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THE WORLD FOOD SITUATION --
WHAT IS THE U.S. ROLE?

by

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THE WORLD FOOD SITUATION -- WHAT IS THE U.S. ROLE?

D. G. Sisler

As United States farmers begin the spring planting season, there is great anxiety and uncertainty relative to the world's ability to feed its growing population. It seems that each newspaper, periodical, or evening's television viewing provides yet another round of statistics, narratives, and pictorial evidence of hunger. Our senses have been numbed by this overwhelming coverage of food shortage. On one hand, we wish to help. The feeling is amplified by guilt, morality, or the urge for self-preservation--perhaps a combination of all three. On the other hand, we feel uncertain. Is there a problem? How great is it? Will it go away in a few years? Can we help? Let us look at the evidence and try to unravel some of the more salient facts and issues bearing on the present state of food availability and future outlook.

The Evidence

There can be no question relative to the existence of hunger. Emaciated children and adults too weak from undernourishment to function effectively have been brought into our living rooms via the TV screen and news media. The UN estimates that of the approximately 4 billion people in the world, 430 million have an absolute shortage of calories or severe malnourishment. This is a finite number which may be disputed or open for interpretation, but the more useful question seems to be, are we making progress in eliminating hunger? Is it ubiquitous, or concentrated in geographic pockets of poverty and misery?

During the last decade, total food production in the less developed countries has grown by approximately 35 percent. Rising population in these

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NOTE: Several of the issues and their statistical documentation on the next two pages of this paper are from "The World Food Situation and Prospects to 1985," USDA, Foreign Agricultural Economic Report No. 98.

countries has nearly negated this remarkable accomplishment. The result is that per capita food production is a scant 1 or 2 percent above a decade ago. In contrast, recent food production per capita in industrial nations has been from 12 to 15 percent above 10 years earlier.

Grain is the most important single component of the world's food supply, and changes in grain supply and demand conditions provide an excellent barometer of developments in the world food situation. Grain is the major, sometimes almost exclusive, source of food for many of the world's poorest people supplying 60 to 75 percent of their calories.

Between 1961 and 1974, world grain production increased from 833 million to 1,238 million tons, an average increase of 36 million tons per year. At present, per capita consumption of grain in the world is approximately 700 pounds. To hold this level of food availability requires an additional 25 million tons of grain each year. Over the past two decades, world grain production has increased in all but four years. Two of these declines, 1963 and 1965, were very modest, with shortfalls easily made up from existing stocks. Starting in 1966, it seemed that the combination of new seeds, fertilizer, water control, and other changes which are collectively called the Green Revolution, would provide some much needed breathing time in the race between food and people. Over the five year period 1967-1971, grain production in the developing countries rose a remarkable 6 percent per capita, and it seemed that all systems read "Go". In 1972 the weatherman pulled all the wrong levers. In that year, world grain production fell by 35 million tons, equal to one year's average annual growth. The 89 million ton increase in 1973 was sufficient to compensate for 1972's shortfall, but in 1974, world grain production fell by 42 million tons, probably the largest single year's reduction in history.

Heavy pressure has been placed on world food supplies since 1972, not only because of the decline in grain production, but also because of the growth in grain consumption. Between 1972 and 1974, aggregate consumption exceeded production by 42 million tons. Consumption expanded as a result of the dual forces of rising world population and affluence in Japan and Western Europe. Other industrial nations desired to emulate the food habits of the United States. Americans consume approximately 1,800 pounds of grain annually, nearly 1,700 of which is fed to livestock to be converted into meat, eggs, and dairy products. Livestock and poultry numbers increased markedly in Europe, and grain use rose a striking 200 pounds per person within the European Common Market nations.

The 1972 drop in grain production was accompanied by a sharp rise in world grain trade from 111 million tons in 1971 to 151 million in 1973. United States exports accounted for nearly all the additional grain movement. World grain stocks declined precipitously, from 150 million tons in 1971 to 97 million tons in 1974. Poor grain crops in recent years, coupled with depleted stocks, have caused our confidence in man's ability to feed himself to waver.

The Needs of Developing Nations

Developing nations have made enormous strides in increasing their food output. It is anticipated that the rate of growth in total food production within developing nations cannot be sustained. The Green Revolution has already reached the acres that are easiest to convert and the farmers that are most amenable to change. New acreage will be brought into production and irrigation waters provided on presently used land only at great expense.

There are exogenous forces at work as well. In 1972, developing nations imported petroleum valued at $2 billion. Last year their oil bill ran to $17 billion. This has the dual impact of increasing the cost of fertilizer and fuel used for agricultural purposes plus draining away foreign exchange necessary for the purchase of other agricultural inputs. As illustrative of the extreme importance of fertilizer price and availability, we may engage in some simple arithmetic. Let us assume that each ton of fertilizer applied to an Asian rice paddy or wheat field increases grain production by 15 tons. A one million ton shortfall in fertilizer availability would reduce grain production by an amount which would feed seventy to eighty million Asian people. The crush of rapidly growing population is likely to exist well into the next decade. At present, developing nations import annually from 34 to 40 million tons of grain. It is anticipated that by 1985, their need for imported food may rise to 80 million tons annually. This puts the problem in perspective. How will they pay for this food, and how will the industrial nations weigh the alternatives involved in allocating it amongst competing demands.

Trade-Offs

As we consider whether or not the United States should provide additional food aid to developing nations, several alternatives must be kept in mind. Clearly, there is no quantitative shortage of food in the United States. We produce more than one-fifth of the world's grain production although our population is only about 5 percent of the world total. The importance of our agricultural exports must be kept in prospective. In 1974 we exported two-thirds of our wheat crop, half of our soybean production, and nearly forty percent of our feed grains. One acre in five is used to produce food for exports. Our decisions to move even greater quantities of grain overseas must be examined in the light of at least four trade-offs:

1. Food shipped to needy nations is not available for domestic use. This contributes to inflationary pressures at home by escalating food prices. Food prices have risen very rapidly in recent years, both in absolute terms and relative to non-food items. In 1971, both food and non-food prices were approximately 30 percent above the 1960 level. By 1974, food prices were roughly 80 percent above the base year while in comparison the prices of non-food items were only 60 percent higher. There is no accurate way to estimate what proportion of the increase in food prices should be attributed to exports. However, when we consider that agricultural exports totaled $21.3 billion in 1974, it becomes apparent that a considerable amount of food has been diverted from home consumption. It is true that only about $1.3 billion of this total moved under governmental programs but any incremental increase in food aid would exert upward pressure on domestic prices. Some would argue that with the current rate of inflation standing at 12 percent we cannot afford to move more of our food in order to feed needy people.

2. Food is used as a tool of diplomacy. In recent years, the United States has opened trade with Communist Bloc nations. They have been good cash customers and to the extent that trade in food may serve as a bond between the United States and Communist nations, its use may be productive. A word of caution might be in order. The Communist giants, China and the Soviet Union, can and probably will inject great uncertainty into the world food arena. For example, in 1972, the Soviet Union stormed into the world grain market for nearly 30 million tons of wheat and coarse grains. The huge acreage and uncertain weather of the Soviet Union indicate that a two-bushel decline in yield per acre may precipitate a demand in the world market for 18-20 million tons of grain. Purchases by Communist nations are likely to be erratic, and holding stocks against the contingency that we "should have

grain available if these countries need it" puts the United States in the unenviable position of being a yoyo on the string of weather in China and the USSR.

3. Food exported for cash is a major source of foreign exchange earnings. In recent years, a positive balance of trade in our agricultural sector has offset a negative trade balance in the non-agricultural sector. The value of agricultural exports in 1974 exceeded the cost of agricultural imports by approximately $11.8 billion. These funds were available to pay for the mounting cost of oil, television sets, automobiles, Scotch whiskey and a vast array of other commodities we need and want. A diversion of more food to developing nations which do not have immediate cash to pay for it would mean a reduction in our ability to purchase imported goods.

4. The provision of food aid will most likely be in the form of grain. This creates inequities among different sectors of domestic agriculture. To grain farmers, overseas shipments with resultant price hikes are a bonanza. To the livestock farmer, these higher prices represent a burdensome increase in the cost of feed components.

Only after these alternative uses of food are carefully evaluated can sound policies be reached relative to the kind and quantity of food aid supplied by the United States.

Have We Helped?

Since its inception in 1954, Public Law 480 has been the mechanism whereby food aid was extended to developing nations. In the past two decades, the United States has made available through gifts, concessional prices, and long-term loans, food valued at slightly more than $25 billion. It should be kept in mind that food transfers under the provisions of Public Law 480 were

not made entirely out of humanitarian motives. Public Law 480 was conceived as a mechanism to make available to needy nations grain which the U.S. government held in burdensome quantity. These stocks, acquired as a part of our agricultural price support program, were expensive to store and held a ceiling on the price of several agricultural commodities. Lest we become too cynical, the food aid was provided in considerable quantity. Americans can be justifiably proud of our contributions to the food needs of many developing nations. This country may find the position of being grainary and residual supplier to the world irksome and costly, but we are, and are likely to remain so in the foreseeable future. In recent years, the United States has held approximately two-thirds of the grain which would be available to meet emergencies.

Some Difficult Questions

1. Is food aid good from the standpoint of the recipient nation?

This is a complicated question which may be divided into three more specific parts: Will food aid merely prolong the life of people who in turn have more children, therefore contributing to a greater problem at some date in the future? Should developing countries be dependent on others for their most vital commodity -- food? Finally, does the provision of food aid undermine and weaken the recipient country's quest for increasing its own food production? It seems to me that each of these questions must be met head-on when sorting out the value of food aid.

It has been asserted that no nation has achieved a sustained decline in its birth rate without first achieving a substantial rise in per capita income. Both the technology of birth control and most importantly, the desire and motivation to adopt contraceptive devices are necessary before birth rates go down. Food aid does keep people alive. It also gives them hope and relaxes the fatalism associated with high infant mortality and no possibility of improving one's socio-economic status. If a couple has to rely on children for security in their old age and infant mortality is high, they will have a large number of children to insure security for their declining years. If food aid is provided in the form of weaning foods and foods made available to pregnant and lactating women, infant mortality may decline significantly. If people realize this, they may have a smaller number of children. If food aid keeps the price of rice, wheat, or maize from skyrocketing and absorbing virtually all of the family's income, money may be available to purchase a bicycle, tool, or a minimal education which in turn may lead to higher income and improved aspirations for oneself and one's children. If it is felt that having a smaller number of children may enhance the probability that those children can earn an education and an improved socio-economic position, there is a positive and real incentive to reduce family size. To the extent that wage rates in many developing countries are tied to food costs, food aid may serve to hold food prices down and ameliorate an upward spiral of wage rates. This is extremely important for countries wishing to sell labor-intensive goods in the international market. For most developing nations an improvement in their export earnings is an absolute necessity for increasing their ability to purchase needed inputs for economic development and higher per capita income. This is an awkward and cumbersome answer to a very challenging question -- is food aid counter-productive in

the sense that it merely leads to higher population growth? In my judgment food aid can be a positive force in breaking the linkage of poverty and despair which causes high birth rates and rapid population increases. This is, however, a long range solution. Clearly the immediate impact of food aid will be to keep people alive and hence enlarge the population base in developing nations.

Certainly no nation wishes to be subject to "food imperialism" whereby the fact that food aid has been provided is used as a political or economic lever. It would seem that this is most satisfactorily handled by food being provided through a super-national agency or along the lines of an interest-bearing loan with no strings attached.

There is the ever-present danger that the provision of food aid will dampen the incentive of the receiving nation to increase its domestic food production. I feel that industrial nations and others providing food aid can and should be objective on this matter and provide sustained food aid only if there is assurance that the receiving country is making every effort to increase its own food production. If food aid depresses prices received by farmers, it may serve as a disincentive to the use of fertilizer, irrigation facilities and other agricultural inputs. To counteract this danger it would seem that the recipient nation will have to be able to support agricultural prices at a level which will provide an incentive to farmers capable of increasing production. If sustained economic development is realized, it will be through an emphasis on agricultural production within emerging nations. The world food problem must be solved in their rice paddies and wheat fields rather than through the international transfer of cereal grains and other foodstuffs.

2. Should the people of the United States eat less beef?

It is currently fashionable to suggest that Americans alter their eating habits, and the particular target is beef consumption. Last year, about 116 pounds of beef were consumed per capita in the United States. I estimate that about 70 of these pounds were produced by operations where grass, hay, and roughage are the principal feeds, or from veal calves and cull dairy cattle. Virtually all grain saved by eating less beef would come from feeding less grain on feed lots. In recent years, we have fed approximately 60 million tons of concentrates to beef cattle. If we set as an objective a 15 percent reduction in feed consumed by beef animals, the decrease in grain use would amount to about 9 million tons. This saving in grain might be accomplished by altering grading standards, feeding to lighter weights, or having several meatless meals per week. What is the magnitude of this saving? Nine million tons is approximately 0.7 percent of world grain production. If we fed no grain to beef, the diversion would amount to 4.7 percent. Before seriously considering the alternative of reducing domestic beef consumption, we must weigh several issues. The needy people of the world want rice and wheat. Diverting U.S. acreage now producing soybeans and corn into rice and wheat production would be inefficient from the standpoint of caloric output per acre. What would be the impact on domestic livestock feeders? Reduced domestic livestock production would depress feed grain prices and could serve as a disincentive to aggregate grain production. The idea sounds good but may simply provide cheaper feed grains to Western Europe, Japan, Russia, and China. I doubt if it is practical in either the short or the long run.

Remedies

The world food problem is complex and solutions to it will be neither conceptually simple nor inexpensive. As an introduction to some possible

remedies let me say that I do not think that the United States can, should, or will gear up to feed the world. Only about 8 to 10 percent of world grain production moves in international trade, and it seems unlikely that this percentage will increase. The solution to world hunger lies within the developing nations. I have selected four solutions to the food problem which seem to me to be most feasible and economically viable. They are ranked so that I leave to the last the remedy which I feel will have the greatest chance of making a sustained contribution to the elimination of hunger in emerging nations.

1. A World Food Bank. The often discussed concept of a world food bank, really a world grain bank, seems to me a conceptually sound mechanism by which it would be possible to mitigate the problems of crop failure. I chose the words "conceptually sound" with care, for I do not believe a world food bank is practical from either a political or administrative standpoint. What would be the cost of operating such a food bank? I have estimated that stocks of approximately 30 million metric tons of grain would be necessary to insure that famine related shortfalls would be covered 90 percent of the time. The annual cost of holding reserves to meet most of the developing nations' shortfalls in grain production would amount to approximately $400 million a year. The cost of purchasing this quantity of grain would be slightly over $3.3 billion. To the extent that the grain was provided free or at prices below acquisition costs these charges would have to be added to the cost of holding the stocks. The capital necessary to fund a world grain bank is only feasible if citizens of other industrial nations join with United States taxpayers in purchasing grain. The oil rich nations will also have to make a significant contribution. There would have to be agreement as to an equitable cost-sharing formula. Problems of acquisition, administration, and funding, coupled with such practical difficulties as where the grain should be located

and a priority system for allocating grain amongst competing requests lead me to conclude that this will not be a likely solution to world hunger.

2. Increasing U.S. Non-Agricultural Exports. Last year, non-agricultural imports into the United States cost $9.1 billion more than was earned by exports of non-agricultural products. At the same time, agricultural exports exceeded the value of agricultural imports by $11.8 billion. Thus, agriculture carried the burden of keeping us from overdrawing our international checking account. It seems to me that agriculture cannot continue to shoulder this burden if more food is to be released to assist those in need. Since our desire to import goods is unlikely to change appreciably, our industrial exports must become more competitive in the world market. This can only be achieved through greater productivity, lower wages, or technical advantages over competitors. All of these are extremely difficult to realize. I would not rule out a further devaluation of the U.S. dollar relative to Japanese and Western European currencies.

3. Freer World Trade. Developing nations rely on exports for funds to purchase both food and industrial goods and technology. The rate of growth in their exports of traditional goods such as rubber, fibers, coffee, and sugar has been very modest in recent years. This is, in part, due to synthetics and more efficient use of some items, but it also has been the result of tariffs, quotas, and other barriers to the movement of goods. As an example, virtually every industrial nation in the world has a domestic sugar beet industry which it subsidizes and protects with quotas. I have estimated that the developing nations lose about $900 million annually as a result of the imposition of these tariffs and quotas. The non-traditional exports of developing nations, largely labor intensive light manufactured goods, are growing rapidly. I wonder if this growth rate will persist. We see rising

pressures from unions and other interested parties to exclude the exports of low wage rate nations. In my judgment, one of the most useful efforts which could be made by industrial nations wishing to help low income countries import food and improve their diet and general level of living would be a relaxation of barriers to their imports.

4. Technical Assistance. A program of food aid seems to me to be totally inadequate. Assistance which barely keeps people alive, hungry, and without hope leaves them with no incentive for family planning, thereby fueling rather than quenching population growth. Successful technology transfer is unlikely to be accomplished by attempting to impose U.S. research and extension techniques. Tailor-made technologies for scores of nations and hundreds of regions within these nations must be evolved. In most cases, nationals of the low income countries are best equipped to identify problems, conduct research, and disseminate results. A viable approach may be through international technical centers such as the Institute for Tropical Agriculture and the International Rice Research Institute. Technicians and para-professionals from developing nations can come to these centers for training in problem identification, research, and extension. Hopefully, they will then return to provide a nucleus of personnel to get on with the task of increasing production in their home countries.

Each dollar of aid from the United States to support technical assistance at international centers of agricultural research might well pay greater returns than any other investment this nation could make. Direct returns would be hard to measure, but the impact on a country's ability to develop new crop varieties, agricultural practices, or technology could be massive. Sending food aid only helps to solve this year's problem. Permanent solutions may require the use of human capital and the ability to adapt what we know to local

conditions. This may be the most hopeful remedy we have. Politically, it is the least controversial, if we can keep from imposing too strict a framework on how our dollars are used.

Conclusions

It would be foolish to suggest that there is no crisis in the world food arena. The years of 1972 and 1974 were particularly harsh. Adverse weather, war, and political turmoil combined to lower food production on millions of acres. I do not believe that events of the past three years portend a downward spiral in man's ability to feed himself. More than 2.5 billion people live in the 116 developing nations of Latin America, Africa, and Asia. Not all of these nations are confronting a food crisis, and certainly not all of the people within the Third World are hungry. Politics and logistics will prevent us from reaching many who are in need. Americans have a strong social conscience. They also have a tendency to oversimplify an extremely complex food problem. It is presently being proposed that we could free grain for the use of needy people by consuming less beef. Each year an enormous quantity of grain is exported to pay for a myriad of imported goods. An alternate way of making grain available to the hungry world would be to drive fewer Mercedes, wear no Harris tweed sport coats, or drink less French wine. But habits, tastes, and preferences are slow to alter. It is right that we should be concerned and reach for solutions, but they should be feasible and well thought through. If the weatherman is benign over the next few years, we should see a build-up in food stocks and a lessening of the immediate food problem. The longer range solution will be a combination of industrial nations providing food in times of famine, and increased productivity in the developing nations. The Green Revolution is a start. It can be argued that the technical

breakthroughs in food production have increased the vulnerability of emerging nations by making them dependent upon fertilizer and other agricultural inputs whose prices are rising rapidly. This is true, but without the technical advancements there would be scant hope of pushing ahead food production rapidly enough so that we have breathing time to work effectively on the real culprit -- soaring population. It is human to search for some shred of benefit in any crisis. A decade ago the leaders of many developing nations were wringing their hands in despair as they contemplated the world food and population equation. Perhaps the most positive effect of present concern will be to provide the impetus to move agriculture from the status of step-sister into the foreground of planning and funding for sustained economic development.

APPENDIX

The following seven figures summarize several of the more salient characteristics of the world food problem and progress in increasing the grain production of developing nations.

Figure 1 compares increases in the food production of developed and less developed countries over the last decade. It will be observed that the less developed countries have made remarkable progress in this time period. The food production of less developed countries in the 1972-74 period is approximately 35 percent higher than the base period of 1961-65. Figure 2 places the problem of the less developed countries in clear perspective. Mounting population has eroded their gains in food output. Per capita food production in the developing countries is now only modestly above a decade earlier.

Figure 3 shows how production, stocks, and exports of grain have changed between 1962 and 1974. An interesting feature of this chart is the differential trend in grain stocks and trade. Overall, the stocks have fallen throughout the period with the greatest decline occuring between 1968 and 1974 when stocks declined from 188 million metric tons to 97 million. World grain trade has risen from 97 million metric tons to 137 million during the same six years. Lower stocks and an increased proportion of grain moving in international trade set the stage for considerable uncertainty in supply and prices to importing nations.

Historically, population growth has been the prime mover in increased demand for grain. Figure 4 shows the emergence of a new dimension of world grain requirements. As countries such as the Soviet Union and Germany reach higher levels of per capita income, their demands for grain to be converted into livestock products increase markedly.

Figure 5 presents the pattern of world grain imports. The developed nations have increased their grain imports primarily for livestock feed. It should be noted that between 1968 and 1974 grain imports by less developed countries grew by approximately 25 million metric tons, primarily for direct human consumption. Grain imports by communist bloc nations have been erratic. In 1970, they imported 4 million metric tons while in 1972 their imports amounted to 27 million. In the last two years their imports have dropped to 12 million tons. The mercurial nature of grain imports by communist nations adds a new degree of uncertainty to the world grain market.

Figure 6 capsules the genesis of higher yields of cereal grains in developing nations. IR-8, first of the so-called "miracle" rice varieties, outyields Peta, an indigenous Indonesian variety, at all levels of nitrogen application. IR-8, a short, stiff-strawed variety, has the capacity to convert fertilizer into grain. When fertilizer is added to Peta, the response is positive up to about 40 pounds of nitrogen per acre. After

that, the fertilizer causes the rice plant to grow so tall that it topples over and yield is reduced.

Figure 7 separates improved grain production in developing countries into proportions attributable to yield and area. In developing nations as a whole, grain production rose by 78.4 million metric tons. Increased yield per acre accounted for 58.9 million tons of this increase. In land-scarce Asia, grain production rose by 45.3 million tons. Higher yields accounted for 39.1 million of this increase. In the other developing nations, Africa and Latin America, more land has been tilled and yield has accounted for a smaller proportion of increased grain production.

Figure 1
INDEXES OF FOOD PRODUCTION IN DEVELOPED AND
LESS DEVELOPED COUNTRIES
1964-1974

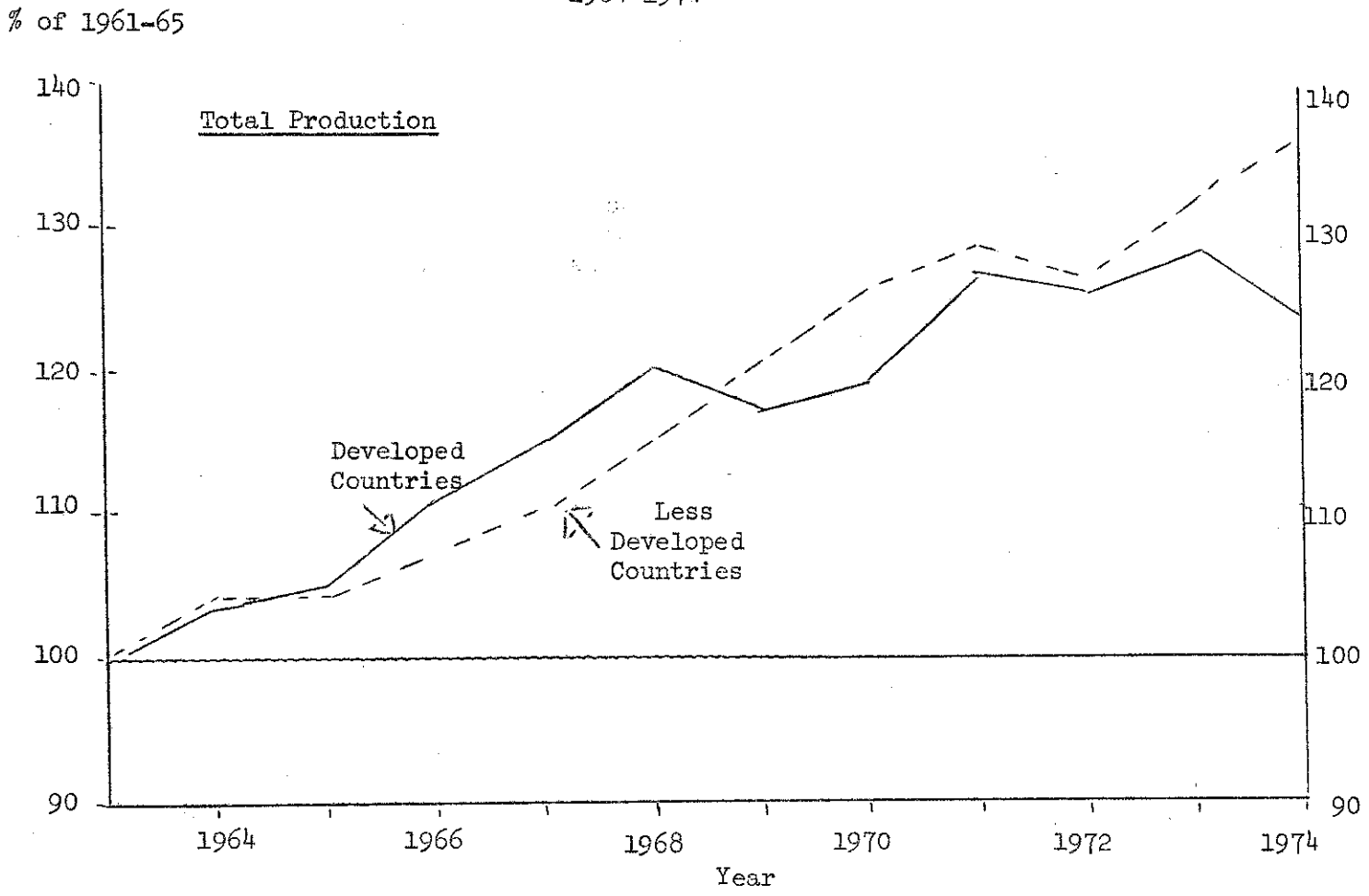

Figure 2
INDEXES OF FOOD PRODUCTION IN DEVELOPED AND
LESS DEVELOPED COUNTRIES
1964-1974

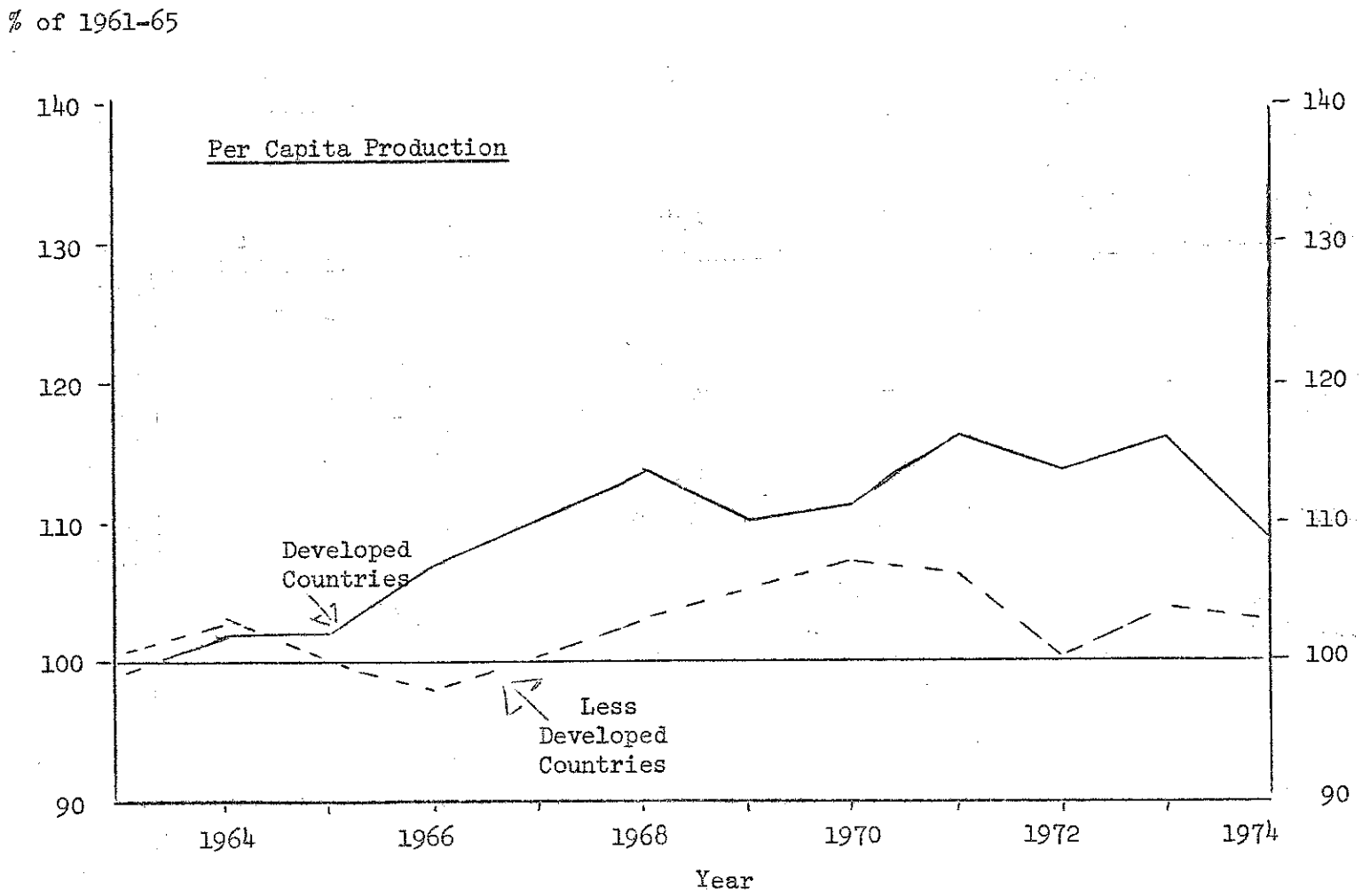

Figure 3. WORLD PRODUCTION, STOCKS, AND TRADE OF GRAIN, SELECTED YEARS
(Million Metric Tons)

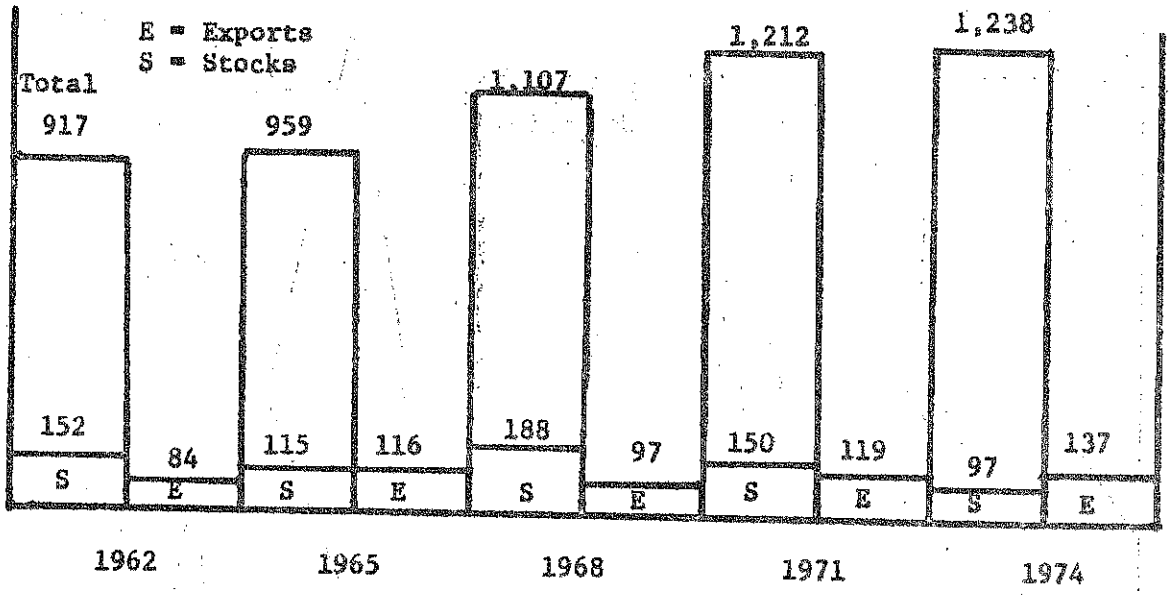

Figure 4. ANNUAL PER CAPITA GRAIN CONSUMPTION, HUMAN AND LIVESTOCK

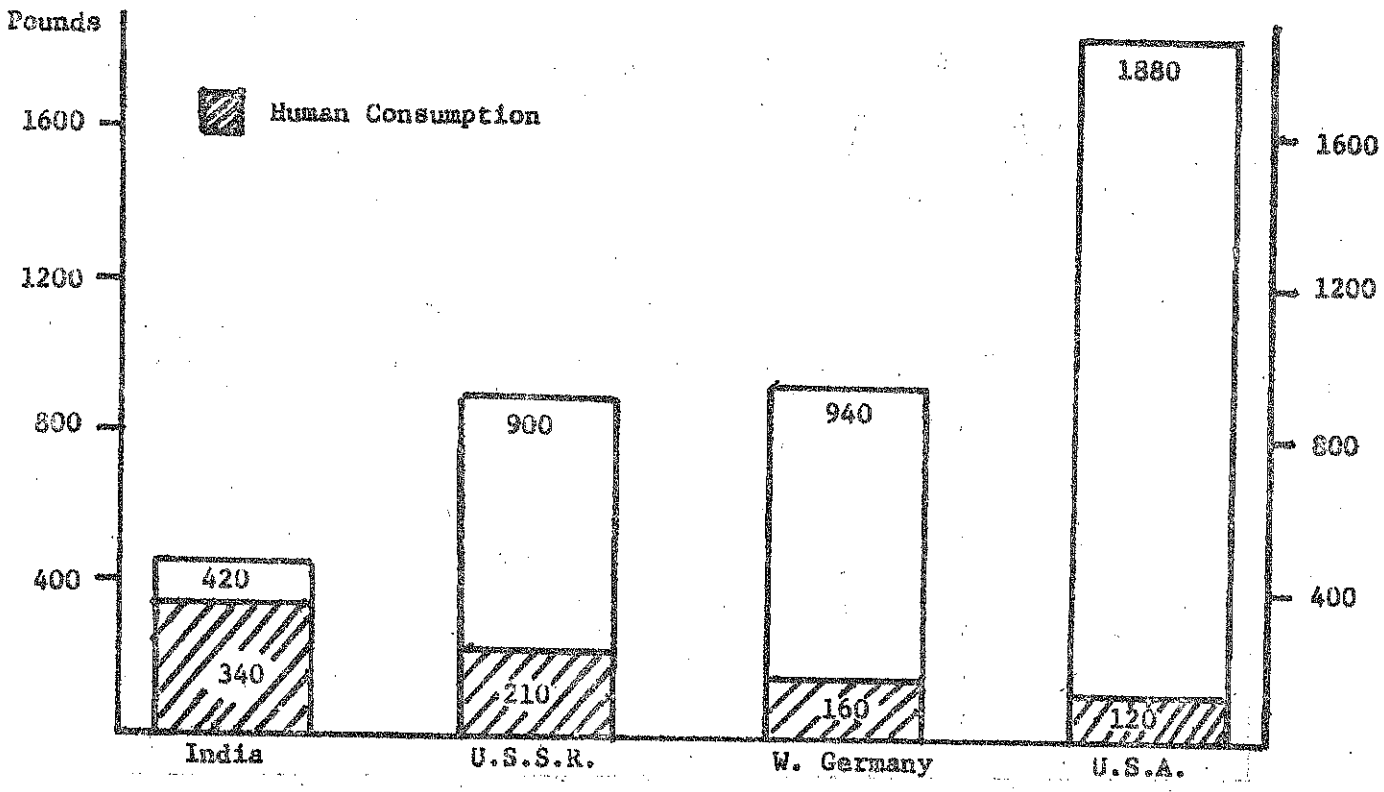

Figure 5

WORLD NET IMPORTS OF GRAIN 1960-1974

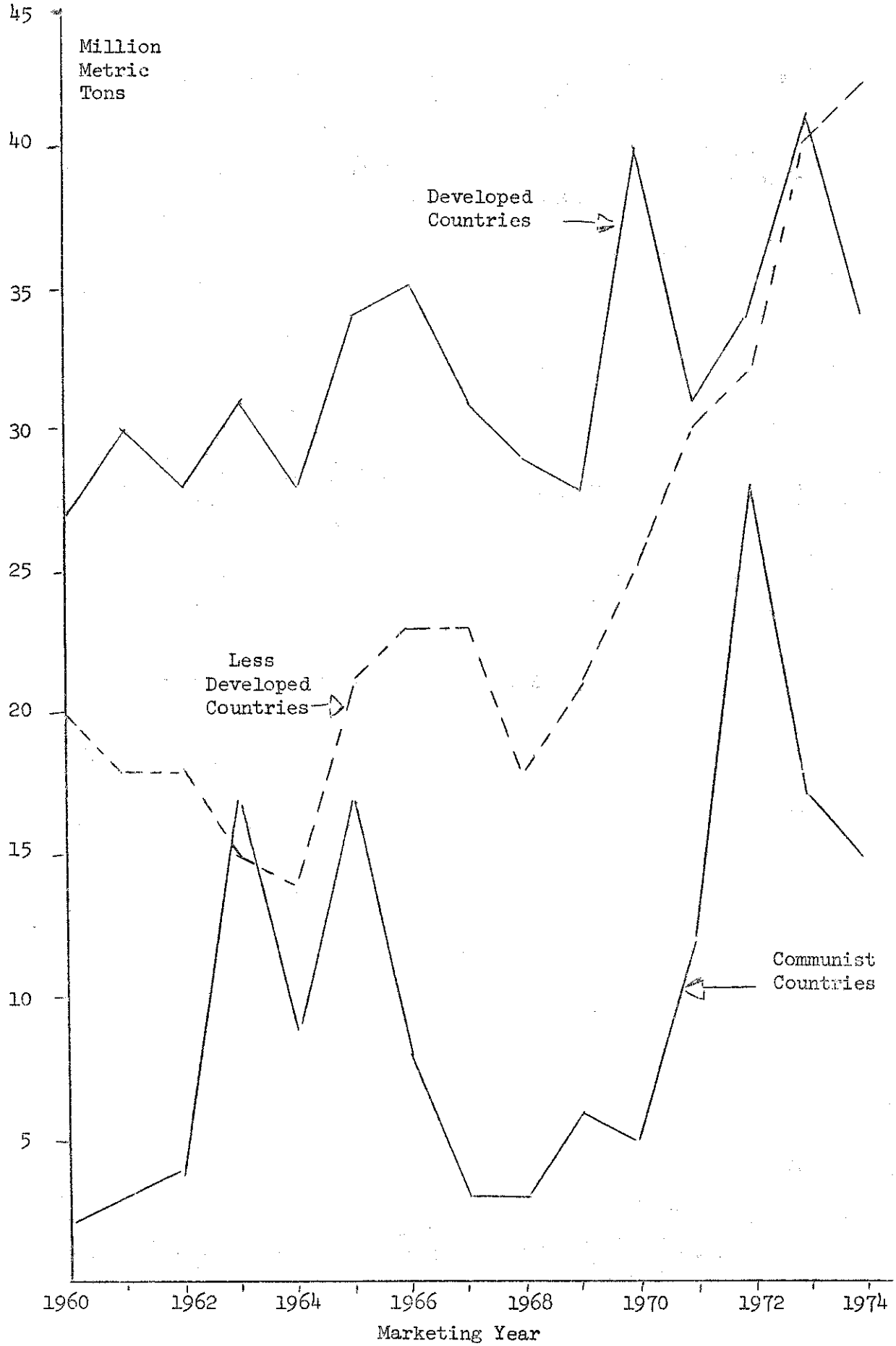

Figure 6

YIELD RESPONSE OF TWO RICE VARIETIES
TO NITROGEN FERTILIZER IN THE PHILIPPINES

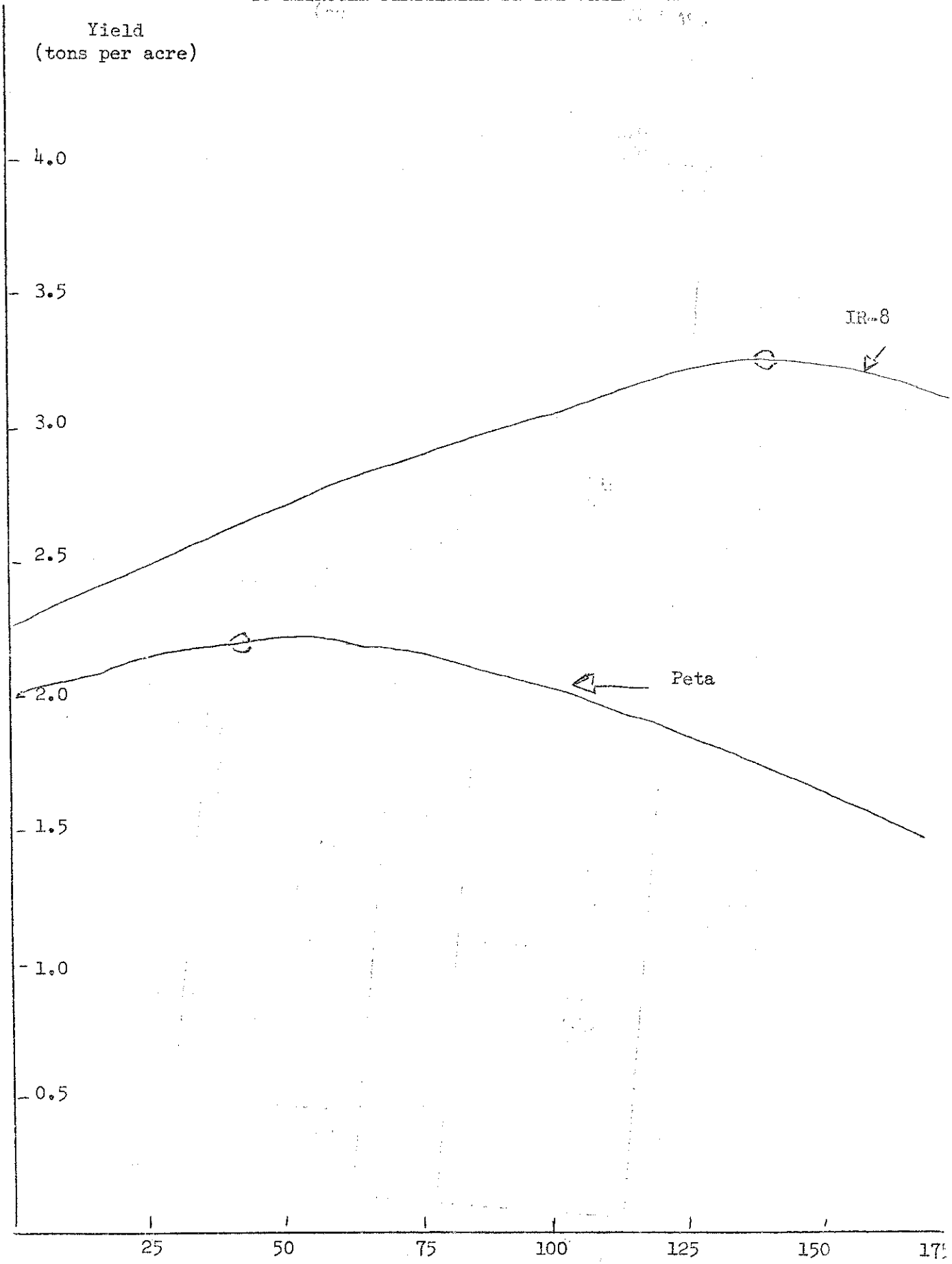

Figure 7
CONTRIBUTION OF YIELD AND AREA TO INCREASES IN GRAIN PRODUCTION OF DEVELOPING COUNTRIES 1965-1975
(million metric tons)