these and other developing countries, average food grain output per acre is less than 1,500 pounds, and often below 1,000 pounds, even on land which is potentially highly productive.



FERTILIZER PRICE AND SUPPLY PROBLEMS

Fertilizer prices were low and plant construction was limited during 1967-73 because of low raw materials costs, rapid technological improvements, and overexpansion in the fertilizer industry in the early 1960s. But by 1972, fertilizer prices began to rise as demand began to overtake supply as a result of the increased needs of the developing countries and the expansion of crop area in North America in response to anxieties over world food supplies.

By early 1974 a critical grain supply situation had developed, accompanied by steeply rising world fertilizer prices. The price of bagged urea (a nitrogen-based fertilizer) rose from $45 to over $350 a ton from 1971 to early 1974, and phosphate prices rose from less than $50 to between $348 and $412 a ton in 1974.

Although the fertilizer shortage and price increases affected all countries, developing countries, which rely on the world market for much of their requirements, were particularly hard hit. Imports by developing countries of all types of fertilizers amounted to $500 million in 1972, $1 billion in 1973, and an estimated $1.8 billion in 1974.

By mid-1974, fertilizers badly needed for import by the developing countries often were unavailable on world markets, even at record prices. But by late 1974, supplies had increased and prices had begun to fall. In 1975, shortages disappeared and prices continued to fall, primarily because of weak demand. Inventories in both exporting and importing countries rose rapidly, and many developing countries began to reduce fertilizer imports. India, Indonesia, Brazil, and the Philippines went so far as to temporarily embargo fertilizer imports.

FUTURE PROSPECTS

A February 1976 report of the U.S. Department of Agriculture's Economic Research Service said that the world fertilizer supply-demand balance is expected to continue to improve through the late 1970s and that a recurrence of the tight world market conditions seems unlikely over the next few years. It states, however, that these expectations could be altered if

- --enough of the announced new capacity is canceled because of low prices;
- --developing countries raise their fertilizer consumption more rapidly than expected; or
- --developing countries fail to expand fertilizer production as much as predicted; such expansion depends on their abilities to complete new plants on schedule and operate the plants efficiently.

CHAPTER 2

FACTORS AFFECTING FERTILIZER USE BY THE DEVELOPING COUNTRIES

To expand fertilizer use enough to meet the increasing food crop production requirements of the developing countries, the constraints that hamper actual fertilizer use by farmers who produce food crops in developing countries will have to be overcome. In addition, developing countries need to overcome the great dependence on imports. Most of the fertilizer they use is imported, and in many developing countries it is used to produce crops for export rather than food crops for domestic consumption.

CONSTRAINTS WITHIN DEVELOPING COUNTRIES

The importance of the farmers producing food crops in developing nations is recognized in section 103(b) of the Foreign Assistance Act of 1961, as amended, which states:

> "The Congress finds that, due to rising world food, fertilizer, and petroluem costs, human suffering and deprivation are growing in the poorest and most slowly developing countries. The greatest potential for significantly expanding world food production at relatively low cost lies in increasing the productivity of small farmers who constitute a majority of the nearly one billion people living in those countries. * * *"

However, farmers, especially small farmers, in many developing countries find it difficult to appreciably increase their use of fertilizer because of policies and constraints within their own countries.

Major internal constraints to increasing the use of fertilizer by small farmers in developing countries are the

--poor ratio of fertilizer prices to crop prices,

--unavailability of credit,

--limited extension and research services,

--inadequacy of infrastructure, and

--general agricultural disincentives.

Fertilizer and crop prices

Fertilizer demand is a derived demand, because it is not directly consumed but is important for its contribution to the food production process. Farming must be profitable if small farmers are to increase food production. The main factors which determine profitability are (1) the cost of fertilizer, (2) the fertilizer/crop production relationship, and (3) the price of the crop.

The second factor is a physical response function, influenced by physical and biological factors. One of the most important of these factors is weather; others include crop variety, seed quality, soil, and appropriateness of the fertilizer formulation.

The first and third factors--fertilizer and food prices--are often directly influenced by the governments. Many developing country governments choose to maintain artificially low food prices for urban populations. To do so, they must use the government budget to subsidize consumers or prices paid by farmers for fertilizer and other inputs or pay a stiffer price in the form of low production resulting from insufficient incentives for farmers.

The following are examples of problems pertaining to fertilizer and food prices in developing countries.

--After its April 1975 visit to the Philippines, a Tennessee Valley Authority (TVA) team reported that in some instances the fertilizer use was 60 percent below the previous year's level. The reduced use was attributed to high fertilizer prices and farmer concerns that the government would not maintain rice prices at a high enough level. High fertilizer cost was also given as a reason for reduced or stagnated consumption in India and Pakistan.

--In countries which have policies of cheap food but no substantial fertilizer subsidies, the use of fertilizers has been even more limited. For example, Thailand, which is able to produce a food surplus even with low crop yields, has a low fertilizer use rate even by developing country standards.

--In Argentina and Brazil, where producer prices are controlled and kept low, prices paid to farmers tend

to limit their use of fertilizer, especially when fertilizer prices are not kept low. For instance, food prices are low in both Mexico and Argentina but, since Mexico is a larger producer of fertilizer, it can better control prices and provide its farmers with fertilizer at lower prices.

--In Zaire, there is vast potential to increase crop yields but small farmers are not using fertilizers on corn and wheat because of the low prices for these crops. Fertilizer consumption in Zaire declined from 20,000 tons in 1971 to 11,000 tons in 1973 and in 1974. TVA attributed this decline to the low food prices.

--Low food prices are also a reason given for the low fertilizer use in Kenya and Tanzania. One government official in Kenya stated that, before the prices were raised in 1975, farmers would have lost money if they had used fertilizers.

--To overcome the impact of low food prices on the use of fertilizer, Ghana, Algeria, and Libya have increased fertilizer subsidies. However, TVA claims that such action is unlikely to greatly increase either food production or fertilizer use.

Credit

The farmer's own resources may be sufficient to finance an initial small purchase of fertilizer, but outside credit is increasingly necessary as the farmer decides to use larger quantities. Simply increasing the quantity and conditions of availability of credit does not automatically mean that it will actually be used to buy fertilizer. Nevertheless, credit is often a major factor in influencing the decision to use fertilizer and, probably more importantly, in determining how much is used.

The importance of credit varies widely, but capital or credit restraint is generally most severe on small farmers in the developing world, where 80 percent of the farms consist of 12 acres or less. These farmers tend to have few capital resources, hence limited collateral and limited access to institutional or commercial sources of credit, and they often have to pay much higher rates of interest.

Cooperatives have played a major role in many developing countries, but because of the farmers' inability or unwillingness to repay fertilizer loans, their position has

been seriously weakened in many countries. When credit is obtained from private village retailers or money lenders, the interest rates are often excessive.

A February 1975 Agency for International Development (AID)/Pakistan study said widespread evidence suggested that credit is a primary constraint to fertilizer use in Pakistan. The evidence consisted partly of surveys showing that 75 percent of nonusers cited lack of resources as the reason for not using fertilizer and that 75 percent of the users cited lack of funds as the primary reason for not using more. The study also referred to a 1971 study which had reported that small farmers and tenants were being forced to rely more heavily on relatively expensive noninstitutional credit (family and friends charged 20 percent; money lenders, 32 percent; and merchants, 46 percent), while large farmers had easier access to the less expensive institutional rates (9 to 11 percent).

In India private money lenders, which account for 70 percent of borrowing, and cooperative societies are the principal sources of agricultural credit. Small farmers have not benefited greatly from the cooperative credit structure, however, because the cooperatives are dominated by the more affluent members. On the other hand, credit is reportedly no longer considered a major problem in Indonesia.

The Banco del Estado, the principal supplier of fertilizer in Chile, extends credit to purchase fertilizer, but the interest rates are extremely high. According to the U.S. Department of Agriculture, high rates were expected to continue in the 1975-76 crop year. As could be expected, the small farmers also incur more lengthy delays in obtaining approval and shorter repayment periods than the larger landholders who produce export crops.

Several sources have recommended that credit provided through cooperatives be encouraged. The problem is that the cooperative movement is far from fully developed in most countries and does not operate efficiently in others. Therefore, cooperatives cannot always cope with the dual function of distributing credit and marketing cash crops. For this reason, government services or the private sector often have to step in, as has occurred in Ethiopia, Kenya, and Zambia. The credit problems remain, however, and private dealers may not be willing to sell at institutional credit rates or to offer adequate guarantees to small farmers.

Extension and research services

As fertilizer production facilities and infrastructure increase, a main constraint to fertilizer use is likely to be the attitude of the farmer, who must be persuaded that using fertilizers is worthwhile. Often the developing country has neither the necessary research program for determining optimum fertilizer applications for individual crops under various soil and weather conditions nor the capability for disseminating such information to the farmers.

These services are often provided by government extension services, government experimental and research stations, and universities. A major part of this service, however, ought to be provided by the organizations responsible for marketing and distributing the fertilizer. The marketing organization should have an agricultural technical service to carry out field trails, demonstrations, and soil analysis; to train and support salesmen and dealers; and to advise management on the most appropriate fertilizers for local requirements.

Soil testing can identify nutrient deficiencies and fertilizer balance requirements, but soil-testing labs are lacking in such countries as India, Indonesia, Pakistan, and the Philippines. The Government of India plans to expand its soil-testing facilities by adding 150 laboratories during its Fifth Five Year Plan (1974-79). The Pakistani Government presently has only one soil-testing laboratory in each of its four provinces; it would like to increase this to 51--one for each district--but will need foreign donor assistance to do so.

Extension services in India, Indonesia, and Pakistan are also inadequte. Problems include:

--Inadequate salaries, transportation, teaching materials, and equipment.

--A communications gap between research stations and extension workers.

--Inadequate attention to farmers' field-training and demonstration programs.

Over the years, FAO and other organizations have sponsored soil-testing laboratories, field trials, and experimental stations for gathering fertilizer response information on food crops under various soil and climatic conditions. Most

of this work was done in conjunction with recipient government research programs, and the results were to be passed on to the small farmer through the country's extension services.

Because of poor or inadequate staffing and financial shortcomings within the extension programs, however, the small farmers were often prevented from receiving the benefits of the research. According to a U.N. official, the 35 to 40 part-time agents in Uruguay responsible for extension work rarely visit the small farmers because they have no transportation allowance and are paid so little that they need two jobs. When the farmers are visited the agents often have problems transmitting their textbook knowledge.

According to a 1975 U.N. report, most African countries have an abundance of untrained farmers who secure only a subsistence for their families. Considerable financial and manpower resources will be required to educate and train millions of these farmers in modern production techniques. There is also a lack of trained personnel in the extension and advisory services.

Infrastructure

The transportation, distribution, and storage systems of many developing countries are inadequate; as a result, the farmers (particularly small farmers) may be unable to get fertilizers where needed, when needed, and in quantities needed. These problems relate to the countries' stage of general economic development, however, and will take considerable time and funds to correct.

Examples of problems involving infrastructure follow.

--A June 1975 TVA report stated that in Bangladesh a principal constraint on distribution of fertilizer was that transportation facilities were ill managed and in ill repair.

--A 1974 study by the Fertilizer Association of India, a nonprofit, nontrading organization of manufacturers, distributors, and others interested in fertilizers, stated that ideally one retail outlet should be located in each village. However, the study estimated that India had only one retail outlet for every 9.6 villages.

--In Latin America very few facilities are located in the remote and isolated highland areas where most small farmers live. Therefore, these farmers must travel long distances to obtain fertilizer and then transport it by animal or on foot over poor secondary roads. In some areas of Guatemala, if a farmer purchased fertilizer, he would have to transport it in 100-pound bags by bus or truck for more than 100 miles and then by mule or on his back to his farm.

--In many African countries, food production is especially constrained by lack of infrastructure--roads and storage and marketing facilities. Many small farmers live in areas that have no fertilizer marketing and distribution systems. They must either get the fertilizer to their farms by whatever form of transportation may be available or rely on the individual state's agricultural program to provide such services.

General agricultural disincentives

An earlier GAO report 1/ concluded that certain governmental policies and insitutional factors, which either act as disincentives or provide insufficient economic incentives, have been major reasons the developing countries have not had greater agricultural production and higher crop yield. For example:

--Low producer prices discourage farmers from using more productive methods or otherwise expanding production.

--Monetary and trade policies make food imports attractive and discriminate against food exports.

--Restrictions on moving food from surplus to deficit areas discourage increased production in the producing areas.

--Institutional credit to small farmers is generally unavailable, and producers for export are favored over producers for domestic consumption.

1/"Disincentives to Agricultural Production in Developing Countries" (ID-76-2, Nov. 26, 1975).

--Extension services are generally inadequate; they do not reach small farmers and are applied to export crops rather than to domestic consumption crops.

--Extreme disparities in farm sizes and the forms of land tenure deter increased production.

These disincentives either relate directly to the fertilizer demand constraints mentioned above or act as indirect constraints in the form of disincentives to increased yields. Also, fertilizer use should be considered along with other methods of increasing crop yield, such as water, high-yielding seed varieties, pesticides, and as part of a needed effort to increase food crops in developing countries.

DEPENDENCE ON FERTILIZER IMPORTS

The developing countries use much less fertilizer than the developed countries, but two-thirds of what they use is imported--about 60 percent of the nitrogen and phosphate and nearly all of the potash. Fertilizer prices have fallen over 50 percent since their peak in 1974 but are not expected to fall to the levels of the late 1960s, when prices of inputs (petroleum and phosphates) were one-fourth of the 1975-76 levels. Appendixes I and II show the relative consumption of fertilizer by regions and for selected countries.

In many developing countries, fertilizer is used to produce crops for export rather than food crops for domestic consumption. Most of the fertilizer in Latin America has been used by large landholders to produce export crops. About half of the region's foreign exchange earnings are derived from the export of bananas, coffee, cacao, tobacco, sugarcane, and cotton. A similar situation exists in Africa, where only the export crops are widely fertilized.

As can be expected the developing countries were most severely affected by the recent fertilizer shortage. Many developed countries exported fertilizer to developing countries at about twice the controlled prices of their domestic markets. By mid-1974 the developing countries were often unable to obtain badly needed fertilizers on the world market, even at record prices.

The concurrent food and fertilizer shortages caused the developing countries to increase their priorities on achieving greater self-sufficiency in food production. They have decided to produce more of their own fertilizer to reduce

both their dependence on fluctuating supplies and foreign exchange expenditures. As a result, there has been a major push toward establishing new fertilizer capacity in developing countries.

In particular, natural gas, which is being used in the production of nitrogen fertilizer, has been found in many developing countries. Although there have been no new large discoveries of potash or phosphates equivalent to those of Canada or Morocco, many new deposits of these materials have been found which could support individual country or regional needs.

About half the new capacity expected to be developed in the world during the remainder of this decade will be located in the developing countries, which currently possess only about 15 percent of the total world capacity. Thus, future world supplies of nitrogen and phosphates depend heavily on the performance of the developing countries in establishing new capacity as expected and operating it efficiently.

Between fiscal years 1974 and 1981, the developing countries' share of world capacity is expected to increase from 12 to 24 percent for nitrogen and from 9 to 18 percent for phosphate. These countries will still produce less than 2 percent of the world's potash, and their import requirements will roughly double by 1981, in direct contrast to projected declines in their nitrogen and phosphate imports.

Asia will account for more than 50 percent of this expected increase in nitrogen capacity, and India will use almost two-thirds of it. Over 70 percent of the new phosphate capacity will be concentrated in Africa and Latin America, mainly in Morocco and Brazil.

Canada controls 43 percent of the world's proven potash reserves and perhaps 85 percent of its known potash resources. Most of the remaining production is in Europe and the Soviet Union. Smaller deposits of potash in such countries as Brazil, Chile, Peru, Thailand, Jordan, Israel, Ethiopia, and the Congo could be developed for local or regional needs.

By 1980 the estimated fertilizer production capacity in developing countries will reach 18.6 million tons, which is about 77 percent of estimated consumption. Nevertheless, the acceleration in food production called for by the World Food Conference would require increased fertilizer use well above the forecasted levels.

CONCLUSIONS

To increase fertilizer use enough to meet their increasing food production requirements, developing countries need to change certain food and fertilizer policies and reduce institutional constraints. A major way to greatly expand production is by increasing the use of fertilizer by farmers who produce food crops in developing nations.

Because of their considerable reliance on imported fertilizer, the developing countries were particularly hard hit by the shortages and high prices of fertilizer on the world market in 1974. The developing countries are now placing greater emphasis on producing more of their own fertilizer requirements.

RECOMMENDATIONS

We recommend that the Secretaries of State, Agriculture, and the Treasury and the Administrator of AID work for concerted action by all countries and institutions that provide fertilizer assistance to:

--Induce recipient governments to revise policies which act as constraints and to adopt a strategy to increase the use of fertilizer on food crops.

--Incorporate, where appropriate, a requirement in new agreements for food, financial, and technical assistance that affirmative action be taken by developing nations to remove constraints to greater agricultural production, including constraints to increasing the use of fertilizer.

AGENCY COMMENTS AND OUR EVALUATION

The Department of State, by letter dated January 26, 1977 (see app. VI), said that our draft report (1) presented a comprehensive summation of the factors limiting fertilizer use in developing countries and (2) cited a number of useful cases and provided a valuable checklist for development planners considering ways of encouraging increased use. The Department said that, although it fully supported the objectives of our review, it could not endorse our second recommendation. The Department said that no one would dispute the need for removing constraints to fertilizer use and increased agricultural production but that it is not evident that placing new restrictions on U.S. assistance is an effective inducement to the removal of such constraints.

The Department of Agriculture, in its comments dated March 4, 1977 (see app. VII), said that our report should contribute to enlightening policymakers about the alternatives for stimulating greater food production and that the report appropriately identified the constraints on the expanded use of fertilizer in less developed countries. The Department said that our first recommendation was well taken. The Department suggested that it be accompanied by a supplemental recommendation that appropriate agencies work with recipient governments in developing specific measures to eliminate constraints and to assist in developing plans for implementing the removal of the constraints.

The Department of Agriculture felt that our second recommendation presented problems, including problems associated with monitoring and enforcing subsequent developments in recipient countries for compliance. The Department believes that its suggested supplemental recommendation, discussed above, is a more promising procedure for attaining the objectives of expanding fertilizer use than including a new condition in assistance agreements.

The Department of the Treasury, in its letter dated January 27, 1977 (see app. VIII), said it fully concurred in our first recommendation. Treasury said that it has urged the international development banks to take appropriate steps in their activities aimed at increasing agricultural production, including greater use of fertilizer, and that an important feature of the banks' lending for agriculture is the identification of factors restricting output.

AID, in its comments dated March 16, 1977 (see app. IX), said that food price policies encourage or discourage the use of fertilizer for food crops but that the difficulties facing countries wishing to raise food prices and the potential impact of increased food prices should be thoroughly explored in our final report. The difficulties encountered by developing countries in raising food prices are discussed in considerable detail in our November 1975 report. (See note, p. 11.)

AID said also that our second recommendation is much too strong. AID went on to cite the views of the State Department. In contrast, TVA, in its letter attached to AID's comments on our report, agreed with our recommendations.

In summary, the agencies' comments focused on our second recommendation, calling for incorporating into new agreements a requirement that action be taken by developing countries to remove constraints to greater agricultural production and use of fertilizer. We do not suggest that such a condition

be incorporated in all new agreements for assistance to developing countries, as evidenced by our use of the words "where appropriate" as part of our recommendation. We believe that the requirement should be incorporated when recipient countries do not make bona fide efforts to respond to U.S. and other donor attempts to induce them to revise policies which act as constraints.

Also, our recommendations do not rule out action on the Department of Agriculture's recommendation that appropriate agencies work with recipient governments in developing specific measures and plans to remove constraints to greater agricultural production and use of fertilizer. In our report, "Disincentives to Agricultural Production in Developing Countries" (see note, p. 11), we made a similar recommendation to AID that it

> "* * * provide more assistance in identifying and bringing to the attention of developing countries those policies and institutions that may not be generally recognized or understood as disincentives and alternative policies and programs that could improve the performance of the agricultural sector."

We also recommended in our November 1975 report that

> "* * * the Secretaries of State and the Treasury take the lead in working for concerted action among major donors, including the international organizations and financial institutions, for removal by aid recipients of agricultural production disincentives and for the adoption by these countries of a positive agricultural development strategy that stresses adequate farm production incentives."

Following up on this recommendation during March 1977 hearings, the Chairman, Subcommittee on Foreign Operations and Related Agencies, House Committee on Appropriations, asked AID to describe the action which the United States is taking directly, or through its representatives in multilateral or international organizations, to have countries remove disincentives to increased agricultural production. AID responded by stating that AID missions and international groups hold various meetings with officials of the countries involved and during these meetings the countries are encouraged to follow sound economic policies, of which removing disincentives to agricultural production is typically the most important.

We think that there is inadequate evidence that effective action has been taken on our 1975 recommendation. In essence,

we are repeating our prior recommendation in this report and have strengthened our view by recommending that the relevant U.S. agencies work for concerted action by donors to incorporate, where appropriate, a requirement in new agreements that affirmative action be taken by recipient countries to remove constraints to increased agricultural production. We believe that such a multilateral approach would be more effective than placing new restrictions on U.S. bilateral assistance. In this respect, we note that the Departments of State and Agriculture opposed new restrictions on bilateral agreements.

CHAPTER 3

ASSISTANCE PROVIDED TO THE DEVELOPING COUNTRIES

In recognition of the vital role of fertilizer in increasing food production, participants at the 1974 World Food Conference requested that multilateral institutions and bilateral aid agencies extend technical and financial assistance to increase fertilizer production and consumption in the developing regions.

After the World Food Conference's request, existing programs of FAO, the United Nations Industrial Development Organization (UNIDO), the International Bank for Reconstruction and Development, and various bilateral donors were expanded. In addition, other organizations, such as the World Food Council, the International Fund for Agricultural Development, the Consultative Group for Food Production and Investment, and the International Fertilizer Development Center (IFDC), were established.

International organizations and developed countries are providing assistance to help alleviate some of the constraints to increasing the use of fertilizer. However, a proliferation of such organizations in recent years has resulted in overlapping functions and the inherent need for additional coordination among them to provide for effective use of the resources available for agricultural development.

For example, IFDC provides technical assistance, a function of UNIDO. AID, which sponsors and funds IFDC, is having problems getting additional donors and getting IFDC politically accepted as an international organization.

MULTILATERAL ASSISTANCE

FAO, UNIDO, and the International Bank for Reconstruction and Development have provided fertilizer assistance to the developing countries for a long time. FAO has concentrated on promoting increased and more efficient use of fertilizers; UNIDO, on helping the developing countries overcome technical problems in their fertilizer industries and studying the feasibility of adding new production capacity; and the International Bank for Reconstruction and Development, on providing financial assistance to construct new fertilizer production facilities and to improve marketing and distribution systems.

FAO fertilizer assistance

An FAO fertilizer program was established in 1960 to improve crop yield and farmer income by promoting the efficient use of fertilizer and related inputs. The program was initially limited to fertilizer trials and demonstrations made by FAO, in cooperation with participating governments, to assess and determine correct fertilizer treatment and applications within the subject countries. These services were carried out through field-level extension work with the small farmer.

The program began in only 6 countries, but as of 1975 it included 39 countries in Africa, Asia, Latin America, and the Near East and conducted an average of 10,000 trials and demonstrations a year. As of 1974 more than 4 million farmers had seen the results of 260,000 trials and demonstrations. About 7,000 local extension workers and supervisors have been trained through the program.

When the program expanded to include pilot schemes involving fertilizer distribution for cash or credit in 1963, FAO and the Fertilizer Industry Advisory Committee created an ad hoc group on statistics, marketing, credit, and the economics of usage. This group prepares country-based economic appraisals and maintains computerized data to establish relationships between yields, ecological conditions, management methods, and fertilizer treatments.

In 1973 the FAO Commission on Fertilizer was established to:

--Review and analyze fertilizer production, consumption, and trade and consider present and potential problems.

--Regularly disseminate information on demand and supply and probable medium- and long-term developments.

--Review the economic factors related to fertilizer use, especially price, distribution, and trade.

--Consider measures to promote the expansion of production to meet estimated demand, with special attention to expanding production in developing countries.

--Report and submit recommendations to the Director-General on policy issues arising out of its deliberations.

In 1975 an FAO task force on fertilizer was established to exchange information and coordinate activities both within FAO and with other organizations. By this time, the program had also developed a more comprehensive approach based on six phases.

1. Project appraisals of present fertilizer use and source of supply.

2. Fertilizer research, including the effects of environmental factors.

3. Fertilizer extension services, including demonstrations combined with training.

4. Pilot schemes involving fertilizer distribution for cash or credit.

5. Training of personnel through publications and seminars.

6. Coordination of fertilizer use development at the regional, national, and international levels.

FAO's fertilizer program is financed by trust funds contributed by various donor groups. As of December 1974 the total value of contributions was $14.5 million, including staff time and materials worth $12.5 million. FAO assumed the administrative costs of its headquarters staff working on the program. Annual contributions in cash and kind now average more than $2 million.

International fertilizer supply scheme

The Director-General of FAO established the international fertilizer supply scheme because of the scarcity and high prices of fertilizers. The scheme was created to provide short-term action to meet any emergency fertilizer shortage in developing countries. It was to insure the availability of adequate amounts of fertilizer and to mobilize financial assistance.

During the first 13 months of the scheme (July 1974-August 1975), various donor groups pledged $118 million, of which about 57 percent was in kind and the rest in cash. The largest contributors were the United Kingdom ($42.5 mil-

lion) and the U.N. Emergency Operations ($40.6 million). The United States, although providing bilateral commodity assistance during this period, did not provide any of its assistance through the scheme.

As of September 1975, about $117 million worth of fertilizer (323,000 tons) had been programed for 36 developing countries. Of the countries to receive assistance, 22 are located in Africa, 9 in Asia, 3 in Latin America, and 2 in the Near East. Three countries--Bangladesh, India, and Kenya--received 46 percent of the fertilizer.

A major shortcoming of the scheme is the fact that FAO does not have a system to evaluate (1) whether the fertilizer is actually getting to the farmer or (2) the impact of the fertilizer on increasing food production in developing countries. A TVA team visiting Haiti found that low-cost scheme fertilizer sales were displacing sales made previously through normal commercial distribution channels.

A representative in the Office of the Assistant Director-General for Agriculture explained that, although FAO has an evaluation service to review the effectiveness of field programs funded by the United Nations Development Program (UNDP), no group exists to evaluate FAO's regular program activities under which the scheme operates. FAO's Chief, Office of Internal Audit and Inspection, claimed that a lack of sufficient staff and travel funds have prevented his Office from visiting recipient countries.

The Department of Agriculture, in commenting on our draft report, said that because present fertilizer supplies are adequate, activities under the scheme are rapidly winding down and that it will probably be terminated or reduced to some kind of "holding operation."

UNIDO

Since UNIDO's inception in 1967, it has provided fertilizer assistance to developing countries throughout the world. The two primary types of assistance are described as

--"debottlenecking"--increasing the output of existing production facilities by advising countries on changes needed to improve fertilizer plant operation--and

--feasibility studies, which consider the need for new plant construction.

A UNIDO official told us that although 70 percent of the present assistance is in the form of feasibility studies, UNIDO is now increasing its emphasis on debottlenecking assistance. Other types of assistance include training developing country personnel and providing technical assistance in fertilizer marketing and distribution.

UNIDO initiated 13 fertilizer projects in 1974 and 8 in 1975. These projects represented less than 1 percent of its total technical assistance expenditures. For example, in 1974 total technical assistance expenditures amounted to about $24 million, but only $162,000 was used to specifically finance fertilizer assistance. Based on UNIDO's estimates, trends were similar in later years. About $500,000 out of $26 million was scheduled to finance fertilizer assistance in 1975. Only five fertilizer projects were planned for 1976, and only $200,000 out of the $29 million technical assistance budget was scheduled to be specifically used for fertilizer assistance.

UNDP (approximately 20 percent funded by the United States) finances most of UNIDO's fertilizer projects. In fact, about 90 percent of the projects described above for 1974 and 1975 were financed by UNDP. The other projects were financed out of UNIDO's General Trust Fund.

The number of UNIDO's fertilizer projects funded by UNDP may be drastically reduced in the near future. UNDP is faced with rising operating costs, which will probably greatly reduce its overall technical assistance operations. In fact, the 1976 program was expected to be scaled back by at least $75 million from the prior year's $410 million. There is also speculation that UNDP may experience further setbacks because of a reduction in donor contributions.

World Bank

The World Bank has been a major source of financing for projects to (1) construct new fertilizer production capacity and (2) help improve the output of existing capacity in developing countries. The Bank also makes technical appraisals and investigations to determine the feasibility of each project it finances. Recently the Bank shifted its emphasis and started financing fertilizer marketing and distribution projects.

Because of the importance of fertilizer in increasing food production, in 1974 the Bank established a fertilizer unit to coordinate the planning of its assistance efforts. An additional function of this unit is to devise a coherent

strategy and policy for the Bank's program, taking into account worldwide fertilizer demand and supply. This unit also prepares and monitors fertilizer statistics.

During fiscal years 1974 and 1975, the Bank provided $763 million in loans to finance 15 fertilizer projects in 11 developing countries. India received $355 million and Indonesia got $115 million. The remaining $293.4 million was provided to nine other countries. In the previous 3 years, the Bank financed six projects totaling $147 million in three countries, with India receiving about $88 million.

In 1975 the Bank announced a shift in the type of fertilizer assistance it would finance. Previously, the assistance was concentrated on financing construction of primary production facilities. Because the production and availability of fertilizer had increased, the marketing and distribution systems of the developing countries needed to be improved. The World Bank recognized this trend and is shifting its program to include financing of marketing and distribution projects. For example, in 1975 a major fertilizer distribution project loan for $68 million was approved for Indonesia.

Recently established international organizations

The World Food Conference concluded that the existing institutions providing resources for agricultural development in the developing countries might prove inadequate. Therefore, it proposed the establishment of a World Food Council, a Consultative Group for Food Production and Investment, and an International Fund for Agricultural Development. The first two are in operation and have included fertilizer as one of their prime areas of interest. The operating procedures of the Fund have not yet been developed, and the type of projects to be funded have not been designated; however, fertilizer projects are likely to be included.

World Food Council

The World Food Council was established to be the highest level world body concerned with food problems and to report such problems through the U.N. Economic and Social Council directly to the General Assembly. It is to review reports from all organizations in the U.N. family involved in matters of food and agricultural development and to consider what actions may be necessary to advance their efforts.

At its first meeting in June 1975, the Council discussed some of the critical food issues. One issue discussed was the short-term fertilizer situation, particularly in the context of the minimum import requirements of the developing countries.

In summarizing its position on the fertilizer situation, the Council:

--Recommended that bilateral and multilateral institutions increase their assistance, both in cash and kind, to enable developing countries to obtain their fertilizer requirements.

--Recommended that more of the total commodity assistance be channeled through the international fertilizer supply scheme and that the scheme be put on a longer term basis.

--Recommended that the FAO/UNIDO/International Bank for Reconstruction and Development working group on fertilizers speed up efforts to improve use of fertilizer plant capacity in developing countries.

--Recommended that the Consultative Group on Food Production and Investment investigate the feasibility of expanding fertilizer production in developing countries.

--Stressed the importance of making more realistic forecasts of the developing countries' fertilizer supply and demand.

The Council also attempted to formulate a future work program and procedural rules. However, little progress was made along these lines.

At the second session in June 1976, no extensive discussion on fertilizer occurred, although the developing countries had expressed an interest in discussing the issue. One of the few comments made regarding fertilizer, however, was that the international fertilizer supply scheme should be continued and that the assistance through the scheme should be increased.

Consultative Group on Food Production and Investment

The Group was established in 1975--under the auspices of the International Bank for Reconstruction and Development, FAO, and UNDP--to identify production and investment priorities in

food-deficit countries. The Group is made up of donor countries on a self-selective basis and 10 developing countries representing the different world regions. The first meeting was held in July 1975 to establish relationships with other international organizations and to charter a work program. In that meeting the Group agreed to explore a few specific problems affecting food and agricultural development in developing countries and, when appropriate, seek to direct additional resources toward solving the problems. The Group itself will not fund individual projects or programs but will work through existing organizations in making studies and directing the flow of resources.

One problem explored by the Group in 1975 was the investment needs for fertilizer production and distribution systems in developing countries. The Group concluded that considerable opportunity still exists for further expansion, including cooperative ventures, particularly in countries with a large domestic market or unexploited indigenous supplies of raw materials or feedstock. The Group also concluded that financial and technical assistance will be needed at all stages--from planning, through plant construction, to the development of market infrastructure.

International Fund for Agricultural Development

The Fund was proposed by members of the Organization of Petroleum Exporting Countries (OPEC) attending the World Food Conference to help the developing countries increase food production. The Fund was officially established in December 1976, when its funding target of $1 billion in pledges had been reached.

Unlike the World Food Council and the Consultative Group on Food Production and Investment, the Fund will finance individual projects or programs directly assisting developing countries. Initially, the United States and other developed countries were not enthusiastic about creating a new institution, believing that exising institutions could meet the additional assistance needs. However, the OPEC countries argued for a multilateral forum which would give them a greater role than did the existing institutions. The developed countries therefore agreed to support the Fund if (1) substantial contributions from new donors could be assured and (2) it would not create a large staff but use existing institutions for technical and supervisory operations.

The International Fund for Agricultural Development's only source of funds will be contributions. OPEC members

pledged $435 million, the United States ($200 million) and other developed countries pledged $567 million, and developing countries pledged about $9 million.

What specific projects the Fund will finance has not been determined, but some delegates at the World Food Conference suggested that the Fund should be used for implementing projects in such areas as irrigation facilities, fertilizer, pesticides, seed development, and livestock production.

U.S. BILATERAL ASSISTANCE

During fiscal years 1974 and 1975, U.S. Government agencies provided about $417 million in grants and loans and $95 million in insurance and guarantees to developing countries to help them solve their fertilizer and associated problems. The three agencies providing this assistance were AID, the Export-Import Bank, and the Overseas Private Investment Corporation.

Agency	Grants/ loans	Insurance/ guarantees	Total
	----------(millions)----------		
AID	$335	$ -	$335
Export-Import Bank	82	83	165
Overseas Private Investment Corporation	-	12	12
Total	$417	$95	$512

Agency for International Development

AID assistance to the developing countries, which totaled about $335 million in fiscal years 1974-75, was in the following categories:

Type of assistance	Amount
	(millions)
Fertilizer procurement financing	$263
Plant construction financing	70
Technical assistance, research and development	2
Total	$335

A small amount of fertilizer assistance is also provided as part of related or larger scope project; for example, fertilizer commodity inputs provided as part of rural development projects or soil research projects which include investigating the response of various types of fertilizers.

Commodity financing

During fiscal years 1974 and 1975, AID disbursements, in grants 1/ and loans, for fertilizer procurement totaled $90.2 million and $172.6 million, respectively. Because of increased prices the tonnage actually dropped from 805,860 metric tons in 1974 to 503,019 in 1975. The major recipients during those years were Vietnam ($39.4 million in 1974 and $109.3 million in 1975), Bangladesh ($8.9 million in 1974 and $25.7 million in 1975), and Pakistan ($12.4 million in 1974 and $15.9 million in 1975).

With the elimination of the Vietnam program, the level of commodity financing has declined. As of May 1976, AID fiscal year 1976 commitments totaled only $55 million (for 403,000 metric tons). The largest recipients will be Bangladesh ($21 million) and Pakistan ($22 million). Commitments for fiscal year 1977 amount to $54 million for 287,000 metric tons, with Bangladesh ($27 million) and Pakistan ($25 million) still being the largest recipients.

Plant construction

AID has loaned developing countries $100 million since 1971 to finance plant construction and equipment. Pakistan received two loans, one of $40 million in fiscal year 1975 and one of $20 million in fiscal year 1973. Bangladesh received a loan for $30 million in fiscal year 1975. Two smaller loans were made to India, $6 million in 1971, and Indonesia, $4 million in 1973. No other investments in fertilizer facilities in developing countries are planned. However, a loan of $6 million to Jordan toward a $10 million study of potash recovery has recently been announced.

Technical assistance and research

Through fiscal year 1975, most technical assistance and research projects financed by AID grants were performed under contract by TVA's National Fertilizer Development Center. In fiscal year 1974, TVA handled 17 projects for AID at a cost

---

1/Only to finance fertilizer for Vietnam.

of $736,000. In the following year, activity increased to 21 projects costing $973,000.

In recognition of the important role of fertilizer in increasing food production in the developing countries, the International Fertilizer Development Center was founded in October 1974. IFDC's purpose is to increase fertilizer production, technology, and new products especially designed for conditions in the developing countries. In addition, it is studying the technology of production and marketing; collecting, storing, and analyzing information pertinent to general fertilizer and specific investment decisions; and providing technical assistance and training to promote the use of the most appropriate technology and to rapidly introduce and use the results of ongoing research. These are essentially the same activities that were performed previously by TVA.

During fiscal years 1975 and 1976, AID provided $9.2 million in grants--$5.1 million to cover the construction of IFDC facilities (near existing TVA facilities at Muscle Shoals, Alabama) and $4.1 million to cover operating costs for the first 2 years. For fiscal year 1977, AID is programming an additional $5.7 million, consisting of a grant of $1.9 million to complete AID's support to the Center's capital development program and $3.8 million to support the Center's third year operating budget.

AID and the International Development Research Center of Canada, which has provided $55,000, are jointly sponsoring IFDC as an international institution, but they have had problems obtaining additional sponsors and in getting it recognized as an international organization. The Consultative Group for International Agricultural Research, which now has 26 donor members and provides funds to 11 international agricultural research centers, has approved IFDC's purposes and has agreed to review its program along with those of the centers it funds. It has made no commitment to financially support IFDC, however, because (1) the cost of operating the existing centers is escalating, (2) the Center is located in the United States, and (3) the Center's program is input oriented instead of crop oriented as are the other centers. According to an AID official, there is also a lack of international interest in financially supporting IFDC because it is regarded as a U.S. Government project.

IFDC will continue to need substantial funding support in future years. At present, however, there are only two primary funding sources--AID and reimburseable contract work. In preparing its fiscal year 1977 budget presentation, AID indicated that, in addition to underwriting the initial capi-

tal construction costs, it has decided to fund IFDC's minimum research and development program for the next 3 years and projects that it may have to provide core budget support for 10 years.

Some of the funds needed to cover IFDC's operating costs will be generated through reimburseable work. As of June 1976, IFDC had entered into contracts totaling about $532,000. Two of the 29 projects are regional studies involving Africa and Asia. The other projects are mostly individual country studies involving some 15 different countries. Brazil (with 6 projects), Ghana (5), Colombia (3), and Venezuela (3) are included in the largest number of projects.

The types of projects vary greatly--from training nationals to providing assistance on aspects of fertilizer marketing and production. AID is financing three of IFDC's largest contracts amounting to about $210,000. These are:

--One-year training in plant maintenance for nine nationals from Bangladesh ($74,260).

--A West African fertilizer study to assess the region's production, marketing, and use of fertilizer ($123,844).

--An engineer to assist the AID mission in Ghana in an agricultural management development project ($11,640).

Except for $15,000 from UNIDO and $9,850 from the International Bank for Reconstruction and Development, the remaining funds are being provided by the recipient countries.

Other bilateral assistance

During fiscal years 1971-75, the Export-Import Bank and the Overseas Private Investment Corporation provided about $205 million in financial assistance to developing countries. The Bank's assistance consisted of $90.4 million in loans ($68.9 million in 1975) and $91.9 million in insurance and guarantees. All $22.4 million of the Corporation's assistance was in the form of insurance and guarantees.

The countries receiving the largest amounts of the Export-Import Bank's fertilizer assistance were:

--Korea, loans of $65.5 million and insurance and guarantees of $76.8 million.

--Taiwan, loans of $13.2 million and insurance and guarantees of $7.6 million.

--Brazil, loans of $9.5 million and insurance and guarantees of $6 million.

Most of the $22.4 million of the Overseas Private Investment Corporation's insurance and guarantees for fertilizer aid went to two countries: India, $9.3 million in 1971, and Korea, $11 million in 1975.

OBSERVATIONS AND CONCLUSIONS

In recent years the number of organizations involved in planning for and providing fertilizer assistance to the developing countries--for example, the Consultative Group on Food Production and Investment and IFDC--has increased. In addition, some traditional suppliers of fertilizer assistance--FAO, UNIDO, and the World Bank--have expanded their activities.

This proliferation of organizations has resulted in overlapping functions and the need for additional coordination among them to provide for effective use of the resources available for agricultural development. Funding for UNIDO and IFDC programs is also a potential problem.

In the mid-1960s there were primarily three international organizations--FAO, UNIDO, and the International Bank for Reconstruction and Development--providing fertilizer assistance. FAO concentrated its efforts on the efficient use of fertilizer. UNIDO focused on increasing the efficiency of fertilizer production facilities, and the Bank provided financing for construction of production facilities. Additional assistance was provided through bilateral programs.

These organizations continue to play an important role in fertilizer assistance, but newer organizations, such as the World Food Council, the International Fund for Agricultural Development, the Consultative Group on Food Production and Investment, and IFDC, are also involved in fertilizer assistance. The new organizations often perform functions similar to those of the traditional organizations. For example, debottlenecking activities and feasibility studies are performed by both IFDC and UNIDO, while the International Fund for Agricultural Development is expected to finance projects, a function of the World Bank.

UNDP, the primary source of funds for UNIDO, has recently been experiencing funding difficulties. This could seriously affect UNIDO's fertilizer assistance programs.

IFDC, the new institution conceived of and primarily sponsored by the United States, has encountered difficulty in obtaining funds from non-U.S. donors. If this is not remedied, the U.S. Government will continue to be the primary source of budget support long beyond the 3-year period envisioned when the project was initially presented to the Congress--in the fiscal year 1975 congressional presentation. IFDC has been trying to join the Consultative Group on International Agricultural Research, but the Group has had reservations because

--the cost of operating the existing centers is escalating,

--IFDC is located in the United States,

--IFDC's program is input oriented instead of crop oriented as are the other centers, and

--IFDC is regarded as a U.S. Government project.

RECOMMENDATIONS

We recommend that the Administrator of AID terminate support of the International Fertilizer Development Center and make arrangements for transferring its programs and activities to existing international organizations. GAO also recommends that, before funding any new organizations or programs in the fertilizer assistance area, the Administrator determine that their functions would not overlap or duplicate those of existing organizations or could not be assumed by existing organizations.

AGENCY COMMENTS AND OUR EVALUATION

On March 16, 1977, we received AID's written comments (see app. IX) on our draft report, which was transmitted to the Agency on December 16, 1976. We also met with an AID official to discuss the comments and to obtain additional information about IFDC.

AID stated that new organizations, including IFDC, were created as a result of the world food crisis which was discussed at the World Food Conference in 1974. AID said that controlling the proliferation of multilateral agencies is a desirable goal but one to be pursued judiciously. AID cited, for example, (1) the need for the International Fund for Agricultural Development, whose creation was spearheaded by the World Food Council, because it mobilized $1 billion of new money, about half from OPEC countries, and (2) the need for IFDC, because it fills a serious gap in the international

development effort which should be underwritten by the United States until additional support can be enlisted.

We believe that the circumstances resulting in the creation of these two organizations were dissimilar. In connection with the Fund, the United States was unenthusiastic about the creation of another international organization until interested governments agreed that it would generate substantial additional resources for agricultural development and that many donor governments would provide contributions on an equitable basis. On the other hand, AID unilaterally created IFDC without benefit of equitable burden sharing by other governments providing aid to developing countries.

The Department of State (see app. VI) claimed that IFDC is on the verge of full acceptance in international circles and that the Consultative Group on International Agricultural Research has recently agreed to assume a formal relationship with IFDC by appointing members to its board of directors.

The United States is a charter member and major donor of the Group, whose function is to coordinate research grants to international research institutions. The Group was established in 1971 under the sponsorship of the World Bank, UNDP, and FAO. The United States intends to raise its 25-percent contribution to the Group from $10.7 million in 1975 to about $25 million in 1980. AID and IFDC have stated that they hope IFDC eventually will be accepted into the network of international research centers funded by the Group.

The Technical Advisory Committee of the Consultative Group on International Agricultural Research evaluated IFDC activities and presented its findings at the Group's July 1975 meeting. However, the Group's Chairman interpreted the ensuing discussion by Group donors as meaning that they were not in a position to accept IFDC into the Group's donor-supported system. Similarly, during the Group's July 1976 meeting, AID requested the Group to name members to IFDC's board of directors, but AID acknowledged that the request implied no other changes in IFDC's relationship with the Group and certainly did not include suggestions that the Group take on financial or any other responsibilities for IFDC. Accordingly, we conclude that IFDC is not on the verge of full acceptance in international circles.

AID did not wait for its proposal to establish IFDC to be accepted by the Group because it believed the Group's deliberations would take too long. In October 1974, within 6 months after the Secretary of State proposed to the United Nations that an international fertilizer institute

be established with U.S. assistance, IFDC was legally established in Alabama, adjacent to TVA's National Fertilizer Development Center. Addition of IFDC to the Group's system of research centers was first discussed in the summer of 1975 but was not accepted. An AID official believes the principal reason IFDC has not been accepted by the Group is political--the Center's U.S. location (all the other research centers funded by the Group are in developing countries). The official feels that IFDC ultimately will be politically acceptable to the international community on the basis of the quality of its work.

As part of our continuing reviews of AID's efforts to improve developing countries' food situation, we have reviewed AID's participation in the network of international research centers and the Group. We have seen no indication that the Group anticipates future participation in IFDC financing. With the recent proliferation and the spiraling costs of existing centers, whose costs are estimated to exceed $100 million annually by 1980, the Group's willingness to participate in IFDC may be even more questionable.

The Department of the Treasury (see app. VIII) said that the World Bank and the Inter-American Development Bank believe IFDC is doing valuable work in encouraging the use of fertilizer and that the Center's existence should continue. UNIDO made similar complimentary comments.

However, in its report dated January 21, 1977, the AID Auditor General's Office concluded the following after reviewing IFDC activities:

> "The Organization of the IFDC is progressing satisfactorily in all but one important aspect: it lacks the multinational support needed to become a self-sustaining international body. Continued absence of this key ingredient will nullify all concrete accomplishments made thus far, such as building construction, assembling a staff and establishing operating systems and procedures.
>
> "Unless AID plans to furnish virtually complete financial support for an indefinite period of time (current disbursements exceed $9 million and commitments amount to $5 million) it needs to re-examine its future role in the event efforts to obtain contributions from other sources do not materialize.

"Deferment of a decision by AID to re-examine its future role is likely to translate into calls for continued AID financial support without solving the basic problem--participation by multinational users and beneficiaries. If such cost sharing proves to be economically unrealistic, then it should be fully recognized as such, with provisions made for corresponding modification of goals, appropriate budgetary realignments, or a transfer of IFDC assets to existing centers."

We agree that IFDC's basic problem, the virtual lack of international financial participation, remains unsolved. We do not question the proficiency of IFDC or the value of work performed by its predecessor, TVA's International Fertilizer Development Staff. We believe, however, that had the international community considered support for the Center a matter of high priority, it would have provided financial backing, as it accepted and financed the International Fund for Agricultural Development, also created as a result of the world food crisis.

CHAPTER 4

OBJECTIVES AND SCOPE OF REVIEW

This review focused on the more important factors affecting the developing countries' use of fertilizer on food crops. Specifically, we reviewed the

--policies, programs, and institutional factors within the developing countries which either inhibit or facilitate the use of fertilizer;

--problems in the operation of existing production facilities and the developing countries' plans for increasing production; and

--assistance efforts of U.S. agencies and the major multilateral organizations.

We did work at the Departments of State and Agriculture, the Agency for International Development, the World Bank, the Food and Agriculture Organization of the United Nations, and the United Nations Industrial Development Organization. We also considered reports, studies, and documents and talked with officials of the countries visited--India, Pakistan, Indonesia, and the Philippines.

FERTILIZER CONSUMPTION BY REGION

PER HECTARE OF ARABLE LAND

FOR 1960, 1970, AND 1974

Region	1960				1970				1974			
	N	P	K	Total	N	P	K	Total	N	P	K	Total
	(kilograms)											
Developed	18.2	20.2	16.3	54.7	39.2	30.8	24.7	94.7	44.9	35.2	28.9	109.0
North America	12.5	11.7	9.1	33.3	32.7	19.9	17.1	69.7	37.4	21.6	20.5	79.5
Western Europe	30.8	34.2	32.3	97.3	67.7	56.3	49.5	173.5	80.0	63.2	57.2	200.4
Oceania	1.0	26.0	3.1	30.1	3.3	23.4	4.3	31.0	4.5	35.1	6.2	45.8
Other	44.1	34.9	34.2	113.2	55.3	48.0	36.5	139.8	57.5	60.3	43.7	161.6
Developing	2.5	1.0	0.7	4.2	7.9	3.4	2.0	13.3	10.6	5.2	2.9	18.6
Africa	0.5	0.6	0.4	1.5	1.5	1.3	0.8	3.6	2.3	1.7	1.0	5.0
Latin America	4.2	2.6	2.1	8.9	10.7	7.2	5.1	23.0	14.1	10.9	7.1	32.1
Asia	2.9	0.7	0.4	4.0	10.5	3.0	1.9	15.4	13.3	4.5	2.8	20.5
Near East	3.6	1.1	0.1	4.8	9.8	3.9	0.3	14.0	15.1	6.7	0.5	22.2
Other	1.3	0.1	-	1.4	5.0	1.1	0.6	6.7	8.0	1.8	2.9	12.7
Centrally planned	5.6	4.6	4.7	14.9	25.4	12.7	13.3	51.4	33.6	16.7	17.8	68.2
Asia	5.1	2.1	0.4	7.6	25.7	7.1	2.7	35.5	30.9	11.8	4.4	77.1
Europe, USSR	5.9	5.7	6.5	18.1	26.9	15.3	18.2	60.4	34.9	19.0	24.2	78.1
Worldwide	7.8	7.4	6.2	21.4	21.6	13.4	11.3	46.3	26.2	16.5	14.0	56.8

Key:
N = Nitrogen
P = Phosphate
K = Potash

Source: FAO Annual Fertilizer Review, 1974.

APPENDIX I

APPENDIX II

FERTILIZER CONSUMPTION FOR SELECTED DEVELOPING COUNTRIES TOTAL AND PER HECTARE OF ARABLE LAND JULY 1, 1973 - JUNE 30, 1974

Country	Total	Nitrogen	Phosphate	Potash	Combined
	(metric tons)	(kilograms per hectare)			
Africa:					
Algeria	a/215,750	13.8	13.9	5.6	31.8
Egypt	a/458,000	133.2	26.3	1.1	160.6
Ethiopia	19,250	0.7	0.7	-	1.4
Ghana	a/5,724	0.4	1.0	0.8	2.1
Kenya	43,630	12.2	12.4	1.6	26.1
Morocco	a/137,000	9.0	6.1	3.4	18.4
Nigeria	a/11,300	0.2	0.2	0.1	0.5
Sudan	70,195	9.8	-	-	9.8
Tanzania	19,453	0.8	0.4	0.2	1.5
Uganda	a/7,178	0.8	0.5	0.2	1.5
Zaire	a/6,600	0.4	0.2	0.3	0.9
Latin America:					
Argentina	a/95,600	2.0	1.1	0.6	3.7
Brazil	a/1,673,154	12.5	21.3	15.3	49.1
Chile	188,685	10.5	20.4	2.4	33.3
Colombia	a/311,984	30.4	19.8	11.5	61.7
Costa Rica	a/64,000	69.4	20.4	40.8	130.6
El Salvador	a/107,800	104.5	48.8	12.3	165.6
Mexico	747,535	19.3	6.6	1.3	27.2
Peru	97,571	28.5	3.3	2.8	34.6
Venezuela	85,143	7.8	4.5	4.0	16.3
Asia:					
Bangladesh	176,890	13.4	4.8	1.2	19.4
India	2,783,000	11.1	3.8	1.9	16.9
Indonesia	a/475,300	19.3	4.7	2.2	26.3
Pakistan	402,697	17.6	3.0	0.1	20.8
Philippines	236,120	13.1	4.1	4.0	21.2
Sri Lanka	94,888	25.9	6.1	16.0	47.9
Thailand	a/154,757	5.0	3.2	2.9	11.1

a/Unofficial figure.

Source: FAO Annual Fertilizer Review, 1974.

APPENDIX III

FERTILIZER CONSUMPTION AND PRODUCTION IN ASIA

Asia, particularly South Asia, has by far the largest food deficit and some of the lowest fertilizer use rates of any region in the developing world. Average population growth rates are among the highest in the world, and there is virtually no prospect for significantly increasing the agricultural land area per capita. In fact, when planning for increased levels of agricultural production, one must consider a continued decline in available cropland.

Fertilizer use in developing Asia is low, but the larger countries do have sizable programs to increase agricultural production, which should increase fertilizer use appreciably. The use of irrigation and high-yield cereal varieties is of particular importance in this regard. On the other hand, future increases will be constrained by the relative cost of fertilizers to prices obtainable for crops to which they are applied.

Much of the fertilizer used presently must be imported, but Indonesia, Pakistan, and India are increasing their production capacities substantially and could become self-sufficient in nitrogen fertilizers by the end of this decade. The lack of raw materials, however, will necessitate continued large imports of phosphate and potash fertilizers.

FERTILIZER CONSUMPTION

A World Bank report on the fertilizer requirements of developing countries concluded that the greatest impact of future increases in fertilizer availability will be in Asia, where increased fertilizer application in combination with high-yielding cereal varieties and expanding irrigation will contribute most to higher output. In Asia, the levels of fertilizer application envisaged will increase agricultural production by 50 to 60 percent. By contrast, in Latin America only 30 to 40 percent and in Africa only 20 to 30 percent of the increased output would stem from higher fertilizer consumption.

Asia has the highest percentage of irrigated area relative to total area, and countries such as Bangladesh, India, Pakistan, Indonesia, and Thailand have great potential for more intensive use of fertilizer for high-yielding varieties of wheat and rice.

Consumption constraints

Many factors will determine the success of Asian countries in expanding fertilizer demand enough to meet their food needs. Weather, land, and, to some extent, policy are beyond the control of technology and developers. However, opportunities exist that, if rationally pursued, would enable developing Asia to establish and maintain a balanced fertilizer supply-demand position. Examples of major constraints to increasing the use of fertilizer in Asia are presented in chapter 2.

Efforts to increase consumption

The four Asian countries--Indonesia, Pakistan, India, and the Philippines--we visited have large-scale programs to increase agricultural production which include greater use of fertilizer. Planned increases in the use of high-yielding variety seeds and in the amount of land under irrigation should result in such increased use.

Indonesia began a program in 1965 to extend credit to farmers for purchasing high-yield seeds, fertilizers, and pesticides at subsidized prices. A second and similar program, which began in 1967-68, provides technical advice but not credit. Over 60 percent of the fertilizer is consumed in areas covered by these two programs. Farms under the programs produced 64 percent of the 1973 rice crop of 14.7 million tons, a 34-percent increase over their 1969 production. Total rice production for 1974 to 1978 has been projected to increase 4.8 percent annually, whereas production under the two programs is expected to increase by 9.5 percent annually.

Pakistan's Integrated Rural Development Program is designed, in part, to make agricultural production more efficient and to increase productivity. The government reported that one of the program's achievements has been to increase fertilizer outlets. For example, in one project area where there had been no fertilizer sales depots, a depot and six seasonal subsale depots have been established and fertilizer use is expanding. However, reports by AID, FAO, and the government have criticized the overall program as ill defined and ineffectual.

The Philippines' Masagana 99 program, a credit program for allocating and subsidizing fertilizer, chemicals, and high-yield seeds, was begun in 1972 and directed toward eventual self-sufficiency in rice. The program has expanded from coverage of 1.6 million acres and 406,500 farmers in

1973 to 2.1 million acres and 534,000 farmers in 1974. Additionally, the Philippine Government established the Fertilizer Industry Authority in 1973 to regulate and develop the fertilizer industry in order to insure an adequate supply at reasonable costs.

India is striving for an annual 4.2-percent growth in food grains under its Fifth Five Year Plan (1974-79) and has programed $6 billion to accomplish this. According to the plan, these increased crop yields depend on increased land cultivation, use of high-yield seeds, multiple cropping, and increased and more efficient use of fertilizer.

The use of high-yield seeds and availability of an assured supply of water normally result in increased use of fertilizer. Certain Asian countries make extensive use of these seeds and irrigation, and plan to greatly extend such use.

In India, Pakistan, and Nepal, much of the wheat planted is of the high-yield variety. The Philippines is planting most of its rice areas with the new varieties, and India, Malaysia, and Indonesia are planting more of their rice acreages with these seeds.

Research has shown that high-yield seeds require much more fertilizer to reach their optimum yields than do the low-yield varieties. For example, AID/Cooperative for American Relief Everywhere demonstration projects carried out during 1973-74 in Pakistan showed that wheat and corn production in rainfed areas could be doubled or tripled using high-yield seeds and fertilizer. It was estimated that the 900,000 tons of wheat being produced annually on 3.9 million acres could be increased to 4 million tons.

India's high-yield seed program, initiated in 1966-67, has more than doubled the average crop yields obtained from local varieties of rice, wheat, corn, sorgham, and millet seed. The local crops' average yield was only 607 to 1,012 kilograms an acre; with the better seeds, yield was increased to 1,619 to 2,429 kilograms. The program has expanded its coverage from less than 5 million acres in 1967-68 to about 62 million acres in 1973-74; by the end of the current 5-year plan in 1979, the program is expected to cover almost 100 million acres.

The introduction of high-yield seeds, with their shorter growing season, also paved the way for multiple cropping, which has increased the output per acre. India's Multiple Cropping Program begun in 1967-68 allows two or more harvests

each year and, therefore, greater use of fertilizer. The program has expanded from about 9 million acres in 1967-68 to an estimated 37 million acres in 1973-74.

A reliable and well-managed source of water is a prerequisite for realizing full benefits from fertilizer use, but rainfall in Asia is such that extremes in water availability are common. During a year that a drought in India may greatly reduce food grain yields, typhoons in the Philippines may destroy much of its rice crop.

About 69 percent of the total cultivated area in Pakistan is already irrigated. When the Tarbela Dam becomes fully operational, 1.25 million acres can be brought under irrigation and another 4 million acres should receive supplemental irrigation water. Irrigation water supplies will also be increased over the next 5 years by the Hub and Khanpur Dams, the Chasma Right Bank Canal, canal remodeling, small canal irrigation schemes of the four provincial irrigation departments, and tubewell construction. Some 10,500 public and 20,000 private tubewells are expected to be installed by 1980.

Overall, Pakistan expects to add supplemental irrigation supplies to about 4 million cropped acres and to bring under irrigation another 6 million acres. This increase in irrigation water availability is part of the reason for a large projected increase in fertilizer demand and use over the next few years.

Since 1960 the Philippines has expanded its rice production through irrigation and the use of fertilizer, rather than by expanding land area use. In 1959-60, 21 percent of its riceland was under irrigation and the harvest yielded 8 billion pounds; by 1972-73, 40 percent was under irrigation and the harvest was about 10 billion pounds.

Thus, it has been demonstrated that coupling high-yielding crop variety programs and multiple-cropping programs with irrigation and balanced fertilizer application can greatly increase crop production in the Asian countries.

FERTILIZER PRODUCTION

Some of the largest fertilizer importers among the developing countries of Asia plan to become self-sufficient in nitrogen fertilizers, the most significant type, both because they do not wish to be dependent on other countries for an item so important to food production and because they want to eliminate the large foreign exchange cost of importing fertilizers.

Of all the non-Communist developing countries in the world, India is by far the largest user of fertilizer--in 1974-75 it used an estimated 2,590,000 tons. Brazil, the second largest non-Communist user, consumed only 1,777,000 tons. India has had to import about 40 percent of its total requirements, and this has been costly in terms of foreign exchange. In 1974-75 alone, India spent $531 million to import 1.6 million nutrient tons.

An FAO estimate of import requirements of selected Asian countries for 1975-76 indicates that the import bill of only four countries will total $1.4 billion (India $945.7 million, Pakistan $227.8 million, Bangladesh $142.5 million, and Sri Lanka $86.1 million). Such financial requirements exert extreme pressure on the internal budgets, especially when the cost of subsidies is included in the total fertilizer budgets. Foreign exchange is critical in each of the countries, and its availability will be important to Asia's fertilizer supply-demand picture.

Most producing countries in the region could increase output appreciably by increasing the efficiency of existing plants. Certain countries, such as India, Pakistan, and Indonesia, have major expansion programs.

Expansion plans

A number of countries plan to substantially increase nitrogen production from indigenous raw materials. Indonesia and Pakistan plan to become self-sufficient and, possibly, become exporters by producing fertilizer from natural gas. India is building three plants which will use its available low-grade coal. India and Pakistan are the only countries in the region that have significant known reserves of phosphate rock, and much of the planned expansion is in India--approximately 0.5 million tons by 1980. Since Asia's known potash reserves do not appear to be extensive enough to compete with the large-scale mining operations in Canada and other developed countries, future gains in the use of potash will have to be supplied from imports.

India currently has a production capacity of 2.5 million tons of nitrogen and 700,000 tons of phosphate--an increase of 300 percent since 1965-66. It has 10 new plant construction projects and 11 expansion or modernization projects underway which will double nitrogen and phosphate production capacity by 1980.

Pakistan has about 310,000 tons of nitrogen fertilizer production capacity and 10,000 tons of phosphate capacity, an increase of 500 percent over 1967. It has two large fertili-

zer plants being planned and another under expansion, and it should be self-sufficient in nitrogen by 1979-80. Natural gas reserves are said to be fully adequate for its needs for at least 50 years.

Indonesia plans several large-scale nitrogen production complexes. It should be able to supply its own nitrogen needs by 1978 and have a surplus of more than 500,000 tons by 1980. This would make it one of the world's leading nitrogen suppliers and could go a long way toward correcting the nitrogen deficiency in the region. Indonesia also has large reserves of natural gas and oil. Exploration for additional reserves is continuing, so actual reserves are probably greater than published materials indicate.

The Philippines have no definite plans to put additional production capacity into operation in the next 7 years. It will have a projected deficit of over 180,000 tons of nitrogen and 20,000 to 30,000 tons of phosphate by 1980.

Capacity utilization

The efficiency of plant operations varies considerably from country to country and between publicly and privately owned or operated production units. According to a January 1976 UNIDO document, production in the region has been inhibited by equipment failure, poor maintenance, inadequate power supplies, difficulty in obtaining spare parts and raw materials, and weak management.

Indonesia's plants are producing at about 94 percent of rated capacity, whereas India's overall average is around 50 percent. In both Pakistan and India, the private plants were more efficient than the public ones.

In Pakistan both private sector plants and one of the three public sector plants were operating at or above 100 percent capacity, but the other two government-operated plants were producing at about 40 and 60 percent. An increase of only 5 to 10 percent by the public sector plants would save $3 million to $5 million in annual fertilizer import costs.

In 1974-75 Indian private sector nitrogen plants were performing at 75 percent capacity while government plants were producing at only 47 percent. Increasing plant efficiency, particularly within the public sector, will be necessary if fertilizer production goals are to be achieved. The plant under expansion and one of the two being planned in Pakistan are in the public sector. In India, 8 of 10 new plants under construction and 10 of 11 under expansion are within the public sector.

APPENDIX IV

FERTILIZER CONSUMPTION AND PRODUCTION IN LATIN AMERICA

Consumption of chemical fertilizer in Latin America has increased greatly in recent years, but most fertilizer has been used by large landholders to produce export crops. The poor crop/fertilizer price relationship, constraints on the availability and requirements of credit, lack of adequate market and distribution facilities, and inadequate extension and research services discourage the small farmer from obtaining needed fertilizer.

Fertilizer production has increased much less than consumption. However, with the increased emphasis on fertilizer self-sufficiency by the largest consumers and the other countries' potential for expansion, this trend is expected to change drastically.

FERTILIZER CONSUMPTION

Latin America could become one of the world's primary food producers. The region could dramatically increase its production by increasing farm acreage in such areas as Brazil and Central America, where only a small portion of total arable land is under cultivation, and by increasing crop yields in the primary food-producing countries. However, increasing crop yields will depend largely upon improving agricultural practices, including the intensified and proper use of fertilizers. Both FAO and the U.S. Department of Agriculture have emphasized the potential for increased yields in Latin America and the importance of fertilizer to increasing yields.

Latin America has the highest fertilizer consumption rate of the developing world, ranging from 2.5 million tons in 1970 to 4.2 million tons in 1975. Nevertheless, its annual consumption of 32 kilograms per hectare lags behind the world average of about 57.

Although about half of the region's fertilizer is consumed by Mexico and Brazil, the greatest potential for increased consumption is in these countries and Argentina. Argentina uses only about 4 kilograms per hectare of arable land, Mexico uses 27, and Brazil uses 49. Some of the smaller countries, on the other hand, have substantially higher rates, such as 277 in Barbados, 156 in El Salvador, and 131 in Costa Rica.

In addition to the low total consumption rates, the U.S. Department of Agriculture reported in 1975 that most of the fertilizer is used on highly commercial export and industrial crops, whereas cereal crops, for example, receive very little.

About 50 percent of Latin America's foreign exchange earnings are derived from the export of bananas, coffee, cacao, tobacco, sugarcane, and cotton, which are generally grown by large landholders who are able to acquire and use chemical fertilizer. In addition, Argentina, a limited user of fertilizer, exports wheat, corn, and sorgham, and Brazil exports soybeans. Cereal grains, legumes, and root crops are generally grown by farmers who have no adequate means of acquiring fertilizer.

Consumption constraints

Farmers need better market systems and incentives to use fertilizers to meet increased food demands. Many constraints are related to the countries' stage of economic development, but the impact could be lessened if governments intensified their efforts and changed their policies. Examples of major constraints to increasing the use of fertilizer in Latin America are presented in chapter 2.

Efforts to increase consumption

Many countries have recognized the need for the small farmer to increase fertilizer consumption and have taken certain steps to achieve this. Among these is the increased emphasis being placed on organized cooperatives.

Cooperatives were originally organized to market specific crops but have recently become more influential in guaranteeing members adequate fertilizer and credit. More than 13,000 agricultural and credit cooperatives throughout Latin America have more than 5.5 million members. However, 40 percent of these cooperatives and 75 percent of their members are concentrated in Argentina, Brazil, and Colombia and most members are export crop producers.

Only 10 to 15 percent of the region's fertilizer distribution is handled through the cooperatives, and this percentage varies greatly among countries. For instance, Peru, with an annual consumption of 132,000 tons, handles approximately 34 to 40 percent through cooperatives, but Mexico, with an annual consumption of 667,000 tons, handles only 5 percent through cooperatives.

Although cooperatives are becoming more influential in providing credit for purchasing fertilizers, small farmers continue to face difficulties similar to those faced by small farmers trying to obtain credit through other institutions. (See ch. 2.) They are considered high risks and must provide collateral to qualify for credit.

Listed below are other steps that have been taken to enable the small farmer to use more fertilizer.

--The Mexican Government increased fertilizer sales by reducing farmers' prices to about one-third of the prevailing world market prices. However, countries that lack Mexico's large production capability may not be able to implement such measures. Mexico has also planned a fertilizer marketing and distribution study which will consider the availability of credit and the need for agricultural extension services.

--The Brazilian Government removed import duties on fertilizers and increased minimum food prices.

--The Guatemalan Government is taking steps to guarantee higher purchase prices for products.

These and similar actions should be considered by other countries.

FERTILIZER PRODUCTION

In the past, Latin America has produced less than half of its fertilizer needs, relying on imports for the rest. However, since the world fertilizer crisis in 1974, the region has concentrated on producing more of its fertilizer requirements. Brazil and Mexico, the largest users, have programs to become self-sufficient, and Venezuela could become a large exporter of nitrogen fertilizer.

Fertilizer production has doubled, from 1 million tons in 1970 to 2 million in 1975, but much of the production capacity is concentrated in three countries. There are about 49 plants in the region, 37 producing nitrogen and 12 producing phosphate. Twenty-eight are located in Brazil, Mexico, and Venezuela, and the remainder in eight other countries. Honduras, Uruguay, Panama, and Costa Rica have no production facilities at all.

Production problems

Many facilities are operating well below designed capacities. The ammonia plants are operating at about 55 percent of capacity, while those in the industrialized countries operate at 80 percent. The phosphatic plants are more efficient, but they still operate at only 64 percent. Interruptions of energy and supply, deficient management and planning operations, small uneconomical units, outdated technology, and lack of spare parts contribute to these low operating levels.

One problem that has greatly affected the Venezeulan fertilizer is the long time it has taken to establish new facilities. For instance, the latest plant took 6 years to become operational, compared to the 2- to 3-year average in the industry worldwide.

Expansion plans

Venezuela, Bolivia, Chile, Brazil, Peru, and Argentina have adequate supplies of natural gas. High-quality phosphate reserves are located in Mexico, Brazil, Colombia, and Venezuela. Costa Rica and El Salvador have low-quality phosphate reserves. According to TVA, there are no major potash deposits in this region.

In November 1974 the President of Brazil signed a decree to invest approximately $1.3 billion to achieve fertilizer self-sufficiency by 1980. Mexico has also announced plans to become self-sufficient and, possibly, become a net exporter of fertilizers. According to TVA, Venezuela will become one of the leading suppliers in the world and the primary supplier of nitrogen in Latin America. In fact, this region is expected to increase its number of plants to about 92 by 1980.

Regional production considerations

In February 1975 the Inter-American Development Bank published a paper discussing the possibilities of regional cooperation. The Bank identified areas having large amounts of raw materials and suggested that a mechanism was needed to serve as a catalyst for developing Latin America's resources to overcome imbalances between production and consumption.

FERTILIZER CONSUMPTION AND PRODUCTION IN AFRICA

Consumption of chemical fertilizer in Africa has increased in recent years, but most fertilizer is used on cash crops. The small farmers, who grow most of the food, use other means to increase production. Many areas have plentiful amounts of unused arable land, with and without assured supplies of water. This fact as well as poor food/fertilizer price ratios and inadequate credit, marketing and distribution systems, and inadequate extension and research programs constrain the increased use of fertilizers.

The major oil producing countries of the Middle East are financing a number of agricultural development projects in North Africa to decrease dependence on food imports, and the United States is proposing a large multilateral assistance program aimed at making the Sahel countries self-sufficient in food in 15 to 25 years. These projects will undoubtedly increase the region's consumption of fertilizer. Consumption in some of the countries with the largest populations or greatest potential for increasing food production will increase much more slowly, however, unless action is taken to remove disincentives.

Africa has been and probably will continue to be a large producer and exporter of phosphates. Certain countries have ample supplies of natural gas, so nitrogen production could be greatly expanded. The potential producers are not large consumers, however, so markets should be developed before plants are constructed. A few countries have potash deposits, but for the most part, the developing countries will have to import their potash fertilizers.

FERTILIZER CONSUMPTION

Since the early 1970s fertilizer consumption in Africa has increased approximately 47 percent. Even so, in 1974 the developing countries consumed only about 2.2 million tons, compared to 9.2 million tons in the developing countries of Asia and 4.1 million tons in the developing countries of Latin America. Two of the countries with the largest populations and agricultural sectors are good examples. According to the U.S. Department of Agriculture, less than 2 pounds of fertilizer are used per cultivated acre in Nigeria. In Ethiopia only 1.8 percent of the 14 million acres cultivated received commercial fertilizers in 1975.

FAO reported that export crops are widely fertilized, whereas traditional food crops are still grown without fertilizers. A January 1975 U.N. report reached the same conclusion.

> "Despite the lack of firm evidence, it appears however that an important part of the expanding use of fertilizer is often used for special export crops, with relatively less being used for local food production."

In a March 1975 project paper, AID cited a similar conclusion for fertilizer consumption in Tanzania: "It is difficult to estimate the amount of fertilizer used on food crops, but such usage has lagged behind cash crops such as coffee, cotton, tobacco, and sugar cane."

The cash crops are generally grown by large plantation farmers, who have better means to acquire and use fertilizers. Food crops, such as cassava, rice, and corn, are grown for domestic consumption by small farmers on plots of 3 acres or less. They tend to grow only enough for their own immediate consumption and to cover purchases of essential consumer goods, taxes, etc. They have been able to do this by rotating crops or fields, cultivating new land, and using organic wastes.

Many countries have vast areas of underused cultivable land, with considerable potential for increasing food production through the use of chemical fertilizers. A 1974 U.N. report on rural development in Africa said that, depending on the types of crops and amount of fertilizer applied, increases in production ranging from 20 to 80 percent had been noted. In optimum situations, such as for some cereal crops in certain very poor tropical soils in West Africa, output has been doubled or tripled.

Below are examples of the increased production obtainable by applying fertilizer.

--In Zaire, corn yields increased from 0.5 to 1.5 metric tons per hectare to 6 to 10 tons with the application of fertilizer.

--In Ghana, FAO demonstrated that the application of fertilizer increased yam yields by 3 tons per acre and was highly profitable.

--The Freedom from Hunger Campaign Fertilizers Programme in West Africa (Ghana, Gambia, Nigeria, Senegal, and Togo) showed that the use of optimum fertilizer ap-

plications increased yields for all crops tested an average of 51 percent.

Consumption constraints

For subsistence-level farmers to use appreciable amounts of fertilizer, they will have to be assured that they will not lose their investment or collateral because of inadequate water supplies, pest damage, or inability to market the surplus produced at a reasonable profit. Examples of major constraints to increasing the use of fertilizer in Africa are presented in chapter 2.

Other problems

Other inhibiting factors include land tenure systems, droughts, low government funding, lack of foreign exchange, and unsettled political conditions.

The present land-tenure system in Ethiopia, Nigeria, Kenya, Ghana, and Tanzania guarantees that any person willing to farm will have some land to cultivate, but there is no security of tenure. Furthermore, the farmer is often required to give a percentage of his crop to the landlord. Under such circumstances, farmers often refuse to invest in fertilizer. In most cases, although agriculture is the mainstay of their economies and the livelihood for over 70 percent of their people, governments allocate less than 20 percent of their expenditures to it. The internal or regional turmoil which has plagued the continent has made it difficult to implement any meaningful long-term government programs to reduce constraints.

In 1974, FAO identified 22 countries that needed to import fertilizer but lacked the necessary foreign exchange.

Efforts to increase consumption

In addition to the subsidy programs and other local projects designed to ease constraints to fertilizer use, large-scale projects are underway or planned which will result in increased fertilizer use.

--Project "Bread Basket," financed by the Arab nations to increase Sudan's agricultural output by 6 percent a year so that, after 10 years, it will produce 40 percent of the Middle East's food needs.

--Agricultural development of the Sahel, a project to be financed by AID and other donors to increase production through dryland farming techniques, small-scale

irrigation projects, and farm storage programs. AID estimates the total cost of this project at about $15 billion to $17 billion and its contribution for fiscal years 1976 and 1977 at about $10 million.

PRODUCTION OF FERTILIZER

Developing African countries produce less than 2 percent of total world fertilizer. Africa has enough natural gas to substantially increase nitrogen production if capital is made available and markets are developed.

Africa holds 72 percent of the world's phosphate rock resources, two-thirds of it in Morocco and the Spanish Sahara. The reserves of the largest producers, the United States and Russia, are sufficient for only about 33 and 22 years, respectively. Thus, the growing dominance of Africa, particularly Morocco, in world phosphate rock production and trade is likely to continue.

Algeria, Libya, and Nigeria have large oil and natural gas reserves. In fact, Algeria has about 10 percent of the world's proven natural gas reserves. Studies are underway to determine the feasibility of constructing nitrogen plants in these countries and in Kenya, Zaire, Tunisia, and Madagascar. These countries are not large consumers of fertilizers, however, and much depends on developing markets and securing the necessary capital and technical expertise to build and operate the plants.

Potash deposits in the region are limited, but studies are being made to determine the feasibility of developing deposits in Jordan. The only deposit now being mined in West Africa is in the Congo.

The instability of the governments and the turmoil plaguing the continent could also hamper the expansion of fertilizer capacity in some countries. The United Nations has been requested to settle a dispute between Algeria, Morocco, and Mauritania over territorial rights to the phosphate-rich Spanish Sahara, which was given independence by Spain in October 1975. In recent years, there has been civil strife or overthrown governments in Angola, Nigeria, and Ethiopia. Several countries in eastern and southern Africa are also experiencing both internal and regional problems which could break out in major fighting at any time.

APPENDIX VI

DEPARTMENT OF STATE

Washington, D.C. 20520

January 26, 1977

Mr. J. K. Fasick
Director
International Division
U.S. General Accounting Office
Washington, D.C. 20548

Dear Mr. Fasick:

I am replying to your letter of December 16, 1976, which forwarded copies of the draft report: "Constraints to Increasing Use of Fertilizer on Food Crops in the Developing Countries."

The enclosed comments were prepared by the Deputy Assistant Secretary for International Resources and Food Policy.

We appreciate having had the opportunity to review and comment on the draft report. If I may be of further assistance, I trust you will let me know.

Sincerely,

Daniel L. Williamson
Deputy Assistant Secretary
for Budget and Finance

Enclosure: As stated

GAO DRAFT REPORT: "CONSTRAINTS TO INCREASING USE OF FERTILIZER IN THE DEVELOPING COUNTRIES

GAO should be congratulated on providing a comprehensive yet clear and concise summation of the factors limiting fertilizer use in developing countries. While of course it has not been possible to generalize about the relative importance of each factor, the study cites a number of useful specific cases and provides a valuable checklist for development planners considering ways in which increased utilization might be encouraged.

However, while fully supporting the study's objectives and appreciating the effort involved in its preparation, the Department of State cannot endorse either of its specific recommendations, i.e. that a new requirement is needed for affirmative action to remove constraints to greater agricultural production as a condition of U.S. assistance (p. 19), and that AID consider terminating its support for the International Fertilizer Development Center (p. 39).

No one would dispute the need for removing constraints to fertilizer utilization and agricultural production. However, it is not evident that placing new restrictions on US assistance is an effective inducement to the removal of such constraints. The will to remove them usually exists; the ability to remove them often does not, particularly since the solution of several major problems simultaneously is usually implied. The results of self-help requirements in current U.S. food aid legislation attest to the limited efficacy of this approach.

Contrary to the impression gained when the study was written, the International Fertilizer Development Center is now on the verge of full acceptance in international circles. We understand that the Consultative Group on International Agricultural Research has recently agreed to assume a formal relationship with the IFDC by appointing members to the Board of Directors of the IFDC.

While both the IFDC and other international agencies engage in technical assistance which on some occasions might be considered duplicative, IFDC's expertise in fertilizer production is not generally available within other bodies. The IFDC can provide from its own staff individuals for short-term consultations while groups such as UNIDO must hire such persons from outside, on contract. The unique service provided by IFDC is evidenced

by the recent invitation (with expenses paid) extended to the director of the IFDC to a meeting of a panel of exports on the international fertilizer industry. The IFDC has played a key role in the work of the Indo-US Joint Commission's Agricultural Inputs Working Group. As a result the IFDC is now collaborating directly with Indian Government and private agencies on research into specific problems of fertilizer usage under tropical conditions and in the organization of a joint seminar. Its value to recipients is shown by the fact that much of its assistance is paid for by its users. Moreover, IFDC is the only international organization which conducts extensive technical research.

The Department of State considers it unwise to discontinue support for the IFDC when it has demonstrated its ability to make unique and important contributions to agricultural development.

Stephen W. Bosworth
Deputy Assistant Secretary for
International Resources and Food Policy

GAO note: Page references in this appendix may not correspond to page numbers in the final report.

APPENDIX VII

DEPARTMENT OF AGRICULTURE
OFFICE OF THE SECRETARY
WASHINGTON, D. C. 20250

March 4, 1977

Mr. J. K. Fasick
Director, International Division
U.S. General Accounting Office
441 G Street, N.W.
Washington, D. C. 20548

Dear Mr. Fasick:

Thank you for the opportunity to provide comments on the GAO draft report, "Constraints to Increasing Use of Fertilizer on Food Crops in the Developing Countries."

At the end of Chapter 2, the report makes a recommendation that new food assistance agreements require of recipient nations that they take affirmative action to remove constraints to greater agricultural production, including constraints to increasing the use of fertilizer. We feel that the self-help measures included in each Title I, Public Law 480, Food for Peace agreement adequately meet both the intent and the spirit of this recommendation. The various USG agencies concerned with PL 480 agreements are already aware of the need for concerted action to stimulate food production. Further, we do not agree with the portion of the recommendation that future food aid agreements require affirmative action to remove constraints. Requirements such as this are easy to impose, but they are impossible to enforce, especially when the main enforcement recourse is the threat of no more food aid. This is a very undesirable alternative. The present self-help process is a deliberate approach to a mutual recognition of the action area to be selected for top priority and financial support.

The remainder of our comments are in a separate statement, and they are offered in the hope that these ideas may strengthen this report to the Congress of the United States.

Sincerely,

Bob Bergland
Secretary

USDA COMMENTS ON THE DRAFT REPORT, "CONSTRAINTS TO INCREASING USE OF FERTILIZER ON FOOD CROPS IN THE DEVELOPING COUNTRIES"

This report constitutes an important contribution to the continuing process of enlightening policy makers in the U.S. Government as to the alternatives for stimulating greater food production. The constraints on the expanded use of fertilizer in the less developed countries are appropriately identified. The first recommendation (to induce and encourage recipient governments to adopt policies to increase the use of fertilizer) is well taken. It might be more fruitful if it were accompanied by the further recommendation that appropriate agencies work with recipient countries in developing specific measures to eliminate constraints and to assist in developing plans for implementing the removal of the constraints. Such an addition seems quite appropriate in light of the amendments to PL 480 in the 1976 Foreign Assistance Act which emphasized the use of funds generated under PL 480 as a tool for development.

The second recommendation (that a requirement of affirmative action to remove constraints be a part of any new agreements for future assistance) presents some problems. First, it seems likely that any country in fairly urgent need will agree to the inclusion of such a requirement in future agreements, regardless of its intent to comply. However, it might be quite costly and difficult, or impossible, to monitor subsequent developments in recipient countries for compliance. If noncompliance were established, there would still be a question of steps to enforce compliance. Second, the inclusion of such a requirement in future agreements might seriously complicate the operations of several programs with different objectives, such as the PL 480 program and its concern for moving farm products abroad, or some activities where assistance is undertaken to facilitate non-developmental objectives. The supplemental recommendation discussed above appears to be a more promising procedure for attainment of the objectives of expanding fertilizer use than including a new condition in assistance agreements.

Alternatives and Prerequisites to Fertilizer Use

In these comments the role of fertilizers in agricultural output is accepted without question. We challenge the inferred generalization that fertilizers are useful in all cultivated production. This observation arises from the fact that many factors can influence the effectiveness and efficiency of production. Brazil, with unlimited

land resources, continues to shift production to virgin lands. Sugar cane production in the Caribbean is moving to narrow spacing of cane, and subsurface drainage in low wetlands is producing greater yields. There are many soils that are inappropriate for fertilizer applications -- soils that are too compact or too porous or too toxic or that have other chemical characteristics that diminish the benefits of added plant nutrients. There are many other techniques that may be more manageable or offer better economic alternatives. Nontheless, the process of increasing productivity can be accomplished in many circumstances by the use of fertilizers. The GAO paper should point out the need for investigation and testing before advocating the use of costly inputs in LDC's.

The 1973 surge in fertilizer prices made the use of this input even more costly. Within the period 1973-75 it was illogical that subsistence farmers in economies with arbitrarily low food prices would pay for an added burden to existing disincentives. In 1976 fertilizer prices dropped to levels where farmers in commercial agriculture found it manageable within its benefits, but its application was given priority in crops moving into industrial or export uses. Without some form of subsidization, it is still unlikely that there will be increased application to food crops that are moving into family subsistence or into the local markets.

The GAO draft report is one of a series relating to the world food deficit. Considering that agricultural productivity is the result of interacting systems, a separate statement on fertilizers is out of place. This message would be balanced within a broader critique on the initiatives that the U.S. Government should be taking in the LDC's with the technology transfer that can accomplish the increase in productivity desired. The issues are several and we need to question the nature of our delivery systems, not only those for increasing production but also question systems concerned with the handling, conservation, and distribution of food crops as well.

Efficiencies in handling, storage and distribution can increase the availability of food at the consumer level by substantial quantities as pointed out in GAO's report on this subject. Also, by removing disincentives to production, as pointed out in the GAO study on that subject, you enable farmers to make decisions and to adjust their plans to produce more food. World wide, people need more instruction on the use of food for its nutritional value.

APPENDIX VII

Within a policy statement on the use of fertilizers, there should be a consideration of the factors relating to the availability of fertilizer, the present capacities for producing them, and the state of our mineral resources. In brief, we should only advocate what is within achievable supply. At present, the world's capacity to produce fertilizer is running very close to total use. Greater consumption will require expansion of production facilities. An international agency like FAO should be encouraged to produce assessments and to advise the LDCs of the fertilizer supply situation. This would enable these countries to develop better national plans through which food production can be expanded. The GAO report appropriately points out the proliferation of agencies concerned with the fertilizer question and the need for coordination of these various programs.

Studies are also needed on the welfare effects of increasing agricultural production in developing countries on U.S. consumers. These effects are important both now and in the long run. Very little is known about them, although recent experience in world markets for oilseeds suggests that substantial intranational and international redistribution of income can result. Conversely, investment and the transfer of technology will also affect the location of production and comparative advantage.

Such assistance could lead into shifts or enhancement in comparative advantage, putting some U.S. producers at a comparative disadvantage vis-a-vis developing country producers. The U.S. Government needs to avoid advocating policies that place national and international goals in competition with one another.

GAO note: The Department of Agriculture's editorial suggestions and technical comments which followed were considered in finalizing the report.

DEPARTMENT OF THE TREASURY
WASHINGTON, D.C. 20220

ASSISTANT SECRETARY

January 27, 1977

Dear Mr. Fasick:

Thank you for the opportunity to comment on your draft report to the Congress entitled "Constraints to Increasing Use of Fertilizer on Food Crops in the Developing Countries".

The report recommends the Secretary of the Treasury, along with others, work to encourage governments in less developed countries to remove constraints on the use of fertilizer and to adopt a positive strategy for increased agricultural production. The report also recommends that the Administrator of AID consider terminating support for the International Fertilizer Development Center (IFDC). My responsibilities in this regard concern the role of the international financial institutions (IFIs).

I am pleased to inform you that we have urged the international development banks to take appropriate steps in their activities aimed at increasing agricultural production, including greater use of fertilizer. Consequently, I fully concur with your recommendation.

An important feature of IFI lending for agriculture is the identification of those factors currently restricting output. Consequently, the focus of attention differs in individual loans from increasing the availability of fertilizer to, improved pricing policies, more effective extension services, better hybrid seeds, etc. Additionally, the banks also assist in improving transportation facilities and agricultural marketing arrangements.

Your draft report mentions only the efforts of the World Bank to encourage the use of fertilizer. You will be interested to know that the Inter-American Development Bank (IDB) has been encouraging and assisting the use of fertilizer through loans to its member countries. For example, the IDB has made 83 agricultural credit loans for $713.2 million, of which approximately $115 million was for credit to purchase fertilizers, a Fertilizer Work Group has studied the demand for, and supply of fertilizers in Latin America, and the IDB and World Bank are jointly considering a fertilizer sector planning model for the Andean Subregion in Latin America.

APPENDIX VIII

Your recommendation that AID withdraw support from the International Fertilizer Development Center (IFDC), has been discussed with the World Bank and the IDB. Both institutions believe the IFDC is doing valuable work in encouraging the use of fertilizers. The IBRD indicates the Consultative Group on Agricultural Research (CGIAR) has endorsed the IFDC. In addition, CGIAR has agreed to nominate several members to the IFDC Board in order to give it international status. The IDB considers the withdrawal of support for IFDC premature because: (a) no international organization has the capability for assuming its functions; (b) borrowing countries and the contemplated Latin American Fertilizer Institute intend to draw on IFDC's consultancy services; (c) IFDC has an international staff with considerable experience in fertilizer production as well as marketing in developing countries; and (d) the relationship between IDB and IFDC has been mutually beneficial. In fact, according to the IDB, IFDC is one of the most successful examples of an international technical advisory team that has emerged from the U.S. Government in the last ten years. On the basis of these views, Treasury believes the GAO should reconsider its proposal to have AID terminate its support for IFDC.

I very much appreciate having the opportunity to review this subject and give you my comments.

Sincerely yours,

John M. Niehuss
Acting Assistant Secretary
for International Affairs

Mr. J.K. Fasick, Director
International Division
General Accounting Office
Washington, D.C. 20548

cc: Mr. Curtis Farrar

DEPARTMENT OF STATE
AGENCY FOR INTERNATIONAL DEVELOPMENT
WASHINGTON, D.C. 20523

Auditor General

March 16, 1977

Mr. J. K. Fasick
Director
International Division
U.S. General Accounting Office
441 G Street, N.W.
Washington, D.C. 20548

Dear Mr. Fasick:

Thank you for providing the GAO draft report "Constraints to Increasing Fertilizer Use on Food Crops in Developing Countries" for AID comment. Due to the complexity of the subject of the report and the need to coordinate the comments of a number of organizations, preparing the comments has taken longer than you requested. We believe, however, you will find the attached comments of use in considering the issues raised by the draft report.

Should you require any further assistance in the matter, please feel free to call on me.

Sincerely yours,

Harry C. Cromer

Attachment: a/s

APPENDIX IX

Constraints to Increasing Fertilizer Use
on Food Crops in Developing Countries

Draft Report--General Accounting Office
December 16, 1976

HIGHLIGHTS OF COMMENTS

1. Food price policies control a key factor in the cost benefit relations which encourage or discourage the use of fertilizer on food crops but both the difficulties facing countries wishing to raise food prices and the potential impact of increased food prices, especially on the poor majority, should be thoroughly explored in the final report.

2. Using fertilizer on market and export crops, when it is cost effective, should be encouraged. It helps farmers earn a better income, provides employment for farm and service workers, and helps to meet critical foreign exchange needs. Increased use of fertilizer for export crops also reduces the cost of supplying fertilizer for food crops at convenient locations. It may raise total fertilizer use to a point where local manufacture becomes practical.

3. Controlling the proliferation of multinational agencies is a desirable goal but one to be sought judiciously. The International Fund for Agricultural Development has mobilized one billion dollars

of new money, half from the OPEC countries, for concessional loans. It is a new and significant effort spearheaded by the World Food Council and its creation should be fully endorsed. The International Fertilizer Development Center, primarily a research laboratory developing new fertilizers, new technology and better systems for production and delivery in developing countries, fills a serious gap in the international development effort which should be underwritten by the United States until additional support can be enlisted. A.I.D. and IFDC will continue to seek other major donors to share the financial responsiblity. The International Fertilizer Scheme, under the management of the Food and Agriculture Organization of the U.N., has fulfilled its function and should be allowed to close out at the end of the currently authorized time.

GAO note: AID's supplementary comments and attachments which followed were considered in finalizing the report.

GAO REPORTS ON FERTILIZER AND RELATED SUBJECTS

"Hungry Nations Need to Reduce Food Losses Caused by Storage, Spillage, and Spoilage," ID-76-65, November 1, 1976.

"U.S. Participation in International Food Organizations: Problems and Issues," ID-76-66, August 6, 1976.

"Providing Economic Incentives to Farmers Increases Food Production in Developing Countries," ID-76-34, May 13, 1976.

"U.S. Assistance to Pakistan Should be Reassessed," ID-76-36, February 6, 1976.

"Disincentives to Agricultural Production in Developing Countries," ID-76-2, November 26, 1975.

"The Fertilizer Situation--Past, Present, and Future," RED-76-14, September 5, 1975.

"Increasing World Food Supplies--Crisis and Challenge," ID-75-4, September 6, 1974.

"U.S. Actions Needed to Cope with Commodity Shortages," ID-74-37, April 29, 1974.

APPENDIX XI

PRINCIPAL OFFICIALS RESPONSIBLE FOR ACTIVITIES DISCUSSED IN THIS REPORT

	Appointed
DEPARTMENT OF STATE	
SECRETARY OF STATE:	
Cyrus R. Vance	Jan. 1977
Philip C. Habib (acting)	Jan. 1977
Henry A. Kissinger	Sept. 1973
ASSISTANT SECRETARY, BUREAU OF INTERNATIONAL ORGANIZATION AFFAIRS:	
Samuel W. Lewis	Dec. 1975
AGENCY FOR INTERNATIONAL DEVELOPMENT	
ADMINISTRATOR:	
John J. Gilligan	Mar. 1977
John E. Murphy (acting)	Jan. 1977
Daniel S. Parker	Oct. 1973
DEPARTMENT OF THE TREASURY	
SECRETARY OF THE TREASURY:	
W. Michael Blumenthal	Jan. 1977
William E. Simon	May 1974
ASSISTANT SECRETARY FOR INTERNATIONAL AFFAIRS:	
Gerald L. Parsky	Feb. 1976
DEPARTMENT OF AGRICULTURE	
SECRETARY OF AGRICULTURE:	
Bob Bergland	Jan. 1977
John A. Knebel	Nov. 1976
Earl L. Butz	Dec. 1971