Impacts of Foreign Assistance on Less-developed Countries' Agricultural Productivity

by

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(Abstract)

The purpose of this study was to analyze the effects of foreign assistance on less-developed countries' agricultural productivity. The study employed a Cobb-Douglas production function model. Several alternative model specifications were utilized in an attempt to model the true relationship between agricultural inputs and output. First, the foreign aid variable was included as a distributed lag of past foreign aid receipts and then as a three years moving average of aid expenditures. Second, dummy variables were introduced to allow the effects of aid to differ by income levels, yearly factors, and geographical regions. An intercountry pooled cross-section and time-series data for a set of 59 countries was used in the models from 1975-1984.

The empirical results did not support the hypothesis that the aggregate effect of foreign aid on agricultural production is positive. However, the results of the model including dummy variables which account for the regional differences of aid effects revealed that the contributions of aid differ by geographical regions.

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CHAPTER ONE

Introduction

Research at the United States Department of Agriculture and the World Bank has indicated a direct relationship between the economic growth of less-developed countries (LDCs) and their imports of agricultural commodities from developed countries (Cesal, 1984). It is, however, recognized that limited resources, especially institutional and human capital resources, impose severe limitations on the economic growth of developing countries (Duncan, 1986). Foreign aid to agriculture is viewed as one tool that can potentially alleviate those resource constraints, thereby fostering economic development.

The widespread use of foreign aid as a development tool is a relatively new phenomenon, having arisen primarily since World War II. Since then, a variety of ways to provide economic assistance has evolved, ranging from grants and highly concessional loans to loans at nearly commercial terms. The number of donors have also increased and now includes most industrial countries,

OPEC members, and centrally-planned economies. These donors provide aid through bilateral institutional arrangements and through multilateral agencies consisting of the World Bank, the regional development banks, the OPEC and European Community Development Funds, and some U.N. agencies.

Bilateral and multilateral development assistance agencies have devoted major resources in attempts to facilitate the rapid growth of agricultual production in developing countries (Organization for Economic Cooperation and Development [OECD], 1984). This assistance has included the design and development of agricultural extension services, development of research institutions, and support for investments in land and water development. Theoretically, agricultural assistance is given with the objective of releasing the production constraints, and improving human capital through education and through nutritional gains resulting from food production and consumption. In addition, because a large share of consumer expenditures in less-developed countries is devoted to food purchases, there are likely to be impacts on the global market.

In the first chapter, a background discussion of foreign aid is presented. Second, the research problem,

the objectives and the hypothesis are discussed. Finally, the organization of the study is presented.

1.1. The Background

In less-developed countries (LDCs), concern for economic development often focuses on the agricultural sector. The agricultural share of GDP averages 30 to 40 percent, two or three times greater than industry's share. Also, between 50 and 80 percent of the labor force is engaged in agricultural production. Although production in LDCs is largely subsistence, the agricultural sector is a major source of food supplies, foreign exchange earnings, labor for expanding sectors of the economy, capital formation, and net cash income as a stimulus to industrialization (Mellor and Johnston, 1961). Foreign aid can play an important role in agricultural development of LDCs by providing resources for improving productive capacity. However, the relationship between aid and agricultural development has been debated on a wide range of issues based on different approaches and world views. The following three are the major concerns found in the literature:

1. Foreign aid may create dependent development in LDCs. The recipient nations may become dependent on rich

nations and become less likely to increase their own food production.

2. Foreign aid may strengthen the role of government, distort market signals, and weaken the private sector.

3. Foreign aid may be 'fungible' meaning that aid money may be switched away from developmental purposes.

The first concern is based on a political model of economic development. Political models have made a valuable contribution in understanding development with broad social, political, and structural issues. A range of policy measures can be used to avoid serious negative effects and to develop development strategies which account for the social and political issues of each country. The second concern is that, since most aid goes to governments, it necessarily strengthens the role of government in the economy and weakens the private sector. The assumption that governmental activity is necessarily at the expense of the private sector ignores governments' contributions to infrastructure which is essential for private and public sector economic growth (Krueger, 1986). Furthermore, a large proportion of aid directly supports the private sector. For example, aid to agriculture generally benefits private farmers

(World Bank, 1985). The third concern that aid can be used for other purposes besides development is not something that can be measured with scientific certainty (Mosley, 1987). In general, the larger the share of the development budget financed by aid, the smaller is the scope for this to occur. For example, in countries like Nepal and Bangladesh where much of all the development budget is very much financed by aid, and the nations are too poor to be financed by domestically generated money, there is small possibility for aid to be switched to other purposes.

In addition, there is a wide range of issues on the relationship of food aid and economic development. Bezuneh (1985) has reviewed three major concerns:

1. Food aid may have a significant disincentive impact on agricultural production in recipient countries.

2. Food aid does not reach to poor through the 'standard' market mechanism.

3 Even distribution of food aid to the targeted population may not have any long term development impact.

However, the study of Bezuneh (1985) in Kenya indicated that effects of food for work ensured

participants increased consumption and saving without creating disincentive to either own-farming or to local agricultural production.

Foreign aid has also been criticized on the ground that it encourages capital-intensive and inappropriate technology development. For example, in African countries, tractors have often been used without considering their effects on the poor (Lele, 1975). The mechanization in African countries has allowed the expansion of cultivation, and hence, the area required to be weeded. However, it has increased the labor burden on women since women do most of the weeding (Boserup, 1970). Tractors are successful only if necessary complimentary innovations are introduced to alleviate the labor constraint.

Farm lobbies in the United States actively have criticized aid to the agricultural sectors of developing ocuntries. They argue that assistance by the United States government agencies and land grant universities, if successful, would lead to an expansion of agricultural output by the recipient countries. This increased output is not only displacing imports to LDCs, but in some cases has enabled those countries to increase their exports at the expense of the United States' commodities. In

response to this concern, several studies have examined the relationship between agricultural growth and the imports of developing countries (Lee and Shane, 1985; Kellogg, 1986). The results of these studies indicate that agricultural development in LDCs may not be competitive with, but in fact may be complimentary to, United States exports. As reported by Lee and Shane, Malaysia has developed into a consistent net exporter of agricultural products , but has also increased its demand for the United States' agricultural exports. From 1967 to 1983, Malaysia has increased its imports of food, primarily soybeans, from 1.0 million to 2.4 million metric tons.

Despite the above criticism, foreign aid has been largely viewed as a development tool. The following are the potential benefits of aid to recipient countries that have dominated the economic literature:

1. Foreign aid may supplement domestic savings.
2. Foreign aid may be the source of foreign exchange for LDCs.
3. Aid may contribute to economic growth raising the income and consumption of the poor.
4. Aid may improve recipient countries' welfare through basic services, education, health, nutrition, housing, family planning.

5. Foreign aid may support policy reforms that benefit the poor.
6. Food aid can help feed the needy, either directly through subsidized distribution or indirectly through reduced food prices.

In addition, two major contributions of agricultural aid have been identified by Mellor (1986). First, foreign aid increases recipient countries' production and hence income, which, in turn, may change the consumption pattern of their people. Secondly, it accelerates the growth of employment, which may lead to an increased demand for food.

The first contribution of aid to agriculture may be achieved by improving the resource productivities of recipient countries, including both human resources and physical resources. The second contribution of aid may result from the indirect effects of agricultural growth. Agricultural development may offer a potential for rapid growth in the domestic demand for labor-intensive goods and services. For example, Weaver and Jameson (1981) suggest that additional income for farmers goes largely for the purchase of agricultural goods. These farmers also buy goods from small scale industrial sectors. In turn, industrial workers buy additional food from the rural sector, thereby making the entire process a

generator of employment and income. Agricultural growth also may help keep food prices down, thereby relieving wage pressures which facilitate industrial growth.

1.2. Problem Statement

As discussed above, there is a consensus that agricultural assistance in the form of financial, technical and food aid could lead to increased agricultural production. None of the above studies have provided evidence that agricultural assistance to LDCs has in fact increased total agricultural productivity. The purpose of this study, therefore, is to provide evidence with respect to the relationship between foreign aid and agricultural production in LDCs.

1.3. Objectives and Hypothesis

The major objectives of this thesis are:

1. to analyze the sources of increased agricultural productivity in LDCs, and
2. to assess the impact of foreign aid on agricultural productivity in LDCs.

This study will test the hypothesis that foreign aid to less-developed countries has increased agricultural

production in recipient countries.

1.3. Procedures

An agricultural production function is estimated to provide evidence on the contribution of foreign assistance to agricultural productivity. A production function describes the transformation of a set of inputs into output. In this study, agricultural output is the dependent variable and a series of agricultural inputs and foreign aid are independent variables. Cross-sectional and time-series data from 59 countries for the period 1975-1984 are employed in the analysis. After a literature review on the benefits of foreign aid, the production function is estimated to obtain estimates of the model parameters. Agricultural productivity is regressed on all the inputs and t-tests are used to test the significance of each regression coefficient. The focus of the analysis is on the foreign aid variable to measure its impact on developing countries' agricultural productivity.

1.5. Recent Trends and the Growth of Aid

During the decade of the 1970s, the economic performance of many LDCs had been worsened, especially in

Sub-Saharan Africa (Table 1.1). Between 1980 and 1985, a series of droughts hit several African nations and turned chronic weakness in food production into poverty and a hunger crisis. The cumulative effects of recession reducing world commodity demand and prices and of misguided agricultural policies further decreased food production.

The development record in Asia and Latin America shows that both regions have been relatively successful in terms of economic growth during past quarter of a century. However, poverty has shown no sign of disappearing. Over half of the acutely poor people of the world live in Asia. For several years,Latin America set the pace among all less developed regions in terms of economic growth, but due to a series of factors have experienced reduced growth rates during the 1980's.

Table 1.1. Annual GDP Growth Rate.

Selected LDCs	1960-1970	1970-1979	1979-1982
Ethiopia	4.4	1.9	3.1
Bangladesh	3.7	3.3	6.5
Zaire	3.4	-0.7	1.3
Nepal	2.5	2.7	2.7
Malawai	4.9	6.3	-3.6
Niger	2.9	3.7	2.5
Tanzania	6.0	4.9	1.3
Burundi	4.4	3.0	5.0
Togo	8.8	-0.1	1.2
India	3.4	3.4	-
Madagascar	2.9	0.3	-0.1
Benin	2.6	3.3	3.3
Rwanda	2.7	4.1	8.9
Kenya	5.9	6.5	9.5
Sierraleone	4.3	1.6	3.2
Ghana	2.2	-0.1	-1.7
Sri Lanka	4.6	3.8	6.6
Pakistan	6.7	4.5	6.5
Senegal	2.5	2.9	-
Brazil	5.4	8.7	4.3

Source: Duncan, A. "Aid effectiveness in raising adaptive capacity in the low-income countries." In: Lewis, J. and V. Kallab(eds.). Development Strategies Reconsidered. ODC, Washington D.C. (1986). World Bank, World Bank Report. Oxford University Press, New York. 1981 and 1984.

External assistance has been a major factor of support since the early 1970s for many LDCs facing serious external and internal difficulties. Total Official Development Assistance (ODA) increased to the level of $35 billion in 1985 (World Bank, 1985) which accounts for one third of all capital flows into LDCS. During the mid 1970s, large investments were made in human capital, physical infrastructure, and direct production to provide resources and skills for sustained growth.

Since the 1970s, real net disbursement of ODA has increased in almost all countries. The average annual rate of increase in aid from all sources during 1975-1985 was 1.7 in real terms. Table 1.2 illustrates the total net receipt of ODA by developing countries from all sources on a regional and income basis for 1960/61, 1970/1971 and 1982/1983. The main changes in allocation of ODA in recent years are: (1) a sharp increase in the volume of assistance to the least developed countries, (2) a major increase in the share of total ODA devoted to Sub-Saharan African countries, and a fall in the proportion of aid allocation to other low-income countries, especially India, Pakistan, and China. Aid to upper-middle income countries is declining in relative and absolute term. However, upper-middle income countries still receive a quarter of all aid, much of it for political reasons.

Table 1.2. Total Net Disbursements of ODA to Developing Countries from all Sources (a) by region and income groups

Annual average

	Percentage of total ODA			Percentage of population
	1960/61	1970/71	1982/83	
ASIA.....	44.8	47.1	27.8	69.6
Low-income countries (b)	33.7	23.9	23.8	
Lower-middle income countries	1.8	2.0	3.0	
Upper-middle income countries	9.3	5.8	0.8	
SUB-SHARAN AFRICA.....	9.0	18.7	30.2	11.1
Low-income countries	7.8	13.0	25.2	
Lower-middle income countries	1.0	3.7	3.0	
Upper-middle income countries	0.3	2.1	2.0	
NORTH AFRICA AND MIDDLE EAST....	26.7	11.2	23.9	5.6
Low-income countries	4.1	2.7	7.4	
Lower-middle income countries.	4.0	3.4	3.1	
Upper-middle income countries.	18.7	5.1	13.4	
AMERICA.....	9.9	16.1	11.1	10.9
Low-income countries	1.1	1.1	2.0	
Lower-middle income countries	0.5	2.2	4.2	
Upper-middle income countries	8.3	12.6	5.8	
EUROPE.....	9.3	2.8	2.4	2.6
OCEANIA.....	..	2.2	1.2	0.1
TOTAL.....	100	100	100	100
1. Least-developed countries	6.5	10.2	24.9	8.6
2. Low-income countries	46.5	56.2	56.1	74.2
3. Lower-middle income countries	11.8	17.4	17.5	
4. Upper-middle income countries	41.5	26.2	23.7	

Source: DAC 1985 Report.

a) Net ODA From Bilateral DAC and OPEC Sources; net concessional sources from multilateral programmes (excludes non-concessional lendings).

b) Least-developed countries with and average GNP per capita in 1983 less than $700.

1.6. Organization of the Study

A literature review of the inpact of foreign aid and the theoretical model are presented in Chapter 2. This is followed by a discussion of the model, variable specifications, and data in Chapter 3. The results of model estimation are presented and discussed in Chapter 4. This is followed by the summary, conclusions and implications in Chapter 5.

CHAPTER TWO

Literature Review and The Theoretical Model

This chapter is divided into two sections. The first is the review of literature. The first part of the literature review discusses the definition of foreign aid to be used in this thesis for subsequent analysis of the impacts of aid on agricultural development. The second part discusses how foreign aid is perceived to influence development. The third part of the literature review presents the previous studies on aid effectiveness. The second section of the chapter describes the theoretical model on which this thesis is based.

2.1. Foreign aid: Definitions

Because there are many dimensions to foreign aid, for the purpose of this thesis, it is important to define the concept in an objective and measurable way. Foreign aid attempts to mobilize human and financial resources from developed countries to LDCs in order to close the gap between the rich and poor (World Bank, 1985). Foreign aid includes official grants and concessional loans, in currency and kind, which are broadly aimed at transferring

resources from developed countries to the developing countries on developmental and/or income distributional grounds (Pincus, 1963, Rosenstein-Rodan, 1961, Bhagwati, 1970, Krueger,1986, Mosley, 1987).

Foreign aid is commonly divided into military and economic components. The Development Assistance Committee (DAC) of the Organization for Economic Cooperation and Development (OECD) excludes grants, loans, and credits for military purposes in its concept of aid. In reality, however, the distinction between economic and military aid may not be easily drawn. A donor's decision to classify aid as economic or military aid is often determined politically and bears little relationship to the aid's real impact. The United States, for example, channels well over half of its economic aid, excluding food aid, through the Economic Support Fund (ESF), which is formally subordinated to the pursuit of the United States' strategic objectives (USAID, 1983).

This study uses 'aid' in the strict sense referred to as Official Development Assistance (ODA). For the DAC, aid qualifies as ODA if it meets three criteria. First, it has to be undertaken by official agencies. Second, it has to have the promotion of economic development and welfare as its main objective. Third, it has to have a

grant element of at least 25 percent. The grant element measures the degree of concessionality of the aid transfer compared with market terms, which are normally taken to include an interest rate of 10 percent. Thus, an outright grant of aid has a 100 percent grant element and a loan at 10 percent interest has a zero percent grant element.

Classification of aid must take into account the financial terms under which it is made available and must look at the other conditions attached to the transactions. Official development assistance is provided as loans with terms more generous than either loans obtainable in the commercial market, grants, or loans that must be spent in the donors' home market. The latter is termed 'tied' aid (Bhagwati, 1970). It can also be provided in the form of food aid. Besides financial assistance, technical assistance for individuals receiving training or education at home or abroad, and the development of research institutions are also considered to be important components of development assistance (Krueger, 1986). This definition of aid excludes some concessional flows, namely those of the private voluntary agencies.

Agricultural aid is a subset of ODA. Agricultural aid includes financial, technical, and food aid to the

agricultural sector. Financial and technical aid to agriculture can include such diverse components as agricultural research, irrigation projects, rural roads, agricultural education, and agricultural policy assistance. Unfortunately, ODA is not broken down by sector in the data. Consequently, it is extremely difficult to separate agricultural from non-agricultural aid.

2.2. Aid and Development

The nature of foreign aid has been strongly influenced by the way donors and recipients perceive development. The success of the Marshall Plan in the 1940s and 1950s led many people to believe that similar transfers of capital to developing countries would, despite their physical, human, and institutional limitations, achieve similar results. The early model of development, therefore, was primarily based on the leading sector theory of Rostow (1960). The central concept involved in Rostow's theory was the 'take off' stage. According to Rostow, an increase in capital formation during the period of development would lead a country to 'take off' from a backward agricultural sector to an advanced industrial sector. This strategy implied a need for investment not only in machinery and equipment but

also in physical infrastructure, such as roads. The World Bank, for example, spent almost 50 percent of its lending in the first fifteen years for energy projects and railroads; less than 10 percent went to agriculture; and none went to the social sector (World Bank, 1985).

According to the OECD report on aid to agricultural development, agricultural development during the 1960s placed a heavy emphasis on the direct transfer of agricultural technology from industrial countries to less-developed countries (OECD, 1968). These efforts were based on what Hayami and Ruttan (1985) calls the Diffusion Model of agricultural development. The Diffusion Model assumed that the Third World farmers could substantially increase their agricultural productivity by allocating existing resources more efficiently and by adapting agricultural practices and technologies from industrial countries.

The relative neglect of agriculture in the 1950s and 1960s was reinforced by the works of Prebish (1959) and Hirschman (1958). They advocated that priorities should be given to import substitution of manufactured goods rather than to production of agricultural exports. The main justification for such a policy was the scarcity of foreign exchange for these countries, and that import

substitution was believed to lessen this constraint. Hence, in the 1950s and 1960s, overall growth was the objective, and industrialization was regarded as its key tool of development. As reported by the World Bank (1985), many developing countries employed import substitution using tariffs and quantitative control of imports. Brazil is cited as an example wherein the late 1960s, over 90 percent of consumer goods were produced domestically.

Studies have pointed out that the result of import substitution has instead been to require more foreign exchange rather than less (Weaver and Jameson, 1981). The reasoning behind this argument is that capital equipment, intermediate products, or in some cases raw materials, had to be imported to allow production at home. It turns out that the foreign exchange component in the goods consumed by the rich is much greater than the goods consumed by the poor.

The failure to expand agricultural output and export earnings in many developing countries, particularly in India in the late 1950s, led policymakers to reevaluate the models of agricultural development (Eicher and Staaz,1984). A more outward-looking market-oriented approach to development increasingly became standard. It

also became increasingly recognized that human capital is a critical factor in the promotion of development (Schultz, 1964). Schultz later attributed the low level of investment in agricultural research and rural education in most less-developed countries to national policies and the underutilization of agriculture (Schultz, 1978).

In the early 1970s, several authorities began to question the appropriateness of the conventional emphasis on overall development. Major criticisms were made from the perspective of dependency theory (Frank, 1966). Dependency theorists argued that underdevelopment is not a stage in the development of a nation, but rather is the consequence of the integration of Third World countries into the world capitalist system. Modernization and dependency are two different perspectives each claiming to provide conceptual and analytical tools capable of explaining relative underdevelopment. Both perspectives are concerned with the process of development in natonal societies. However, the modernization theory assumes that the national society is the basic unit of analysis, whereas the dependency theory considers the global system and its various forms of interaction with national societies as the primary objective of inquiry.

The dependency perspective for agricultural

development, particularly in the Latin American context, has been elaborated by de Janvry (1975). In his view, the rural poverty in Latin America is largely explained by a three level chain of exploitative relations: 1) at the international level, between the dominant, developed countries and the dependent, less developed countries; 2) at the sectoral level, between capital-intensive industry, which produces commodities for the upper classes in the world market, versus the labor-intensive industrial and agricultural sector, which produces mass consumption items with cheap labor; and 3) at the social level, between landlords and agricultural laborers. Thus the marginal existence of farmers is a consequence of the peculiar pattern of dependent industrial development. Wages and income remain low in rural areas because capital-intensive industrial development creates little demand for labor, and labor-intensive industrial development can expand only as long the wage rate remains low. The implication of the dependency theory calls for technical change resulting in the generation of new income streams in rural areas and incorporating marginal classes as more active participants in the national and political systems. Accordingly, aid agencies have recently benefitted by focusing concerns on the poorest and the weakest groups in LDCs.

It was also recognized by aid supporters that major beneficiaries of development efforts had been the middle and upper-income groups; growth had not 'trickled downed' to the poor (McNamara, 1973). These observations were important elements in the development of a basic needs approach. The basic needs approach is a strategy of redistribution with growth. These needs are defined by the World Bank as health, education, food, water supply, and sanitation. The basic needs perspective has shifted the aid allocation toward the poorest countries and in sectoral priorities, particularly towards agriculture (Wood, 1986).

Since the 1970s, there has been a rapid expansion of micro-level theoretical and empirical research on the role of agriculture on development (Mellor, 1973; Johnston and Kilby, 1975). Several attempts have been made to model the processes of agricultural growth. Hayami and Ruttan's induced innovation model has been a major contribution. Hayami and Ruttan argued that there are multiple technological patterns to agricultual growth, each embodying a different mix of factors of production, and that changes in relative factor prices can guide researchers to select the most efficient path. This implied that countries with different factor endowments would have different efficieny growth paths. Thereby, the

importation of technologies from industrial countries could lead to highly inefficient patterns of growth. For example, the constraint imposed on agricultural development for a country with an inelastic supply of land, such as Japan, would be offset by the development of high-yielding varieties designed to facilitate the substitution of fertilizer for land. The constraint obtained by the inelastic supply of labor, would be offset by technical advances leading to the substitution of mechanical power. It has also been argued that relative factor prices not only affect technological development, but may also play an important role in developing social institutions. For example, an increasing population combined with scarce land resources would induce changes in property rights. Figure 2.3 illustrates a conceptual framework of the agricultural development model based on the theory of induced innovation. The model outlined in Fig. 4.3 helps to identify the components that enter into economic and social changes. Hayami and Ruttan tested this model with agricultural production function analysis, utilizing data from a cross section of countries. This thesis adds to the Hayami and Ruttan model by including foreign aid as a separate factor of production.

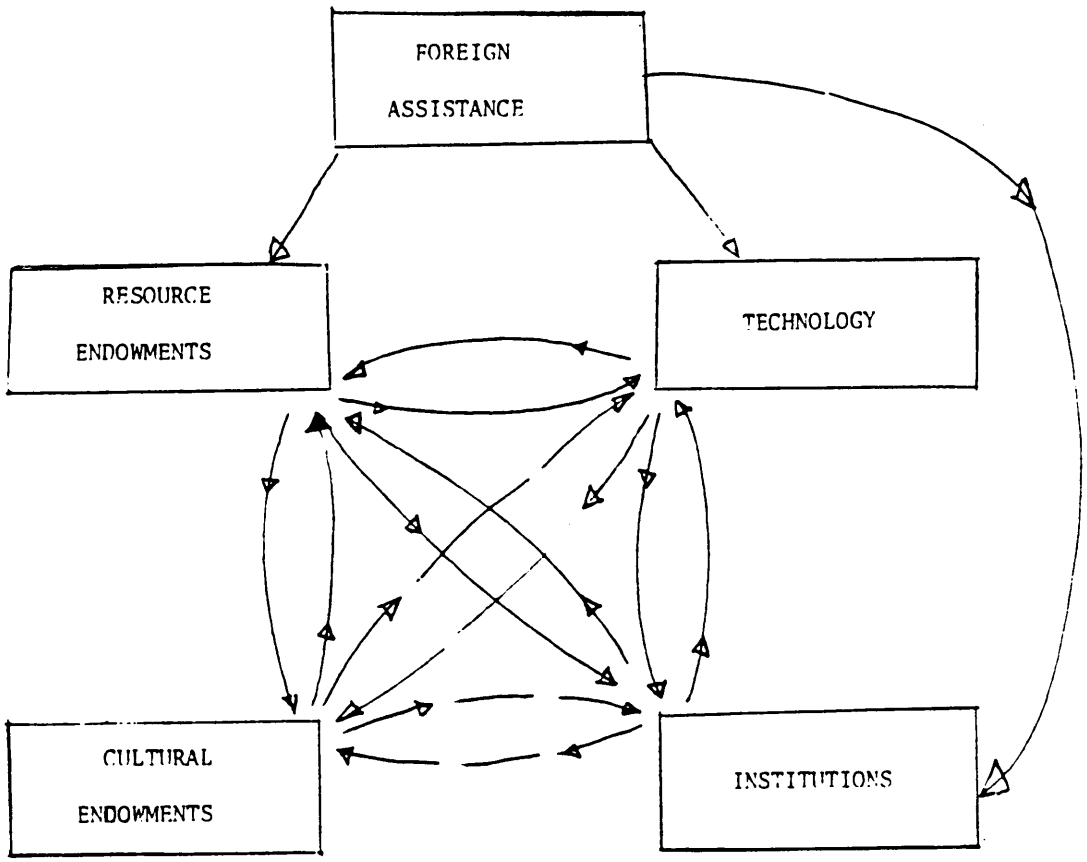

Figure 4.3. The relationships between resource endowments, technology, institutions, cultural endowments, and foreign assistance.

Source: Agricultural Development: An International Perspective. The John Hopkins University Press, London. (1985)

2.3. Previous Studies on the Effectiveness of Aid

The most comprehensive study on the effectiveness of aid is that of Chenery and Strout (1966), "Foreign Assistance and Economic Development." As in virtually all models which include external assistance, the objective of foreign aid as set forth by Chenery and Strout is to help a country achieve self-sustaining growth. The transition process is based on Rostow (1960) in the sense that the preconditions must be established before 'take off'. However, Chenery and Strout regard foreign assistance as being able not only to accelerate the rate of investment during 'take off' but also to facilitate the creation of the basic requisites for the transition to self-sustained growth. The limiting factors to growth are designated as skills, savings, and trade limitations.

Mckinnon (1964) analyzes the nature of the savings limit, the trade limit, and the skilled labor limit, but gives primary emphasis to the trade limitation. He points out that where the foreign exchange constraint is dominant, foreign aid will have a proportionately greater effect on the growth rate than if savings is the constraint.

The effect of foreign aid on the economic growth of LDCs has been widely debated and is considered an important element of modern development theory. Most of the earlier empirical studies which examined the economic contribution of aid focused on macroeconomic effects. Various authors, including Griffin (1970), Papanek (1972, 1973) and Mosley (1980, 1987) have attempted to ascertain the effectiveness of aid from the estimate of the single equation:

$$Y = a_1 + a_2(A) + a_3(S) + a_4(I).$$

Where,

Y = National Income
A = Aid flows
S = Domestic savings
I = Private capital flows

a_1, a_2, a_3, and a_4 are parameters to be estimated

Each of these variables are measured as a proportion of national income in the recipient countries over a period of time. This model is based primarily on the Harrod- Domar type of model in which investment is divided into three components; aid, domestic savings and inflow of private capital flows. Mosley (1987) further expanded the model by including literacy rate and export value as additional independent variables in order to capture changes in human skills and export prices. These studies

specify foreign aid as grants, measured by DAC of OECD. By and large, the results of these studies have been mixed. The ordinary least square estimates have shown no demonstrable effect on economic growth. Generally, the results have indicated that the impact of aid depends on the pre-saving rate of the country and the propensity of its government to spend on consumer goods. In these studies, considerable variability exists in the estimated foreign aid coefficients. This variability may be due to differences in model specification, difference in data used, differences in estimation procedures, or differences in time periods selected for each study. Most of these studies are based on the critical role of capital formation in growth process. The underlying rationale of aid had been that capital formation is an essential factor in growth and, traditionally much economic theory has provided support for this view.

An inability to reach definitive results using macro-economic assessment of the role of aid led to an alternative approach of assessing aid effectiveness at the micro-economic level by determining the contributions of sectors or projects to development. For instance, in 1967, in response to food problems in less-developed countries, DAC of OECD conducted an intensive analysis of agricultural aid programes of bilateral and multilateral

agencies. However, this was the first time that an analysis of agricultural assistance efforts had been attempted on a global basis, and the necessary quantitative and qualitative information was not readily available (OECD, 1968).

The critical role of aid in agriculture has been examined along two dimensions: 1) the direct effects of food assistance, and 2) the impacts of external technical and financial support for agricultural production. A major analytical issue in the aid literature has centered around the role of food aid. Schultz (1960), in a classic paper, raised a question relating to the impact of food aid programs. The role of food aid was criticized by Schultz on the grounds that food aid depresses prices of food crops in less-developed countries. However, studies have found insignificant price disincentive effects. Maxwell and Singer (1970) reviewed 21 studies of food aid imports and concluded that only 6 studies out of the 21 reported disincentive effects. They discussed policy tools in order to overcome the problem of disincentive effects. Deaton (1980) examined the impact of food aid in LDCs and indicated its potential contribution to creating employment, increasing domestic savings, and improving the spatial distribution of people and jobs.

The supply of external support for agricultural production is also a key element in an agricultural development strategy. The major external supports include improved agricultural research and extension, land reform, credit systems and activities indirectly supporting the agricultural sector.

Aid agencies are increasingly supportive of the need for developing research and for building up the indigenous base for science and technologies (OECD, 1984). Several studies have estimated the returns to agricultural research either at the aggregate or commodity levels (Grilliches, 1964; Evenson, 1967; Peterson, 1967; and Norton, 1981). These studies generally have estimated Cobb-Douglas production functions to study allocative efficiency, spillover effects of research across geophysical boundaries over time, and marginal returns to research on several commodities. Ruttan (1982) mentions a large number of studies of the contribution of research to productivity growth. Almost all of these studies indicated high rates of return to investment on research.

There are a number of studies that examine foreign aid investments on education and extension and their contributions to agricultural productivity in low-income

countries. The studies of Wu, (1977) in Taiwan, Moock (1981) in Kenya, and Pudasaini (1983) in Nepal indicate positive effects of education on agricultural productivity. These studies assume that farmers' education affects agricultural production in several ways: it improves farmers' skills, thereby enabling them to achieve higher output for given inputs; it enhances farmer's ability to obtain, understand, and utilize new inputs and practices; and it improves farmers' overall managerial ability. Education as a factor of production is assumed to be most effective during the period in which a nation's agricultural research system is introducing new technologies into the system. As Mellor (1986) explains, foreign aid has a tremendously important role to play in accelerating the growth of education, particularly higher education, which is so essential to an agriculture and employment-based growth strategy. Vast numbers of trained people are critical to developing countries and running agricultural research systems, extension systems, and input supply systems.

A recent study of Ruttan (1986) reviews in detail the effectiveness of foreign aid activities in land and water development, agricultural research, extension, land reform, and development of credit systems. The review indicates that the performance of projects by sub-sector

and geographical areas has been variable. Irrigation projects, credit, and agricultural research have achieved a high average rate of return with low failure rates. The study also noted a "cycling" of program priorities and thrusts. Extension programs, for example, appeared in the 1950s, were deemphasized in the 1960s and were stressed again in 1970s. Supports for research was also found to be a priority for many donors. The study emphasized that both technical change capable of generating new income streams at low cost and adequate attention to institutional designs are essential if agricultural investments and surrounding infrastructure are all to support each other.

2.4. The Theoretical Model

There are a few studies which have examined aid from all sources to a particular country. There is virtually no quantitative estimates on the overall marginal rate of return on development assistance. One exception is a recent study of Peterson (1987) who examined the effect of aid on aggregate production in a large cross-section of countries. However, he did not focus on the effects of aid on agriculture. The present study attempts to go further by surveying a large sample of aid recipient

countries and analyzing foreign aid's contribution to agricultural output using production function analysis.

2.4.1. Production Function

The production function approach is the technique used in this study to assess the effects of aid on agriculture. This approach has been used by several authors to estimate inter-country agricultural production functions (Hayami, 1969; Hayami and Ruttan, 1971, 1985; Yamada and Ruttan, 1980, and Mundlak and Hellinghausen, 1982). Historically, agricultural production has been increased by expanding the limits of existing resources, including labor and land. Today, modern technologies have been introduced to expand productivity levels of existing resources. Agriculture is affected by conventional inputs such as land, labor, and capital as well as non-conventional inputs including research, extension, education, and foreign aid. It has been theoretically and empirically shown that the productivity differences in agriculture are increasingly a function of investments in science, industrial capacity, education of rural people as well as natural resource endowments (Hayami & Ruttan, 1985). Foreign aid may play an important role in accelerating the growth of research and education, financing imports of capital intensive goods when exports

are lagging, and providing infrastructure at an early stage of development through food aid. The effects of non-conventional inputs on agricultural production can be estimated by fitting a production function with these inputs included as separate variables. Results from the production function will be used to derive a marginal rate of return to foreign aid, one of the primary objectives of this study. Using the estimated coefficients, the impact of foreign aid on agriculture can be considered.

2.4.2. Production Function Theory

The production function describes the transformation of a set of inputs into output. More specificially, and for each combination of inputs and output, it represents the minimum quantity of inputs that yields a given quantity of output (Fergusen, 1969). For a group of homogeneous firms, the production function can be written as:

$$Y = F(X_1, X_2, \ldots\ldots, X_n),$$

Where, 'Y' is the observed output of a firm having different inputs ($X_1, \ldots\ldots, X_n$).

2.4.3. Cobb-Douglas Production Function

A specific algebraic form is chosen to describe the production function which characterizes agricultural production. The ideal functional form is determined by economic, biological, and physical behavior underlying the production process. Data availability and statistical managability are also important factors in determining a suitable functional form. Certain functional forms may explain physical phenomena and the production processes very well, but are difficult to estimate. Some functional forms may not represent well the real physical phenomena being modelled but they are easily estimated and specified. This study uses the Cobb-Douglas (C-D) production function because of its consistency with economic theory and computational simplicity as discussed below. The Cobb-Douglas production function has the general form:

$$Y = A X_1^a X_2^b \qquad (1)$$

Where 'Y' is output, X_1 and X_2 are variable inputs, 'A' is a constant term, and 'a' and 'b' are the parameters to be estimated with respect to variable inputs X_1 and X_2. The exponents of the coefficients are production elasticites for the individual variables. The sum of the coefficients indicates the returns to the

size or scale.

2.4.4. Properties and Economic Interpretations of the Cobb-Douglas Production Function

The computationally attractive property of Cobb-Douglas production function is that it becomes linear in the logs of the variables. For example, we can rewrite equation (1) as:

$$\text{Log } Y = \text{Log } A + a \text{ Log } X_1 + b \text{ Log } X_2 . \qquad (2)$$

Another property of any production function is the extent of economies of scale. In the C-D production function, an increase of 1 percent in all inputs increased output by the percentage indicated by the sum of inputs' coefficients. If, for example:

the sum of coefficients are < 1, then there are decreasing returns to scale,

the sum of coefficients are > 1, then there are increasing returns to scale, and

the sum of coefficients are = 1, then there are constant returns to scale.

The marginal productivity of a factor can be

measured by the production function. The marginal productivity represents the change in output that results from a small change in any one input when all other inputs are held constant. It is expressed by the partial derivatives of output with respect to an input. The marginal product is employed in the derivation of the elasticity of production with respect to each input, which is defined as the percentage change in output with respect to a one percent change in an input.

In the case of the Cobb-Douglas production function, the elasticity of production with respect to any input is constant. Furthermore, it is directly estimated in terms of the exponents of the respective inputs.

Another property of Cobb-Douglas is that it is a constant elasticity of substitution function. The elasticity of substitution measures the sensitivity of factor proportions to changes in the marginal rate of substitution. The Cobb-Douglas has a constant elasticity of substitution of unity. This implies that a certain percentage change in the marginal productivity ratios of two factors will induce equivalent proportional change in their utilization. This has been found to be a reasonable assumption for agricultural production in previous studies. Within the objective of the present study, the

constant elasticity of substitution among inputs should not impose a serious constraint on the selection of this functional form.

2.3.4. Modified Cobb-Douglas Production Function

An intercountry comparison of agricultural production appeared in the pioneering work of Clark (1940). That work was extended by Hayami and Ruttan (1971), who analyzed the sources of differences in agricultural productivity among 43 different countries. That study used the production function approach and expressed the model as:

$$\text{Log } Y = \text{Log } A + b_1 \text{Log } X_1 + b_2 \text{Log } X_2 + b_3 \text{Log } X_3 + b_4 \text{Log } X_4 + b_5 \text{Log } X_5 + b_6 \text{Log } X_6 + b_7 \text{Log } X_7 + b_8 \text{Log } X_8 .$$

The variables were defined as:

Y = Gross agricultural output net of seed and feed converted to 1000 wheat units by aggregating quantities

X_1 = Number of male workers in agriculture

X_2 = Acres of land under permanent crops

X_3 = Total N+P+K fertilizer

X_4 = Total livestock units

X_5 = Total tractors horsepower

X_6 = Number of graduates from agricultural colleges

X_7 = Percent of adult population who are literate

A dummy variable X_8 also was added to differentiate between developing countries and less-developed countries.

The current study will employ a similar model but will incorporate foreign aid as an exogenous variable to measure its effects on agricultural production in the developing countries.

2.3.5. Problems associated with the Cobb-Douglas Production Function

The first problem that may arise with any production function study is the availability of data. Data are available at an aggregate level on a yearly basis, in many cases, in dollar values. However, it is difficult to break foreign aid data down into detailed categories. The foreign aid data for agricultural development over time is not available. The measurement of Official Development Assistance, which this study uses, was found to be not documented before 1969. This study uses ODA data as a

measure of foreign aid for agricultural development. The use of total ODA rather than only the agricultural component as a measure of foreign assistance to agriculture will not bias the coefficient on the aid variable in the Cobb-Douglas production function if agricultural aid is a constant proportion of ODA across countries and over time. Because this is not likely to hold exactly, some bias is expected.

A problem also may arise due to the omission of private assistance flows. This problem may result in biased estimates of the marginal product and the internal rate of return to foreign aid due to specification bias if private assistance and foreign aid are correlated.

In assessing the return to foreign aid, one potential problem that may arise when foreign aid is included in a function as an independent variable, is multicollinearity. Although, in theory, the production inputs including education, labor, fertilizer, livestock, land, tractors, and foreign aid are logical candidates to explain the behavior of agricultural production, in practice, it may be difficult to disentangle the separate influence of each variable. There are, however, several statistical techniques which can be used to minimize the problem of multicollinearity..pa

CHAPTER THREE

Empirical Model and the Variable Specifications

Introduction

This chapter discusses the empirical model used in the study. The production function model is specified and a detailed description of the data and variables used in the production function model are presented, followed by a description of the foreign aid lag structure.

3.1. The Model

The production function used in this model is of the form:

$$Y_{it} = A_{it} \sum_{j=1}^{m} X_{ij}^{a} F_{i,k-t}^{b} e^{u}$$

Where,

Y_{it} = Total GDP in agriculture for country i in year t

A_{it} = Shift factor n country i in year t

X_{ijt} = jth production input for country i in year t

$F_{i,\ k-t}$ = Foreign aid for country i in year k-t where k is the total years of aid flow and t is each year of foreign

aid flow.

Several alternative model specifications were utilized in an attempt to model the true relationship between agricultural inputs and output. First, the foreign aid variable was included as a distributed lag of past ODA receipts and then as a three years moving average of ODA expenditures. The moving average specification was used in an attempt to smooth out large year to year variations which may reflect project funding figures more than actual utilization of the funds. Second, dummy variables were introduced to allow the effects of aid to differ by income levels, regions, yearly and political factors.

3.2. The Data

To examine the relationship between agricultural productivity and foreign aid, data for 99 less-developed countries were collected. The countries included in the analysis were drawn from three categories of the World Bank's listing of national economies by stage of economic development: (1) low income countries (2) lower-middle income countries, and (3) middle-income countries. Cross section and time-series data from 1975-1984 were collected from annual issues of U.N. publications.

Although the number of countries reported in these three categories was 99, the availability of suitable data for some countries limited the sample size to a maximum of 59 countries.

3.3. Specification of the Dependent and Independent Variables

3.3.1. Agricultural Output

Agricultural output, as the dependent variable in the production function, is specified in monetary terms. The data for Gross Domestic Product (GDP) in the agricultural sector are obtained from The World Tables of the World Bank for different countries. The GDP data, given in local currencies, are deflated by each country's deflator index developed by the World Bank to remove the influence of inflation. The computed agricultural GDP in constant local currencies are divided by the 1982 exchange rate, giving the real U.S. dollar value for agricultural output in 1982 prices.

3.3.2. Land

The land variable in the production function is specified as hectares of land under permanent crops. The data for this variable were collected from FAO Production

Yearbooks. The use of acreage as a land variable is criticized because it does not take into account the quality of land and the ability of different areas of land to support different crops and livestock. The potential bias due to land quality has been reduced by using the land quality adjustment factor given by Peterson (1986).

3.3.3. Labor

The labor variable used in the study is based on the labor variable used by Hayami and Ruttan (1985). In their study, the number of male workers in agriculture is estimated from the economically active male population.

The women labor force in agriculture may have been omitted because data on farmers are not usually disaggregated by sex in the agricultural reports. However, this study attempts to incorporate the female labor force in the agricultural sector by defining the labor variable as follows:

Labor = (Total population) (% of working age labor force) (% of agricultural labor force).

3.3.4. Livestock

The livestock variable is specified in animal units.

Various animals such as cattle, buffalo, sheep, pigs, horses, camels, mules, asses, goats and poultry are aggregated using weights of (1.0), (1.1), (0.1), (0.2), (1.0), (0.2), (1.0), (0.8), (0.1) and (.01) respectively. The weights for aggregation are those in the study of Hayami and Ruttan (1985). The livestock variable is considered as a form of biological capital stock. Weights to the animals are given depending on the estimated stock value of each animal. For example, the investment in a cow is bigger than in a chicken so the higher weight is given to a cow than a chicken.

3.3.5. Capital

Capital is represented by two variables associated with chemical and mechanical technologies. Advances in biological technology are associated with fertilizer use. The fertilizer variable includes the total quantity of nitrogen, phosphorus, and potassium used per hectare. The data are collected from FAO Fertilizer Yearbooks. Inputs such as animal manure and green manure are not considered due to data problems. Advances in mechanical technologies are usually associated with larger inputs of power and machinery. The machinery variable is specified with a proxy variable in terms of tractor horsepower to account

for differences in quality as well as quantity of machinery. Data for number of tractors were taken from the FAO, Production Yearbook (various issues). Tractor horsepower data were estimated by the following formula.

$$M_{it} = h_{it} N_{it}$$

where, M is the total horsepower, h is the average horsepower per tractor, N is the number of tractors, and i, t represent country and year. The data for average horsepower are taken from Hayami and Ruttan (1985).

3.3.6. Education

An important measure of the quality of labor relates to its human capital content which may be equated crudely with formal school education. Another crude measure of the human capital index is experience, which can be counted as exposure to informal education or knowledge through the agricultural extension service. The data for education are collected from the Statistical Yearbook of UNESCO. The study measures general education levels as the school enrollment at the secondary level including vocational education.

3.3.7. Foreign Aid

Several different approaches have been used in the past to specify the foreign aid variable. Some researchers have combined flows from private and public sectors into a single measure of foreign aid to explain economic growth (Griffin and Enos, 1970). Others have separated private from public capital flows (Papanek, 1973).

In the present study, the flow of Official Development Assistance (ODA) to LDCs is used as a measure of foreign aid. The foreign assistance variable represents total official development assistance. The data are collected from The World Development Report of 1986 and the Geographical Distribution of Financial Resources to Developing Countries of the OECD over the 16 years period starting in 1969. In order to remove the influence of inflation, the data are deflated over time by a deflator index developed by the World Bank (World Tables, 1985).

In analyzing the effects of foreign aid, it should be recognized that foreign aid is embodied in other variables including land, labor, education and fertilizer. However, there is no satisfactory way of separating the foreign aid effects of those variables in the estimation.

3.3.8. Foreign Aid Lag Specification

In estimating the effect of foreign aid on agricultural production, this study uses a quadratic distributed lag structure (The Almon Polynomial Lag). A six-year second order polynomial lag distribution weights the effects of past years' foreign aid on ten years of agricultural production. The main justification for using this particular lagged-distribution of foreign aid is that when moving forward from the initial year, the effects of foreign aid on agricultural production are distributed over time. The effects may be small in the early years due to the time needed for development, extension, and adaption of new technologies within the indigenous farming system. The importance of aid to production is hypothesized to rise steadily, but then begin to decline as there are lags in the utilization and implementation of foreign aid, and eventually the depreciation of aid impacts.

The second-order Almon Lag assumes a quadratic 'U' shaped distribution of the partial foreign aid coefficient, B_t, represented by

$$B_t = a_0 + a_1 t + a_2 t^2 \qquad (3.1.9)$$

Where,

a = Polynomial lagged weights

$t = 0$ through k and $k = 6$ years

$t = 0$ in the beginning year

Substituting this weighted lag in the original production function,

$$\log Y_{it} = \log A_{ijt} + \sum_{j=1}^{m} a_{ijt} \log X_{ijt} + \Sigma(a_0 + a_1 t + a_2 t^2) \log F_{it} + U. \qquad (3.1.10)$$

Two end point constraints will be used such that $B_{-1} = 0$ and $B_6 = 0$ giving two linear relationships between the a's:

$$a_0 + a_1 + a_2 = 0 \text{ and } a_0 + a_1 k + a_2 k = 0$$

This simplifies to:

$$a_0 = -a_2 (k+1) \text{ and } a_1 = -a_2 k \qquad (3.1.11)$$

Substituting (3.1.11) into (3.1.10) and substituting into the original production function and then reducing:

$$Y'_t = \ln A + \sum_{j=1}^{m} a_{ij} X'_{ij} + a_2 Z + u \qquad (3.1.12)$$

$$\text{Where, } Z = (k - 1 - kt + t^2)F' \qquad (3.1.13)$$

Y', X' and F' are in logs. a_2 is then estimated from (3.1.12) and is substituted into (3.1.11) to get partial production coefficients, (b_t). The partial production coefficients over six years are then summed up to get the coefficient on foreign aid B_F.

The empirical model discussed in this chapter attempted to incorporate the internal resources (land and livestock), modern technical inputs (fertilizer and machinery), human capital (general education), and external resource (foreign aid) in the production structure of the LDCs' agriculture. The production function is considered as the common intercountry production function which Hayami and Ruttan identified as metaproduction function or potential production function. The metaproduction function assumes that new technnical knowledge in agriculture as endogenous. It is generated in response to changes in relative factor and product prices (Hayami and Ruttan, 1985). In the subsequent chapter, the result of the intercountry production function analysis will be discussed.

CHAPTER FOUR

Empirical Results and Analysis

4.1. Introduction

The intercountry production function developed in the previous chapters is estimated using Ordinary Least squares estimation procedures. This chapter presents the estimated coefficients and a discussion of the empirical results from the estimated models. First, a discussion of the Ordinary Least Squares (OLS) results is displayed followed by a diagnosis of potential econometric problems associated with the estimated results.

4.2. Results of the Model Estimations

Agricultural output is regressed on inputs (livestock, labor, land, tractors, education, foreign aid, and fertilizer) and the Cobb-Douglas production function estimates are obtained by ordinary least squares. The following equation is estimated including foreign aid first as a six year quadratic distributed lag of ODA expenditures and second as a six year distributed lag of a three year moving average of ODA expenditures:

$$\ln Y = \ln A + b_0 \ln S + b_1 \ln L + b_2 \ln M + b_3 \ln T + b_4 \ln E + b_5 \ln K + b_6 \ln F + e_1 \quad (4.1)$$

Where A = a constant term

S = livestock (total animal units)

L = labor (total number of labor force in agriculture)

M = acres of cultivated land

T = tractors (total horsepower used)

E = education (number enrolled in school)

K = foreign aid (total ODA)

F = fertilizer

e = error term (assumed to be normally distributed with mean zero and a constant variance)

The results are obtained by applying ordinary least squares to equation (4.1). The results of the estimation of the Cobb-Douglas production function based on cross-country time-series data are summarized in Tables 4.1 and 4.2. The R^2 statistics is 0.85 for both models. The F-statistics for the production function for the first model is 459 and for the model with the three year average aid expenditure is 460, indicating that the independent variables explain a significant amount of variation in the dependent variable in each model.

Table 4.1. Ordinary Least Squares Estimates of the Intercountry Production Function with lagged-foreign aid data using 1975-1984 data for 59 LDCs.

	Coefficients	T-statistics
Intercept	2.5143	7.461
Livestock	0.0451	1.642
Labor	0.2422 (a)	6.799
Land	0.2367 (a)	4.523
Machinery	0.0501 (a)	2.418
Education	0.3014 (a)	9.242
Foreign Aid	- 0.0001 (a)*	2.975
Fertilizer	0.096 (a)	4.123
R^2	0.85	
F-statistic	458.60	
Df	7	

(a) Represents significance at .05 level.
* Represents the B coefficient calculated from the estimated a_2 coefficient on this distributed lag variable.

Table 4.2. Ordinary Least Squares Estimates of the Intercountry Production Function with a 3 Year Moving Average for the Foreign Aid Variable Using 1975-1984 data for 59 LDCs.

	Coefficients	T-statistics
Intercept	2.8707	7.98
Livestock	0.0413	1.51
Labor	0.2635 (a)	7.08
Land	0.2296 (a)	4.38
Machinery	0.0556 (a)	2.66
Education	0.2889 (a)	8.97
Foreign Aid	-0.0364 (a)*	3.24
Fertilizer	0.093 (a)	3.99
R^2	0.85	
F-statistic	460.16	
Df	7	

(a) Represents significance at .05 level.
* Represents the B coefficient calculated from the estimated a coefficient on this distributed lag variable.

All of the regression coefficients have reasonably large t-values except livestock, indicating that most of the variables affect the dependent variable except for the livestock variable. The livestock variable in each model is not significant from zero at .05 level of significance. The regression coefficients on land, labor, and education variable are highly significant and positive in both models. However, the foreign aid variable is significant but negative, indicating that foreign aid negatively affects on agricultural production. The coefficient of the foreign aid for the first model is -0.0001 and for the second model with the three year moving average is -0.0364.

As discussed in chapter 3, several other alternative model specifications are estimated in an attempt to discover the true relationship between foreign aid used in the production of agricultural output. The initial model represented by equation (4.1) is estimated including various classes of dummy variables (slope and intercept). First, dummy variables are introduced in an attempt to pick up the differential effects of foreign aid between low and high income groups (Low-income countries are grouped according to 1984 Gross National Product (GNP) per person of less than $400 based on the classification of the World Bank, and high income countries have more

than $400 GNP per person). Table 4.3 shows the results of the estimates of the production function in which both an intercept dummy and slope dummy on foreign aid variable are included. The estimates of both intercept and slope coefficients are not significant. The coefficient of foreign aid variable is significant at the 0.05 level of significance but negative. The results indicate that the effects of aid on agricultural production do not vary by the income levels chosen for the analysis.

Table 4.3. Ordinary Least Squares Estimates of the Production Function With dummy variables to capture the Effects of aid on Countries with Different Levels of Income (intercept and slope dummies).

	Coefficients	T-statistic
Livestock	0.041	1.500
Labor	0.265 (a)	7.114
Land	0.226 (a)	4.295
Machinery	0.057 (a)	2.733
Education	0.289 (a)	8.967
Foreign Aid	- 0.025 (a)*	2.733
Fertilizer	0.091 (a)	3.918
Dummy 1 (Intercept)	- 0.104	-0.694
Dummy 2 (Slope on Aid)	-0.0001	-0.499
R2	0.85	
F-statistic	357.21	
Df	9	

(a) Significance at .05 level.
* Represents the B coefficient calculated from the estimated a coefficient on this distributed lag variable.

Second, the initial model is estimated again by including yearly intercept dummy variables in an attempt to capture the difference in aid effects due to yearly factors. The results of the yearly model are presented in Table 4.4. The estimated differential intercepts are not significant at 0.05 level of significance, indicating that there is no yearly factors affecting the intercept or the level of production function. The regresson coefficient of foreign aid is negative and significant at the 0.05 level.

Third, the model is estimated using dummy variables to indicate the difference in the effects of foreign aid on particular countries, Syria, Israel, and Costa Rica, due to political factors. These countries are selected because they have exceedingly high per capita ODA receipts. The per capita ODA of Syria, Israel and Costa Rica are 85.1, 86, and 298.4 respectively which exceeds the value of other countries in the sample by a large amount, two or three standard deviations away from the mean value of all the observatons (World Bank, 1986). The estimated results of the model including an intercept dummy and slope dummy variable on foreign aid for Israel, Syria, and Costa Rica are presented in Table 4.5. Dummy variable one asssigns a zero to Israel, Syria, and Costa

Rica and unity to the rest of the countries. The estimated coefficient on dummy variable one is 1.482 and the coefficient is significant at 0.05 level, indicating that the agricultural production for the three countries has a greater intercept. However, the slope dummy variable on foreign aid (Dummy 2) is non-significant at the .05 level indicating that the effects of foreign aid on the three countries are not different from the remaining countries.

Table 4.4. Ordinary Least Squares Estimates of the Intercountry Production Function with Intercept Dummies by Year.

	Coefficients	T-statistics
Intercept	2.92	7.808
Livestock	0.04	1.433
Labor	0.27 (a)	6.996
Land	0.22 (a)	4.136
Machinery	0.06 (a)	2.830
Education	0.29 (a)	8.816
Foreign Aid	- 0.04 (a)*	3.000
Fertilizer	0.08	3.590
Dummy 1	-0.03	-0.256
Dummy 2	0.09	0.879
Dummy 3	0.07	0.717
Dummy 4	-0.01	-0.082
Dummy 5	-0.03	-0.331
Dummy 6	-0.05	-0.481
Dummy 7	-0.05	-0.581
Dummy 8	0.43	0.405
Dummy 9	-0.05	-0.484
R^2	0.85	
F-statistic	200.16	
Df	16	

(a) Represents significance at .05 level.
* Represents the B coefficient calculated from the estimated a_2 coefficient on this distributed lag variable.

Table 4.5. Ordinary Least Squares Estimates of the Intercountry Production Function with Intercept and Slope Dummies for Israel, Costa Rica, and Syria.

	Coefficients	T-statistics
Intercept	3.263	9.348
Livestock	0.043	1.632
Labor	0.341 (a)	9.071
Land	0.204 (a)	4.050
Machinery	0.052 (a)	2.636
Education	0.285 (a)	9.238
Foreign Aid	-0.036 (a)*	5.216
Fertilizer	0.061 (a)	2.929
Dummy 1 (Intercept)	1.482 (a)	3.882
Dummy 2 (Slope on Aid)	0.001	0.001
R2	0.86	
F-statistic	401.385	
Df	9	

(a) Represents significance at .05 level.
* Represents the B_2 coefficient calculated from the estimated a coefficient on this distributed lag variable.

Finally, the initial model is estimated including dummy variables (both intercept and slope) for different regions to indicate if the effects of foreign aid differ by geographical regions. The dummy variables are assigned to different regions of the world including Africa, Asia, Latin America, Mexico and the Caribbean, Europe (Yugoslavia, Portugal, Turkey, and Greece), and Middle East countries. The results indicate that foreign aid effects are positive and significant in some regions but not in others. The 'a' coefficients on the slope dummies are used to calculate the beta coefficients for the foreign aid variable for each region. As Table 4.6 indicates, aid has a positive and significant effect in Latin America, negative but insignificant effect in Middle East, Asia and Africa.

The results suggest that effects of aid differ by regions. There are numerous reasons which may account for differences in the effects of foreign aid on different geographical regions. The variations in aid effects may be due to differences in human and natural endowments, political leadership, climatic factors, and skills in determining and implementing agricultural strategies and policies.

Historically, Latin America has received aid from developed countries for much longer time than relatively newly independent African countries. Institutions, human resources and other infrastructure are less developed in African and some Asian countries, thereby, lessening the potential effectiveness of foreign aid. For example, in 1980, fifteen countries had adult literacy rate of 25 per cent or less. A few countries had less than 10 per cent of female aged 15 - 49 ever enrolled in primary school. In addition, Sub-Saharan Africa has faced difficult external agro-climatic conditions.

Furthermore, a major portion of aid going to African countries is in the form of project aid. This aid makes capital or technical assistance available for specific projects but may not contribute to the long-run economic self-relience of the recipients. Project aid is of little use when the countries are at the limit of their capacity to absorb additional investments. Most commonly, limits in capacity to handle additional project aid result from the lack of complimentary domestic resources including recurrent cost in the budget, foreign exchange or man power.

Table 4.6. Ordinary Least Squares Estimates of the Production Function with Effects of Aid by regions (both intercept and slope dummies).

	Coefficients	T-statistics
Intercept	2.7475	6.79
Livestock	0.1107 (a)	3.25
Labor	0.2425 (a)	5.45
Land	0.1931 (a)	3.65
Machinery	0.0388	1.76
Education	0.2936 (a)	8.69
Foreign Aid	0.0424 *	-0.99
Fertilizer	0.1116 (a)	4.57
African Intercept Dum.	0.2484	0.83
Asia Intercept Dum.	- 0.0166	-0.06
Latin Am. Int. Dum.	-0.9099 (a)	-3.41
Mexico and Car. Dum.	- 0.6518	-1.83
Middle East Int.Dum.	0.6310	1.86
Africa Slope	-0.1224 *	1.06
Asia Slope	-0.1172 *	0.75
Latin Am. Slope	0.6580 (a)*	- 3.22
Mexico and Car. Slope	-0.1230 *	- 0.90
Middle East Slope	- 0.1223 *	0.62
R2	0.87	
F-Statistics	213.91	

Df 17

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* Represents the B coefficient of calculated from the estimated a_2 coefficient on this distributed lag variable.

(a) Represents significance at .05 level.

4.4. Foreign Aid Results

The estimated result of foreign aid was found to be negative in all of the six models used for analysis. The model with dummy variable which takes into account the effects of aid by regions has negative but insignificant estimate at the .05 level. It is possible that the results may not be conclusive due to following measurement and econometric problems.

4.4.1. Measurement Problems

The main difficulty faced in this study was the lack of appropriate data for many of the variables. The most serious problem arose in measuring agricultural aid. The specification of Official Development Assistance as our measure of agricultural aid may have led to a biased estimate on the aid variable. Ideally, it would have been desirable to break agricultural aid out of total ODA for use as a variable in the model. Unfortunately, this was not possible.

4.4.2. Problem of Aggregation

The negative relationship between foreign aid and the agricultural output variable may be due to the

aggregation of all LDCs into a single sample. Since aid operates in different administrative, infrastructure, and policy environments, the aggregation of LDCs into a single sample could be masking the phenomenon of aid effectiveness. It is therefore, worth looking at the impacts of aid on different regional groups and individual countries. Before anything definitive can be said about the quantitive impact of aid on agricultural production, a detailed study of particular countries over long periods are required. Exogenous factors including drought may be affecting the production as well.

The failure of aid to contribute to agricultural production growth may also be attributed to the lack of coordination between the donor and recipient countries. The coordination between both sides is necessary to share information and to increase the overall impact of aid. Through communication, both recipients and donors can better understand what the problems and the needs are.

4.3. Comparision of Results with Other Studies

A check on the plausibility of the production function results can be obtained by comparing them with the results of previous studies. There are several studies which have attempted to estimate the inter-country

agricultural production function (Hayami, 1970; Hayami and Ruttan, 1971 and 1985; Yamada and Ruttan, 1980; and Mundlak and Hellinghausen, 1982). The results of these studies are summarized in Table 4.7. On the whole, there is a close similarity in the results. The present study, however, intended to capture the impact of foreign aid which was not included in the previous studies. The main difference between our study and the previous studies is in the values of the elasticities of livestock and machinery. The livestock coefficient is much smaller, 0.04 - 0.09 in contrast to the previous results from other studies which fell in the range of 0.20 -0.30. Another difference is in the machinery elasticity, .05 in contrast to other studies in which the coefficient ranged from 0.10 -0.15. This difference may reflect differences in sample coverage both cross-sectionally and over time.

Table 4.7. Comparision of 1970, 1971, 1980, and 1982 Intercountry Agricultural Production Functions Using Results Obtained by Hayami (1970), Hayami and Ruttan (1971), Yamada and Ruttan (1980), Mundlak and Hellinghausen (1982), Hayami and Ruttan (1985), and this Study respectively.

Source	1970 Hayami	1971 Hayami/ Ruttan	1980 Yamada/ Ruttan	1982 Mundlak/ Hellinghausn	1985 Hayami/ Ruttan	1987 Rai
# of Countries	38	38	41	58	43	64
Period of Estimation	1960	1955,60,65	1970	1960,63	1960,70,80	1975-84
Estimation Method (a)	OLS	OLS & IV	OLS	OLS & PC	OLS	OLS
Data Specification (b)	NG	M;NG	M;NG	M;NG	M;NG	M;NG
Coefficients Estimated						
Labor	.45	.40	.35	.40	.50	.24
Land	.20	.10	-	.20	.09	.23
Livestock	-	.25	.30	.20	.30	.05
Fertilizer	.20	.15	.25	.30	.15	.10
Education	.10	.15	.15	-	.30	.18
Machinery	.15	.10	.15	.10	.05	.06
Foreign Aid	-	-	-	-	-	-.036

Source: Hayami and Ruttan (1985), Agricultural Development. An International Perspective.

(a) OLS and represents Ordinary Least Square and Principal Component Variable.

(b) M;NG represents Multiple Years Observations and

4.6. Problem of Multicollinearity

There are several methods of assessing the presence of multicollinearity in any application of a regression model. One of methods to detect multicollinearity is the use of Variance Inflation Factors (VIF). The VIFs are obtained by regressing one of the independent variable on all others in a model such that

$$X_j = F(X_i)$$

If the coefficient of multiple determination of this regression, R_j^2, is close to one, this means, X_j is explained very well by one or more of the other independent variables in the model X_i. The VIF equals

$$1/(1-R_j^2)$$

and in an ideal situation, equal one, i.e., $R_j^2 = 0$.

If R_j^2 is close to one, the Variance Inflation Factor will be large. The variance inflation factor associated with each input obtained by regression is presented in Table 4.8. The Variance Inflation Factors indicate that there is no indication of a severe problem with multicollinearity.

Table 4.8. Variance Inflation Factors (VIF) Associated with the Variables in the Cobb-Douglas Production Function Model Including a six year Distributed lag of Foreign Aid Variable.

Variables	VIF
Livestock	3.72
Labor	6.36
Land	9.87
Tractors	4.59
Education	5.65
Foreign Aid	1.23
Fertilizer	2.89

CHAPTER FIVE

Summary, Conclusions and Recommendations

5.1. Introduction

This chapter begins with a summary of the analysis, structure, and the results. Following the summary, the conclusions and recommendations are presented based on the results.

5.2. Summary

The effects of agricultural assistance to less-developed countries have been widely debated. Most of these studies have assumed that agricultural assistance has helped increase the productivity in less-developed countries. There has not been however, any empirical evidence to support this assumption. The purpose of this thesis was to identify the sources of agricultural productivity in less-developed countries. The major objective of this study was to estimate the impact of foreign assistance on the agricultual productivity in

less-developed countries using production function analysis.

This study has defined foreign aid as official grants and concessional loans in currency and kind. These grants and loans are broadly aimed at transferring resources from developed to developing countries on developmental and/or income distributional grounds. From the time of the Marshall Plan in the 1940s to recent times, foreign aid has influenced the pattern of development. In the 1940s, 1950s, and 1960s, foreign aid contributed to industrial development. In the 1970s and 1980s, the use of foreign aid shifted increasingly to agricultural growth and development, focusing on the basic needs of rural people.

From the review of the literature it would appear that foreign aid has had mixed effects at the macro-level where the effects of aid have been studied on GNP growth. Foreign aid effects have been generally more positive on the microlevel, where the impacts of agricutural assistance in the form of food aid, research and development, education have been studied. The production function approach is the technique used in this thesis to measure the impact of foreign aid. The Cobb-Douglas production functional form was chosen to describe the

agricultural production function. The dependent variable, agricultural output, was specified as GDP in agriculture; and independent variables include land, labor, livestock, machinery, education, fertilizer, and foreign aid. Six alternative model specifications were utilized to estimate the relationship of agricultural inputs to output. First, a model was estimated with a six-year distributed lag of foreign aid and then a model including foreign aid with a six-year distributed lag and a three year moving average of foreign aid data. Other estimated models included dummy variables in an attempt to capture the differing effects of aid by income level, regions, yearly, and political factors.

In general, the Least Squares regression results of the inter-country production function indicated a negative relationship between foreign aid and agricultural productivity in developing countries. The estimates were from pooled time-series cross-sectional data from 1975-1984. The results of all the six regressions revealed a highly negative effect of aid on agricultural productivity in LDCs. Only the model including dummy variables which account for the regional differences of aid effects showed positive results for some regions but negative and significant for others. The

estimates of other variables including land, labor, and education are highly positive in all of the models specified.

5.3. Conclusions and Recommendations

The major conclusion reached in this study is that the aggregate effects of foreign aid on agricultural production of LDCs may be negligible or even negative. This finding is inconsistent with the recent comprehensive study of Cassen (1987). Cassen concluded that the great majority of aid succeeds in its developmental objectives.

Several reasons may exist for the results. First, the negative result of foreign aid may not be valid because of problems in measuring the aid data. This study used total ODA as the measure of agricultural aid, perhaps influencing the estimate of the aid coefficient. Also, the aid data is not broken down by sectors. Consequently, it is extremely difficult to separate agricultural data from non-agricultural data. More detailed data are required for the variable that accounts for agricultural assistance to developing countries in order to capture the importance of agricultural aid. In

addition, the aid variable may have been embodied in other variables including education, land, labor and fertilizer. In such cases, however, there is no single satisfactory analysis that can separate the effects of aid from other variables.

Second, this study looks at a large sample of countries in heterogeneous circumstances. The effects of aid may vary from country to country, and aid operates in different administrative, infrastructural and policy environments. The aggregation of LDCs into a single sample, therefore, may be masking the effects of aid. More detailed studies of particular countries over reasonably long periods of time could be most valuable in this regard.

However, there are reasons why the results may in fact be valid. First, the credit extended to LDCs has resulted in foreign indebtedness. Current trends show a substantial drop in capital flows to low-income countries because of the substantial growth in debt service and a small increase in assistance lines. As a result, many developing countries are facing an undesirable choice of borrowing more money or cutting investment in physical, institutional, and human resources. These choices, in turn, may harm LDCs' long-term economic potentials.

Second, aid may have contributed to the concentration of wealth and inequality in distribution. This inequality, in turn, may have negatively affected agricultural growth. For example, Sobhan (1982) estimates that in Bangladesh, more than 50 percent of development expenditures in that country are financed by foreign aid. He feels that the increased dependence on aid-supported projects has helped mostly those with access to power and resources. In the process, rural societies have become more polarized, as a small group of rich farmers have enhanced their income and control over assets and actually strengthened their economic power base in the villages. Sobhan feels, therefore, that increasing rural poverty both absolutely and relatively, creates a built-in constraint to self-sustained development. The implication is that agricultural growth itself has been reduced. Furthermore, the donors and project proliferation that have occurred in recent years may have imposed negative impacts on the major government institutions of LDCs (Morss, 1984). Morss feels that instead of working to establish comprehensive and consistent national development objectives and policies, government officials are forced to focus on pleasing donors by approving projects that mirror the current

development "enthusiasm" of each donor.

The implication on these issues is for donors to strengthen their capacity to understand LDCs' institutional, political, and social environments in which aid activities are set. In many cases, the form and substance of aid programs do not match the needs of recipients. To a great extent, what aid programs do and how they do it should be determined on the basis of recipients' needs rather than the donors' priorities and procedures. Also, major efforts will be needed from both donor and recipient countries to improve policy formulation. The policy formulation in LDCs has been one of the major factors in aid failure (Krueger, 1986; Duncan, 1986). The key agricultural policy factors in virtually all LDCs are concerned with research and extension, prices of food, and investment and maintenance of rural infrastructure etc. It is also important to recognize that many of the problems of the poor in the management of agricultural programs are derived from deficiencies in macro-economic management, including budget deficits, rapid inflation, overvalued exchange rates and interest rates. Duncan (1986) suggests that the explanation for the poor quality of policy analysis lies in the scarcity of human and physical resources, and institutional inadequacies. The proliferation of donors

and projects can be avoided by designing a project to aid a country in implementing its existing projects and finding the bottlenecks that are interfering with the effective implementation of projects.

Another explanation for the possible lack of aid effectiveness are analytical and implementation components of countries' capacity to absorb foreign aid (Duncan, 1986). The management and institutional capacity in many low-income countries particularly in Sub-Saharan Africa has been subjected to a good deal of criticism and is held to be partly responsible for their dissappointing economic performances (World Bank, 1984). The low income countries need management and institutional capacity, human resources development, and improved technology. These deficiencies call for investment in education to ensure that individuals are available with the specialized qualifications needed for policy analysis, a working environment, and technical assistance that is explicitly designed to strengthen the institutional capacity for the policy analysis of recipient countries.

Another possible explanation for the lack of aid effectiveness is the problem of fungibility. The possibility of switching aid money away from developmental purposes will be greater when a higher proportion of the

development budget is financed from foreign resources than from local resources (Mosley, 1987). Donors and recipients must have confidence in each other, whether through policy dialogue or investment programs. Technical cooperation to strengthen the recipients' capacity for analysis, administration, and evaluation will often be important parts of the relationship.

In addition, a possible reason for failure of aid may be the risk factor involved in adopting new technologies and agricultural practices. It has been widely accepted that small farmers, particularly subsistence farmers, are relatively risk averse. If farmers are assured of compensation for any crop failure resulting from the new techniques, they are more likely to change the farming practices. In this case, food aid can be used as a compensation for the crop failure in order to ensure farmers' food security.

The conclusions and recommendations to be made are numerous. There is a need for policy formulation, institution building, and education in LDCs in order to make the best use of foreign aid. The many failures of aid effectiveness may derive from the lack of effective institutions, external donor pressures, and the political situations in LDCS or from external factors, including

weather, commodity prices, and the political situations of LDCs. The catastrophic famines in Ethiopia and the Sudan in 1984/1985 are a case in point. Countries in such a position require support on a long-term basis.

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COUNTRY	AG.OUTPUT ($MILLION)	LIVESTOCK (ANIMAL UNITS)	LABOR (MILLIONS)
ALGERIA	2338.3	2912.9	2.8422
ALGERIA	2237.5	2525.5	2.1004
ALGERIA	2033.1	2545.5	2.9155
ALGERIA	2186.4	2781.7	2.5872
ALGERIA	2242.6	2860.2	2.8538
ALGERIA	2591.0	4645.4	2.2867
ALGERIA	2552.2	1845.9	2.3998
ALGERIA	2454.3	3352.4	2.4859
ALGERIA	2579.0	3704.9	2.4859
ALGERIA	2759.0	3754.4	2.6058
ARGENTINA	1150.5	54951.2	2.5906
ARGENTINA	6550.0	60882.8	2.5199
ARGENTINA	6933.0	52020.1	2.2932
ARGENTINA	6084.5	57160.0	2.3285

COUNTRY	LAND (1000 HA.)	AID ($ MILLIONS)	EDUCATION (ENROLLMENTS)
ALGERIA	3341.7	259.3	615.27
ALGERIA	3554.7	317.3	512.43
ALGERIA	3430.2	199.0	745.84
ALGERIA	3517.9	133.0	857.18
ALGERIA	3523.6	102.0	936.52
ALGERIA	2987.6	176.0	1031.79
ALGERIA	2987.6	163.0	1154.71
ALGERIA	3531.1	137.0	1124.10
ALGERIA	5409.4	10.0	1420.30
ALGERIA	3496.8	122.0	1569.17
ARGENTINA	23800.0	30.9	1283.05
ARGENTINA	23800.0	25.8	1243.05
ARGENTINA	26950.0	34.0	1288.11
ARGENTINA	23868.0	29.0	1293.07

COUNTRY	FERTILIZER (100 GRAMS/HA.)	TRACTOR (HORSEPOWER)
ALGERIA	230	1785.0
ALGERIA	206	1820.0
ALGERIA	244	1820.0
ALGERIA	215	1855.0
ALGERIA	227	1873.0
ALGERIA	215	1748.0
ALGERIA	221	1760.0
ALGERIA	244	2600.0
ALGERIA	248	2680.0
ALGERIA	244	1700.0
ARGENTINA	16	5700.0
ARGENTINA	20	6650.0
ARGENTINA	22	5850.0
ARGENTINA	25	7000.0

COUNTRY	AG.OUTPUT ($MILLION)	LIVESTOCK (ANIMAL UNITS)	LABOR (MILLIONS)
ARGENTINA	2242.5	55781	2.2359
ARGENTINA	5652.1	53489	2.3126
ARGENTINA	2552.1	48290	2.2415
ARGENTINA	635.0	49676	2.2688
ARGENTINA	5063.0	50007	2.2688
ARGENTINA	4250.0	52297	2.3865
BANGLADESH	5698.0	21445	35.2634
BANGLADESH	5698.0	23921	34.5416
BANGLADESH	6556.0	21812	32.3014
BANGLADESH	7473.3	25992	31.9658
BANGLADESH	7473.0	27075	33.5509
BANGLADESH	6019.2	29258	42.7061
BANGLADESH	5439.1	30830	43.3966
BANGLADESH	9402.0	28561	37.9605

COUNTRY	LAND (1000 HA.)	AID ($ MILLIONS)	EDUCATION (ENROLLMENTS)
ARGENTINA	23881.6	43.0	1296.84
ARGENTINA	29194.4	18.0	1300.00
ARGENTINA	29230.4	44.0	1366.44
ARGENTINA	24344.0	30.0	1454.00
ARGENTINA	27489.0	48.0	1477.42
ARGENTINA	24208.0	49.0	1635.65
BANGLADESH	14088.0	381.8	2184.43
BANGLADESH	13687.5	1222.1	2183.14
BANGLADESH	9391.5	967.0	2213.06
BANGLADESH	13690.5	988.0	2638.54
BANGLADESH	13710.0	1166.0	2004.44
BANGLADESH	13392.0	1283.0	2659.21
BANGLADESH	13380.0	1093.0	2407.89
BANGLADESH	13702.5	1346.0	2407.89

COUNTRY	FERTILIZER (100 GRAMS/HA.)	TRACTOR (HORSEPOWER)
ARGENTINA	37	7175.0
ARGENTINA	25	6671.0
ARGENTINA	27	6356.0
ARGENTINA	22	6160.0
ARGENTINA	22	6000.0
ARGENTINA	22	7288.0
BANGLADESH	226	111.0
BANGLADESH	215	129.0
BANGLADESH	371	112.0
BANGLADESH	414	140.0
BANGLADESH	446	144.0
BANGLADESH	414	164.0
BANGLADESH	436	166.0
BANGLADESH	371	184.0

COUNTRY	AG.OUTPUT ($MILLION)	LIVESTOCK (ANIMAL UNITS)	LABOR (MILLIONS)
BANGLADESH	12649.1	31862	37.9605
BANGLADESH	15063.0	32243	38.6160
BENIN	310.7	889	0.8320
BENIN	243.8	793	1.5985
BENIN	372.4	841	0.7821
BENIN	420.9	785	0.7894
BENIN	437.0	840	0.8087
BENIN	456.6	617	0.8141
BENIN	421.4	854	0.8539
BENIN	247.0	865	0.8807
BENIN	325.5	990	0.8807
BENIN	387.0	1016	0.8947
BURKINAFASO	432.8	2190	2.6356
BURKINAFASO	461.4	1818	2.4459

COUNTRY	LAND (1000 HA.)	AID ($ MILLIONS)	EDUCATION (ENROLLMENTS)
BANGLADESH	13704.0	1071.00	2959.44
BANGLADESH	13666.5	1202.00	3111.26
BENIN	714.0	88.60	47.43
BENIN	714.0	89.00	47.43
BENIN	877.1	75.00	55.07
BENIN	529.0	62.00	55.43
BENIN	1646.8	85.00	64.27
BENIN	1242.0	91.00	83.21
BENIN	1242.0	82.00	99.29
BENIN	1658.8	80.00	117.72
BENIN	1661.5	87.00	123.88
BENIN	1672.6	77.00	120.58
BURKINAFASO	1978.1	129.30	16.13
BURKINAFASO	1978.1	144.20	16.23

COUNTRY	FERTILIZER (100 GRAMS/HA.)	TRACTOR (HORSEPOWER)
BANGLADESH	200	188.0
BANGLADESH	31	192.0
BENIN	10	2.7
BENIN	17	5.0
BENIN	3	2.8
BENIN	52	3.0
BENIN	7	4.0
BENIN	52	4.0
BENIN	15	4.0
BENIN	3	4.0
BENIN	11	4.0
BENIN	3	4.0
BURKINAFASO	1	1.6
BURKINAFASO	10	3.0

COUNTRY	AG.OUTPUT ($MILLION)	LIVESTOCK (ANIMAL UNITS)	LABOR (MILLIONS)
BOLIVIA	1109	5111	1.516
BOLIVIA	2471	5674	1.557
BOLIVIA	2893	6042	1.557
BOLIVIA	2780	6122	1.643
BRAZIL	17219	83612	27.830
BRAZIL	21809	91215	55.523
BRAZIL	26414	94610	26.819
BRAZIL	24557	89030	26.947
BRAZIL	26166	89651	25.630
BRAZIL	27440	103568	20.012
BRAZIL	27403	94610	20.661
BRAZIL	26140	115513	21.146
BRAZIL	35006	116550	21.146
BRAZIL	20211	113870	23.081

COUNTRY	LAND (1000 HA.)	AID ($ MILLIONS)	EDUCATION (ENROLLMENTS)
BOLIVIA	2600	169.00	166.3
BOLIVIA	2675	147.00	176.2
BOLIVIA	2396	173.00	233.4
BOLIVIA	2708	172.00	199.9
BRAZIL	19890	158.80	2212.7
BRAZIL	32946	213.20	1935.9
BRAZIL	38161	95.00	2437.7
BRAZIL	41534	113.00	2537.9
BRAZIL	70349	107.00	2300.0
BRAZIL	74570	85.00	2819.2
BRAZIL	62832	235.00	3093.6
BRAZIL	76163	208.00	2874.5
BRAZIL	74073	101.00	3481.8
BRAZIL	76755	161.00	3500.0

COUNTRY	FERTILIZER (100 GRAMS/HA.)	TRACTOR (HORSEPOWER)
BOLIVIA	20	29.3
BOLIVIA	12	30.0
BOLIVIA	9	30.0
BOLIVIA	12	31.0
BRAZIL	523	8100.0
BRAZIL	117	9540.0
BRAZIL	774	8400.0
BRAZIL	791	10500.0
BRAZIL	517	11200.0
BRAZIL	791	13200.0
BRAZIL	376	13600.0
BRAZIL	774	13800.0
BRAZIL	423	14000.0
BRAZIL	477	13340.0

COUNTRY	AG.OUTPUT ($MILLION)	LIVESTOCK (ANIMAL UNITS)	LABOR (MILLIONS)
BURKINAFASO	427	5917	2.604
BURKINAFASO	471	2573	2.445
BURKINAFASO	480	2623	3.061
BURKINAFASO	454	2894	2.861
BURKINAFASO	561	2760	2.298
BURKINAFASO	607	2786	3.106
BURKINAFASO	575	3023	3.106
BURKINAFASO	545	2977	2.887
BOLIVIA	822	4389	1.793
BOLIVIA	848	3956	2.692
BOLIVIA	857	3400	1.379
BOLIVIA	902	5160	1.460
BOLIVIA	117	5404	1.458
BOLIVIA	1083	6526	1.476

COUNTRY	LAND (1000 HA.)	AID ($ MILLIONS)	EDUCATION (ENROLLMENTS)
BURKINAFASO	1980	168.90	17.4
BURKINAFASO	1994	159.00	21.1
BURKINAFASO	1999	198.00	25.1
BURKINAFASO	1989	212.00	27.5
BURKINAFASO	2044	217.00	31.4
BURKINAFASO	2054	213.00	32.6
BURKINAFASO	2054	213.00	35.9
BURKINAFASO	2054	188.00	43.8
BOLIVIA	2669	170.40	128.1
BOLIVIA	2664	95.50	130.0
BOLIVIA	2357	144.00	143.1
BOLIVIA	2662	156.00	143.1
BOLIVIA	2693	161.00	143.0
BOLIVIA	2600	170.00	170.7

COUNTRY	FERTILIZER (100 GRAMS/HA.)	TRACTOR (HORSEPOWER)
BURKINAFASO	15	1.7
BURKINAFASO	18	2.0
BURKINAFASO	28	2.0
BURKINAFASO	18	3.0
BURKINAFASO	37	0.3
BURKINAFASO	15	2.8
BURKINAFASO	19	3.0
BURKINAFASO	5	3.0
BOLIVIA	10	22.2
BOLIVIA	13	12.6
BOLIVIA	12	19.9
BOLIVIA	13	25.0
BOLIVIA	10	26.0
BOLIVIA	13	30.0

COUNTRY	AG.OUTPUT ($MILLION)	LIVESTOCK (ANIMAL UNITS)	LABOR (MILLIONS)
BURUNDI	546	743	1.785
BURUNDI	546	730	3.472
BURUNDI	434	616	1.928
BURUNDI	463	689	2.065
BURUNDI	490	713	1.814
BURUNDI	432	781	1.803
BURUNDI	528	770	1.936
BURUNDI	627	477	1.986
BURUNDI	627	563	1.986
BURUNDI	592	568	1.966
CHILE	1273	4224	1.512
CHILE	1677	4164	1.904
CHILE	2146	4172	1.358
CHILE	1796	4084	1.305

COUNTRY	LAND (1000 HA.)	AID ($ MILLIONS)	EDUCATION (ENROLLMENTS)
BURUNDI	1109	96.80	13.7
BURUNDI	1119	88.00	13.6
BURUNDI	1119	80.26	14.9
BURUNDI	1124	75.00	15.9
BURUNDI	1140	95.00	16.4
BURUNDI	977	117.00	19.0
BURUNDI	977	122.00	20.4
BURUNDI	1149	127.00	20.4
BURUNDI	1149	142.00	26.4
BURUNDI	1151	141.00	91.0
CHILE	3439	2.50	465.9
CHILE	3439	8.20	448.9
CHILE	3439	11.00	487.3
CHILE	3439	8.00	510.5

COUNTRY	FERTILIZER (100 GRAMS/HA.)	TRACTOR (HORSEPOWER)
BURUNDI	8	0.2
BURUNDI	6	0.4
BURUNDI	7	2.6
BURUNDI	9	0.3
BURUNDI	7	2.0
BURUNDI	9	2.0
BURUNDI	8	2.0
BURUNDI	7	2.0
BURUNDI	4	2.0
BURUNDI	7	2.0
CHILE	162	855.0
CHILE	246	680.0
CHILE	180	738.6
CHILE	218	725.0

COUNTRY	AG.OUTPUT ($MILLION)	LIVESTOCK (ANIMAL UNITS)	LABOR (MILLIONS)
CHILE	1860	4206	1.330
CHILE	2024	4370	1.308
CHILE	2159	3904	1.330
CHILE	1449	4432	1.353
CHILE	1779	4509	1.353
CHILE	1431	4533	1.422
CHINA	76977	159001	364.690
CHINA	76977	149894	395.871
CHINA	75999	155364	343.900
CHINA	74882	167025	360.349
CHINA	96769	169473	417.725
CHINA	100000	188898	435.690
CHINA	110428	177979	438.060
CHINA	99044	135962	475.836

COUNTRY	LAND (1000 HA.)	AID ($ MILLIONS)	EDUCATION (ENROLLMENTS)
CHILE	3263	1.0	536.4
CHILE	5439	1.0	538.3
CHILE	5437	1.0	554.7
CHILE	5262	1.0	567.7
CHILE	5262	1.0	613.5
CHILE	5261	2.0	608.3
CHINA	189070	1.0	60000.0
CHINA	155490	1.0	45368.0
CHINA	103538	1.0	68490.0
CHINA	145416	1.0	66372.0
CHINA	146605	17.0	60248.0
CHINA	143707	66.0	56778.0
CHINA	142517	477.0	47027.9
CHINA	147300	524.0	46340.7

COUNTRY	FERTILIZER (100 GRAMS/HA.)	TRACTOR (HORSEPOWER)
CHILE	218	725.0
CHILE	218	1384.0
CHILE	204	1386.0
CHILE	180	1388.0
CHILE	227	1389.0
CHILE	180	1306.0
CHINA	481	6000.0
CHINA	622	7000.0
CHINA	743	6000.0
CHINA	940	19495.0
CHINA	1303	23345.0
CHINA	940	29600.0
CHINA	1502	31699.0
CHINA	743	32504.0

COUNTRY	AG.OUTPUT ($MILLION)	LIVESTOCK (ANIMAL UNITS)	LABOR (MILLIONS)
CHINA	132857	163544	475.836
CHINA	112923	163598	498.014
COLOMBIA	7181	21485	5.426
COLOMBIA	7471	20240	4.423
COLOMBIA	8296	22257	4.499
COLOMBIA	8535	23062	4.531
COLOMBIA	8496	23361	4.158
COLOMBIA	8290	26439	4.024
COLOMBIA	8304	22492	4.108
COLOMBIA	6501	22996	4.201
COLOMBIA	9887	22598	4.201
COLOMBIA	5151	22415	4.312
COSTA RICA	944	1600	0.047
COSTA RICA	935	1643	0.921

COUNTRY	LAND (1000 HA.)	AID ($ MILLIONS)	EDUCATION (ENROLLMENTS)
CHINA	147305	670.0	48618.8
CHINA	147302	798.0	60608.0
COLOMBIA	4747	149.9	1490.8
COLOMBIA	5065	50.0	1370.2
COLOMBIA	5608	77.0	1616.1
COLOMBIA	5152	71.0	1616.1
COLOMBIA	5152	54.0	1733.2
COLOMBIA	5228	90.0	1733.2
COLOMBIA	5228	102.0	1816.6
COLOMBIA	5226	97.0	1816.6
COLOMBIA	5602	86.0	1816.6
COLOMBIA	5239	88.0	1889.0
COSTA RICA	544	27.2	116.0
COSTA RICA	544	33.0	111.5

COUNTRY	FERTILIZER (100 GRAMS/HA.)	TRACTOR (HORSEPOWER)
CHINA	696	33664.0
CHINA	740	34482.0
COLOMBIA	421	738.0
COLOMBIA	446	890.0
COLOMBIA	512	750.0
COLOMBIA	487	935.0
COLOMBIA	558	961.0
COLOMBIA	487	1137.0
COLOMBIA	178	1160.0
COLOMBIA	512	1144.0
COLOMBIA	456	1148.0
COLOMBIA	512	1149.0
COSTA RICA	1353	171.0
COSTA RICA	1322	201.0

COUNTRY	AG.OUTPUT ($MILLION)	LIVESTOCK (ANIMAL UNITS)	LABOR (MILLIONS)
COSTA RICA	1093.7	1699.1	0.3528
COSTA RICA	8535.0	1767.7	0.3410
COSTA RICA	1111.0	1826.2	0.3696
COSTA RICA	1518.0	1962.0	0.3899
COSTA RICA	3298.4	2934.0	0.3877
COSTA RICA	2094.0	2006.1	0.3968
COSTA RICA	3056.0	2240.8	0.3968
COSTA RICA	1472.0	2210.2	0.0336
CAMEROON	1706.8	3493.7	2.6676
CAMEROON	1706.8	2495.4	4.7409
CAMEROON	1811.3	2804.8	3.1568
CAMEROON	1831.2	2875.3	3.5867
CAMEROON	1859.5	3141.8	3.6752
CAMEROON	1915.3	3267.6	3.8339

COUNTRY	LAND (1000 HA.)	AID ($ MILLIONS)	EDUCATION (ENROLLMENTS)
COSTA RICA	362.6	27.0	121.20
COSTA RICA	543.9	51.0	121.20
COSTA RICA	543.9	56.0	134.35
COSTA RICA	543.7	65.0	135.83
COSTA RICA	541.7	55.0	133.91
COSTA RICA	704.8	80.0	130.34
COSTA RICA	709.9	252.0	122.84
COSTA RICA	707.1	217.0	117.41
CAMEROON	8006.0	262.5	140.00
CAMEROON	8044.2	223.3	143.81
CAMEROON	6046.0	303.0	188.23
CAMEROON	8055.1	178.0	200.00
CAMEROON	7534.1	270.0	208.00
CAMEROON	6737.4	265.0	234.09

COUNTRY	FERTILIZER (100 GRAMS/HA.)	TRACTOR (HORSEPOWER)
COSTA RICA	1265	172.0
COSTA RICA	1630	205.0
COSTA RICA	1364	207.0
COSTA RICA	1630	238.0
COSTA RICA	1175	240.0
COSTA RICA	1265	242.0
COSTA RICA	1137	244.0
COSTA RICA	1265	360.0
CAMEROON	17	9.0
CAMEROON	22	16.8
CAMEROON	43	10.5
CAMEROON	52	14.0
CAMEROON	47	16.0
CAMEROON	52	20.0

COUNTRY	AG.OUTPUT ($MILLION)	LIVESTOCK (ANIMAL UNITS)	LABOR (MILLIONS)
CAMEROON	1762.2	3243.9	3.8769
CAMEROON	2521.0	3475.2	3.9464
CAMEROON	2905.0	3661.9	3.9464
CAMEROON	2122.0	3656.9	3.9288
DOMREPUBLIC	1121.9	1918.4	0.9540
DOMREPUBLIC	1063.9	1944.6	3.0595
DOMREPUBLIC	1176.3	2073.2	1.4914
DOMREPUBLIC	1118.7	2125.7	1.4814
DOMREPUBLIC	1198.9	2183.8	1.3250
DOMREPUBLIC	1390.0	2816.2	1.4434
DOMREPUBLIC	693.0	2079.8	1.5829
DOMREPUBLIC	1161.0	1931.8	1.6223
DOMREPUBLIC	1414.0	2047.9	1.6223
DOMREPUBLIC	1469.0	2136.3	1.6442

COUNTRY	LAND (1000 HA.)	AID ($ MILLIONS)	EDUCATION (ENROLLMENTS)
CAMEROON	6737.4	199.0	241.82
CAMEROON	7923.0	212.0	266.51
CAMEROON	6333.6	130.0	288.73
CAMEROON	7591.8	188.0	328.42
DOMREPUBLIC	1114.4	78.4	206.18
DOMREPUBLIC	1377.6	58.5	260.13
DOMREPUBLIC	738.0	54.9	249.41
DOMREPUBLIC	1377.6	50.0	318.90
DOMREPUBLIC	1377.6	78.0	337.51
DOMREPUBLIC	976.8	125.0	356.09
DOMREPUBLIC	982.3	105.0	379.38
DOMREPUBLIC	929.0	137.0	343.32
DOMREPUBLIC	876.0	102.0	380.00
DOMREPUBLIC	1646.4	198.0	343.32

COUNTRY	FERTILIZER (100 GRAMS/HA.)	TRACTOR (HORSEPOWER)
CAMEROON	58	27.0
CAMEROON	43	30.0
CAMEROON	20	31.0
CAMEROON	43	33.0
DOMREPUBLIC	843	98.0
DOMREPUBLIC	691	102.5
DOMREPUBLIC	595	87.9
DOMREPUBLIC	505	105.0
DOMREPUBLIC	517	107.0
DOMREPUBLIC	505	126.0
DOMREPUBLIC	471	129.0
DOMREPUBLIC	595	130.0
DOMREPUBLIC	645	131.0
DOMREPUBLIC	595	132.0

COUNTRY	AG.OUTPUT ($MILLION)	LIVESTOCK (ANIMAL UNITS)	LABOR (MILLIONS)
ECUADOR	1537.4	3134.1	1.8987
ECUADOR	1592.0	3218.5	1.3688
ECUADOR	1656.9	3634.1	1.7498
ECUADOR	1581.1	3625.7	1.8299
ECUADOR	1511.9	3417.7	2.1481
ECUADOR	1392.9	4495.7	2.1689
ECUADOR	1359.0	4057.3	2.2376
ECUADOR	2318.0	4062.5	2.3528
ECUADOR	1989.0	4129.9	2.3528
ECUADOR	1757.6	4286.4	2.5534
EGYPT	3750.1	7375.3	1.5275
EGYPT	3750.1	4140.6	12.4432
EGYPT	3586.1	7321.0	10.7957
EGYPT	3119.2	5516.5	11.3954

COUNTRY	LAND (1000 HA.)	AID ($ MILLIONS)	EDUCATION (ENROLLMENTS)
ECUADOR	5401.8	86.0	425.76
ECUADOR	5394.3	123.9	383.63
ECUADOR	2641.1	82.0	461.11
ECUADOR	2771.9	45.0	410.78
ECUADOR	2771.9	70.0	535.45
ECUADOR	2579.5	46.0	581.85
ECUADOR	2440.0	59.0	672.60
ECUADOR	2782.5	53.0	664.10
ECUADOR	2507.8	64.0	650.28
ECUADOR	2660.6	136.0	655.22
EGYPT	2232.5	2112.1	2180.74
EGYPT	2236.5	2522.3	787.36
EGYPT	3680.3	2637.0	2408.25
EGYPT	2242.0	2370.0	2523.64

COUNTRY	FERTILIZER (100 GRAMS/HA.)	TRACTOR (HORSEPOWER)
ECUADOR	91	111.0
ECUADOR	198	213.0
ECUADOR	206	204.0
ECUADOR	269	195.0
ECUADOR	319	198.0
ECUADOR	269	230.0
ECUADOR	277	274.0
ECUADOR	206	287.0
ECUADOR	311	296.0
ECUADOR	206	304.0
EGYPT	1312	660.0
EGYPT	1683	772.0
EGYPT	1878	675.0
EGYPT	2048	823.0

COUNTRY	AG.OUTPUT ($MILLION)	LIVESTOCK (ANIMAL UNITS)	LABOR (MILLIONS)
EGYPT	3876.2	5521.4	10.8920
EGYPT	4631.1	4259.1	11.7565
EGYPT	4975.8	4459.7	12.2578
EGYPT	5462.0	3124.4	12.5565
EGYPT	4396.0	5676.9	12.5565
EGYPT	4089.0	5690.5	13.0122
ETHIOPIA	1592.5	25108.0	12.7772
ETHIOPIA	1592.2	25136.9	12.7864
ETHIOPIA	1748.0	26167.9	13.4824
ETHIOPIA	1763.5	28833.6	13.3083
ETHIOPIA	2243.0	28900.6	13.1016
ETHIOPIA	1870.5	39167.6	13.3162
ETHIOPIA	1969.0	26542.9	13.3777
ETHIOPIA	1970.8	29405.8	13.6968

COUNTRY	LAND (1000 HA.)	AID ($ MILLIONS)	EDUCATION (ENROLLMENTS)
EGYPT	2243.6	1450.0	2598.96
EGYPT	2700.0	1387.0	2929.17
EGYPT	2700.0	1292.0	3085.46
EGYPT	2468.0	1417.0	3089.00
EGYPT	3212.3	1431.0	227.61
EGYPT	1954.5	1764.0	320.17
ETHIOPIA	10160.2	209.0	281.45
ETHIOPIA	10160.2	267.3	230.91
ETHIOPIA	10182.4	199.0	279.60
ETHIOPIA	10160.2	140.0	326.81
ETHIOPIA	10231.9	191.0	371.30
ETHIOPIA	9731.0	216.0	426.28
ETHIOPIA	9768.0	250.0	487.18
ETHIOPIA	10360.0	200.0	535.15

COUNTRY	FERTILIZER (100 GRAMS/HA.)	TRACTOR (HORSEPOWER)
EGYPT	2469	858.0
EGYPT	2048	1000.0
EGYPT	2868	1020.0
EGYPT	1878	1600.0
EGYPT	1766	1640.0
EGYPT	1878	1680.0
ETHIOPIA	24	111.0
ETHIOPIA	19	131.0
ETHIOPIA	21	112.0
ETHIOPIA	21	134.8
ETHIOPIA	27	137.0
ETHIOPIA	21	158.0
ETHIOPIA	33	166.0
ETHIOPIA	21	156.0

COUNTRY	AG.OUTPUT ($MILLION)	LIVESTOCK (ANIMAL UNITS)	LABOR (MILLIONS)
ETHIOPIA	1970.8	31086	13.697
ETHIOPIA	1846.6	31085	14.451
GHANA	11053.4	1132	2.929
GHANA	11351.0	692	2.726
GHANA	12904.0	930	2.862
GHANA	15110.3	982	2.970
GHANA	14574.0	1013	3.051
GHANA	14710.0	1227	3.098
GHANA	12057.0	605	3.261
GHANA	10686.0	709	3.368
GHANA	13105.0	739	3.368
GHANA	11763.8	1147	3.317
GREECE	5361.7	2657	2.414
GREECE	5691.0	2609	4.613

COUNTRY	LAND (1000 HA.)	AID ($ MILLIONS)	EDUCATION (ENROLLMENTS)
ETHIOPIA	10308	344.0	579.8
ETHIOPIA	10308	363.0	535.2
GHANA	2457	61.5	577.0
GHANA	2462	112.9	556.0
GHANA	2246	72.8	556.0
GHANA	2475	144.0	592.3
GHANA	2503	93.0	613.7
GHANA	2592	193.0	668.4
GHANA	2592	148.0	693.5
GHANA	2521	142.0	729.6
GHANA	2521	110.0	753.7
GHANA	2566	216.0	751.2
GREECE	3730	1.0	694.2
GREECE	2889	14.0	661.8

COUNTRY	FERTILIZER (100 GRAMS/HA.)	TRACTOR (HORSEPOWER)
ETHIOPIA	20	156.0
ETHIOPIA	21	156.0
GHANA	252	97.5
GHANA	68	115.0
GHANA	109	99.0
GHANA	70	117.0
GHANA	67	119.0
GHANA	70	140.0
GHANA	105	142.0
GHANA	109	144.0
GHANA	76	146.0
GHANA	109	148.0
GREECE	1190	2910.0
GREECE	1189	3850.0

COUNTRY	AG.OUTPUT ($MILLION)	LIVESTOCK (ANIMAL UNITS)	LABOR (MILLIONS)
GREECE	5239.6	2257	2.355
GREECE	5798.1	2186	2.346
GREECE	5473.6	2115	2.262
GREECE	6211.2	3277	2.283
GREECE	6210.0	1700	2.309
GREECE	6680.0	2068	2.318
GREECE	6036.0	2496	2.318
GREECE	6534.0	2515	2.347
HONDURUS	467.1	1662	1.005
HONDURUS	467.0	1768	1.862
HONDURUS	612.5	1875	1.039
HONDURUS	623.0	1896	1.088
HONDURUS	627.6	1671	1.134
HONDURUS	631.9	2628	1.163

COUNTRY	LAND (1000 HA.)	AID ($ MILLIONS)	EDUCATION (ENROLLMENTS)
GREECE	3741	9.5	689.8
GREECE	3701	62.0	697.3
GREECE	3769	41.0	725.3
GREECE	3511	40.0	725.3
GREECE	3755	14.0	671.4
GREECE	3776	12.0	683.0
GREECE	3855	13.0	640.0
GREECE	3815	13.0	700.0
HONDURUS	1015	83.5	51.1
HONDURUS	1043	108.3	56.7
HONDURUS	995	102.0	89.9
HONDURUS	2003	93.0	93.3
HONDURUS	2003	97.0	109.4
HONDURUS	1778	103.0	127.3

COUNTRY	FERTILIZER (100 GRAMS/HA.)	TRACTOR (HORSEPOWER)
GREECE	1256.0	3300.0
GREECE	1464.0	4200.0
GREECE	1480.0	4550.0
GREECE	1464.0	5660.0
GREECE	1469.0	5920.0
GREECE	1256.0	6600.0
GREECE	1273.0	6600.0
GREECE	1256.0	6075.0
HONDURUS	226.0	31.5
HONDURUS	130.0	38.0
HONDURUS	305.0	33.0
HONDURUS	133.0	112.0
HONDURUS	111.0	116.0
HONDURUS	133.0	130.0

COUNTRY	AG.OUTPUT ($MILLION)	LIVESTOCK (ANIMAL UNITS)	LABOR (MILLIONS)
HONDURUS	624.0	2265	1.204
HONDURUS	608.0	2300	1.246
HONDURUS	608.0	2442	1.246
HONDURUS	608.0	2231	1.365
IVORYCOAST	797.5	620	3.094
IVORYCOAST	857.4	673	6.152
IVORYCOAST	865.0	671	3.198
IVORYCOAST	943.0	684	3.285
IVORYCOAST	1209.0	701	3.369
IVORYCOAST	2762.6	874	3.453
IVORYCOAST	2342.1	834	3.474
IVORYCOAST	2750.0	921	3.587
IVORYCOAST	2643.0	1078	3.587
IVORYCOAST	2696.0	972	3.967

COUNTRY	LAND (1000 HA.)	AID ($ MILLIONS)	EDUCATION (ENROLLMENTS)
HONDURUS	1784	109.0	147.1
HONDURUS	2264	158.0	148.0
HONDURUS	2009	192.0	219.7
HONDURUS	2259	290.0	164.5
IVORYCOAST	3526	58.2	127.5
IVORYCOAST	3526	72.4	126.8
IVORYCOAST	3526	52.0	125.7
IVORYCOAST	3952	131.0	144.6
IVORYCOAST	4004	162.0	172.3
IVORYCOAST	2850	210.0	217.8
IVORYCOAST	2881	124.0	1211.7
IVORYCOAST	5399	137.0	1322.5
IVORYCOAST	5300	157.0	1427.3
IVORYCOAST	4186	128.0	1343.6

COUNTRY	FERTILIZER (100 GRAMS/HA.)	TRACTOR (HORSEPOWER)
HONDURUS	161.0	131
HONDURUS	305.0	132
HONDURUS	152.0	132
HONDURUS	229.0	133
IVORYCOAST	47.0	69
IVORYCOAST	10.0	95
IVORYCOAST	52.0	81
IVORYCOAST	115.0	100
IVORYCOAST	131.0	105
IVORYCOAST	115.0	124
IVORYCOAST	125.0	128
IVORYCOAST	52.0	132
IVORYCOAST	102.0	136
IVORYCOAST	52.0	143

COUNTRY	AG.OUTPUT ($MILLION)	LIVESTOCK (ANIMAL UNITS)	LABOR (MILLIONS)
INDIA	51314.0	220049	235.442
INDIA	51314.0	219265	265.600
INDIA	54985.7	212808	253.628
INDIA	54504.0	215145	262.067
INDIA	48448.1	215111	257.417
INDIA	54012.0	223720	278.822
INDIA	54485.9	219543	282.470
INDIA	50918.0	154062	288.010
INDIA	71594.5	226807	288.012
INDIA	57015.0	226572	296.904
INDONESIA	15711.5	9087	49.970
INDONESIA	15711.5	10764	46.972
INDONESIA	17902.3	8875	44.856
INDONESIA	18343.0	9066	45.696

COUNTRY	LAND (1000 HA.)	AID ($ MILLIONS)	EDUCATION (ENROLLMENTS)
INDIA	296768	3340.0	23447.7
INDIA	230384	1987.7	23638.7
INDIA	219160	1749.0	25426.8
INDIA	229160	1289.0	26910.3
INDIA	229612	1350.0	28065.5
INDIA	224672	2146.0	29337.4
INDIA	224259	1911.0	32600.9
INDIA	230574	1545.0	35302.1
INDIA	228956	1725.0	34032.1
INDIA	228956	1547.0	35203.1
INDONESIA	34952	693.9	3833.1
INDONESIA	30960	661.7	3570.1
INDONESIA	29534	435.0	4084.3
INDONESIA	29462	635.0	4467.5

COUNTRY	FERTILIZER (100 GRAMS/HA.)	TRACTOR (HORSEPOWER)
INDIA	165.0	7526.0
INDIA	170.0	9514.0
INDIA	253.0	8155.0
INDIA	267.0	10244.0
INDIA	297.0	10850.0
INDIA	267.0	16725.0
INDIA	340.0	18320.0
INDIA	253.0	18463.0
INDIA	201.0	20103.0
INDIA	223.0	22142.0
INDONESIA	260.0	367.0
INDONESIA	253.0	339.0
INDONESIA	350.0	378.0
INDONESIA	449.0	413.0

COUNTRY	AG.OUTPUT ($MILLION)	LIVESTOCK (ANIMAL UNITS)	LABOR (MILLIONS)
INDONESIA	18566.0	9097.0	47.2142
INDONESIA	18035.2	10201.0	49.9067
INDONESIA	19047.6	16501.5	49.6072
INDONESIA	18221.8	7207.7	50.5924
INDONESIA	25029.0	10340.7	50.5924
INDONESIA	22372.0	10551.0	52.6710
IRAN	11103.5	9918.9	8.0468
IRAN	12496.0	10694.4	5.4475
IRAN	12112.0	11055.0	6.0990
IRAN	12116.7	11445.7	7.0992
IRAN	12498.4	11524.7	7.5480
IRAN	15151.0	12832.0	7.8666
IRAN	18017.0	8880.9	7.9741
IRAN	20774.0	12100.0	8.2051

COUNTRY	LAND (1000 HA.)	AID ($ MILLIONS)	EDUCATION (ENROLLMENTS)
INDONESIA	34952.4	721.0	4299.03
INDONESIA	25560.0	950.0	5721.81
INDONESIA	25650.0	975.0	6320.01
INDONESIA	26248.0	906.0	6568.85
INDONESIA	26248.0	751.0	6650.28
INDONESIA	25044.0	673.0	6445.00
IRAN	10048.5	1.0	2192.05
IRAN	10048.5	31.0	2183.14
IRAN	10049.0	24.0	2000.00
IRAN	10048.5	128.0	2202.68
IRAN	10048.5	6.0	2836.00
IRAN	9657.9	31.0	2856.00
IRAN	8253.0	9.0	2836.14
IRAN	8631.0	3.0	2693.54

COUNTRY	FERTILIZER (100 GRAMS/HA.)	TRACTOR (HORSEPOWER)
INDONESIA	441.0	431.0
INDONESIA	449.0	520.0
INDONESIA	744.0	552.0
INDONESIA	350.0	568.0
INDONESIA	254.0	592.0
INDONESIA	253.0	616.0
IRAN	207.0	900.0
IRAN	221.0	1740.0
IRAN	180.0	1832.0
IRAN	180.0	1925.0
IRAN	306.0	1995.0
IRAN	180.0	2320.0
IRAN	349.5	2360.0
IRAN	206.0	3000.0

COUNTRY	AG.OUTPUT ($MILLION)	LIVESTOCK (ANIMAL UNITS)	LABOR (MILLIONS)
IRAN	22674.0	13782.0	8.2051
IRAN	22674.0	15650.7	8.8824
ISRAEL	929.2	520.8	0.2148
ISRAEL	1040.8	307.0	0.4075
ISRAEL	981.6	297.8	0.1500
ISRAEL	971.3	307.7	0.1528
ISRAEL	977.3	283.1	0.1569
ISRAEL	1019.2	323.2	0.1574
ISRAEL	1026.0	295.5	0.1604
ISRAEL	2138.0	309.5	0.1633
ISRAEL	113.7	323.0	0.1633
ISRAEL	1117.5	339.0	0.0728
JAMAICA	238.3	288.9	0.0315
JAMAICA	242.0	303.7	0.5844

COUNTRY	LAND (1000 HA.)	AID ($ MILLIONS)	EDUCATION (ENROLLMENTS)
IRAN	8303.00	48.0	2832.84
IRAN	9342.90	13.0	3107.55
ISRAEL	467.64	198.2	173.19
ISRAEL	464.46	155.2	170.17
ISRAEL	446.00	308.0	176.89
ISRAEL	446.04	900.0	182.55
ISRAEL	446.04	1185.0	193.22
ISRAEL	351.00	892.0	199.86
ISRAEL	351.00	772.0	210.67
ISRAEL	453.60	857.0	229.15
ISRAEL	419.52	1345.0	139.50
ISRAEL	471.96	1256.0	230.00
JAMAICA	238.50	157.0	225.74
JAMAICA	238.58	118.5	216.25

COUNTRY	FERTILIZER (100 GRAMS/HA.)	TRACTOR (HORSEPOWER)
IRAN	241	3000.0
IRAN	206	1220.0
ISRAEL	1707	720.0
ISRAEL	1691	739.0
ISRAEL	2041	686.0
ISRAEL	2041	851.0
ISRAEL	1885	896.0
ISRAEL	2041	1080.0
ISRAEL	1804	1133.0
ISRAEL	1781	1072.0
ISRAEL	1794	1099.0
ISRAEL	1781	164.0
JAMAICA	819	78.0
JAMAICA	743	91.0

COUNTRY	AG.OUTPUT ($MILLION)	LIVESTOCK (ANIMAL UNITS)	LABOR (MILLIONS)
JAMAICA	255.9	301.2	0.2520
JAMAICA	237.0	302.8	0.2940
JAMAICA	211.2	307.8	0.2420
JAMAICA	221.1	414.0	0.4101
JAMAICA	211.0	371.6	0.4196
JAMAICA	187.2	276.8	0.4791
JAMAICA	211.6	764.0	0.4791
JAMAICA	106.6	375.6	0.4484
KENYA	1623.8	10730.4	5.5680
KENYA	1623.0	7458.3	5.1083
KENYA	2254.8	9796.2	6.1320
KENYA	2084.9	9529.1	5.8065
KENYA	2025.1	9396.2	5.9670
KENYA	1955.8	10416.2	6.1479

COUNTRY	LAND (1000 HA.)	AID ($ MILLIONS)	EDUCATION (ENROLLMENTS)
JAMAICA	280.90	108.0	206.02
JAMAICA	238.50	122.0	242.27
JAMAICA	238.50	123.0	255.23
JAMAICA	235.75	126.0	248.00
JAMAICA	235.75	155.0	248.00
JAMAICA	239.40	180.0	249.65
JAMAICA	285.14	181.0	233.35
JAMAICA	242.10	170.0	233.00
KENYA	1598.40	129.0	288.54
KENYA	1679.80	162.0	240.97
KENYA	1614.20	163.0	328.74
KENYA	1679.80	248.0	370.52
KENYA	1679.80	351.0	319.91
KENYA	1324.60	397.0	428.02

COUNTRY	FERTILIZER (100 GRAMS/HA.)	TRACTOR (HORSEPOWER)
JAMAICA	558	79.5
JAMAICA	897	95.0
JAMAICA	503	96.0
JAMAICA	897	112.0
JAMAICA	718	115.0
JAMAICA	558	116.0
JAMAICA	540	117.0
JAMAICA	558	118.0
KENYA	252	180.0
KENYA	225	210.0
KENYA	227	181.0
KENYA	222	213.0
KENYA	169	231.0
KENYA	222	270.0

COUNTRY	AG.OUTPUT ($MILLION)	LIVESTOCK (ANIMAL UNITS)	LABOR (MILLIONS)
KENYA	1868.3	10395.2	6.2865
KENYA	2145.0	9811.2	6.5489
KENYA	2145.0	11395.2	6.5489
KENYA	1909.0	11122.2	6.9358
KOREAREPUBLIC	10240.0	1541.2	11.4480
KOREAREPUBLIC	11173.0	1822.8	12.2046
KOREAREPUBLIC	11895.0	1641.4	9.7200
KOREAREPUBLIC	11250.4	1598.1	9.4538
KOREAREPUBLIC	12267.4	1673.3	8.5730
KOREAREPUBLIC	1955.0	1664.6	8.0365
KOREAREPUBLIC	10787.0	1903.2	8.2444
KOREAREPUBLIC	10631.0	1575.2	8.3846
KOREAREPUBLIC	10786.0	1868.6	8.3846
KOREAREPUBLIC	11667.0	2540.7	8.7712

COUNTRY	LAND (1000 HA.)	AID ($ MILLIONS)	EDUCATION (ENROLLMENTS)
KENYA	1354.2	449.0	422.45
KENYA	1767.1	484.0	449.83
KENYA	1709.4	402.0	449.93
KENYA	1727.9	431.0	517.03
KOREAREPUBLIC	3021.3	218.1	3322.01
KOREAREPUBLIC	3011.8	249.8	3311.51
KOREAREPUBLIC	2231.0	239.0	3492.09
KOREAREPUBLIC	2997.0	164.0	3692.81
KOREAREPUBLIC	2979.4	134.0	3997.32
KOREAREPUBLIC	5507.8	139.0	4285.89
KOREAREPUBLIC	5487.0	331.0	4335.02
KOREAREPUBLIC	2943.0	34.0	4435.00
KOREAREPUBLIC	2167.0	8.0	4718.22
KOREAREPUBLIC	2924.1	1.0	4718.20

COUNTRY	FERTILIZER (100 GRAMS/HA.)	TRACTOR (HORSEPOWER)
KENYA	358	264.0
KENYA	227	260.0
KENYA	237	260.0
KENYA	227	277.0
KOREAREPUBLIC	3579	23.7
KOREAREPUBLIC	3510	33.8
KOREAREPUBLIC	3299	33.6
KOREAREPUBLIC	3919	56.0
KOREAREPUBLIC	3857	71.0
KOREAREPUBLIC	3919	107.0
KOREAREPUBLIC	3513	155.0
KOREAREPUBLIC	3299	223.0
KOREAREPUBLIC	2874	299.0
KOREAREPUBLIC	329	231.0

COUNTRY	AG.OUTPUT ($MILLION)	LIVESTOCK (ANIMAL UNITS)	LABOR (MILLIONS)
LIBERIA	256.8	96.7	0.6566
LIBERIA	288.2	79.4	0.7000
LIBERIA	314.2	65.8	0.6701
LIBERIA	342.8	67.5	0.6518
LIBERIA	357.4	69.4	0.6901
LIBERIA	359.0	91.8	0.6679
LIBERIA	334.0	84.1	0.7276
LIBERIA	344.0	77.2	0.7543
LIBERIA	309.0	103.2	0.7543
LIBERIA	301.5	104.5	7.7277
MALAYSIA	4347.2	319.0	3.4290
MALAYSIA	4863.6	785.9	5.3652
MALAYSIA	5028.4	755.5	3.0888
MALAYSIA	4959.4	874.3	3.5910

COUNTRY	LAND (1000 HA.)	AID ($ MILLIONS)	EDUCATION (ENROLLMENTS)
LIBERIA	333.1	28.5	31.22
LIBERIA	337.6	29.8	34.15
LIBERIA	341.0	41.0	47.45
LIBERIA	337.6	48.0	44.45
LIBERIA	337.6	81.0	53.25
LIBERIA	314.7	98.0	102.02
LIBERIA	311.7	109.0	104.65
LIBERIA	337.6	109.0	110.73
LIBERIA	141.0	118.0	122.84
LIBERIA	337.6	133.0	130.00
MALAYSIA	3962.3	107.1	861.10
MALAYSIA	3874.0	165.7	609.38
MALAYSIA	4365.6	100.0	864.89
MALAYSIA	4748.0	80.0	943.90

COUNTRY	FERTILIZER (100 GRAMS/HA.)	TRACTOR (HORSEPOWER)
LIBERIA	58	7.8
LIBERIA	128	8.0
LIBERIA	94	8.0
LIBERIA	102	10.0
LIBERIA	148	10.0
LIBERIA	102	12.0
LIBERIA	200	12.0
LIBERIA	94	12.0
LIBERIA	161	12.0
LIBERIA	94	12.0
MALAYSIA	594	15.9
MALAYSIA	613	378.0
MALAYSIA	355	235.0
MALAYSIA	571	280.0

COUNTRY	AG.OUTPUT ($MILLION)	LIVESTOCK (ANIMAL UNITS)	LABOR (MILLIONS)
MALAYSIA	5639.7	882.3	3.6077
MALAYSIA	5522.7	1103.5	3.8836
MALAYSIA	6189.9	1000.0	4.0362
MALAYSIA	5981.0	866.8	4.1342
MALAYSIA	5897.5	1161.8	4.1342
MALAYSIA	5736.8	1170.9	4.4092
MALAWAI	439.1	728.5	2.4253
MALAWAI	439.1	718.0	4.4063
MALAWAI	481.6	630.1	2.5822
MALAWAI	509.3	648.8	2.5981
MALAWAI	607.0	680.8	1.5063
MALAWAI	555.6	764.9	2.5671
MALAWAI	365.5	797.6	2.7387
MALAWAI	495.0	747.3	2.8320

COUNTRY	LAND (1000 HA.)	AID ($ MILLIONS)	EDUCATION (ENROLLMENTS)
MALAYSIA	4845.5	125.0	1075.88
MALAYSIA	4300.0	135.0	1173.20
MALAYSIA	5326.0	143.0	1076.14
MALAYSIA	5852.3	135.0	1137.70
MALAYSIA	4426.8	177.0	1156.47
MALAYSIA	5872.5	327.0	1272.93
MALAWAI	1221.9	97.3	15.14
MALAWAI	1913.5	100.2	15.65
MALAWAI	1913.5	109.8	15.56
MALAWAI	1930.3	99.0	15.56
MALAWAI	1930.3	142.0	16.49
MALAWAI	1932.0	143.0	19.88
MALAWAI	1932.0	138.0	21.22
MALAWAI	1932.0	121.0	21.65

COUNTRY	FERTILIZER (100 GRAMS/HA.)	TRACTOR (HORSEPOWER)
MALAYSIA	1011	276.0
MALAYSIA	571	322.0
MALAYSIA	823	332.0
MALAYSIA	355	319.0
MALAYSIA	703	320.0
MALAYSIA	355	167.0
MALAWAI	49	30.0
MALAWAI	77	58.0
MALAWAI	86	31.0
MALAWAI	114	39.0
MALAWAI	110	40.0
MALAWAI	114	48.0
MALAWAI	147	50.0
MALAWAI	86	50.0

COUNTRY	AG.OUTPUT ($MILLION)	LIVESTOCK (ANIMAL UNITS)	LABOR (MILLIONS)
MALAWAI	494.9	848.5	2.8320
MALAWAI	358.2	858.7	2.8029
MADAGASCAR	1121.5	8156.0	4.2145
MADAGASCAR	1215.9	8084.2	4.3451
MADAGASCAR	1189.3	8056.8	3.5381
MADAGASCAR	1128.3	7055.7	3.7118
MADAGASCAR	1257.2	7262.5	3.8454
MADAGASCAR	1180.0	8472.5	4.0116
MADAGASCAR	1047.9	8609.6	4.1416
MADAGASCAR	1093.0	8548.0	4.2573
MADAGASCAR	1093.0	8761.7	4.2573
MADAGASCAR	880.5	8841.1	4.2325
MEXICO	15148.0	34202.9	14.2290
MEXICO	15021.0	32980.8	17.1746

COUNTRY	LAND (1000 HA.)	AID ($ MILLIONS)	EDUCATION (ENROLLMENTS)
MALAWAI	1969.0	117.00	22.24
MALAWAI	1969.8	159.00	24.84
MADAGASCAR	3405.8	165.00	130.00
MADAGASCAR	3485.5	206.40	113.27
MADAGASCAR	3983.4	131.00	160.00
MADAGASCAR	3485.5	91.00	100.00
MADAGASCAR	3570.0	138.00	180.00
MADAGASCAR	2986.9	230.00	260.00
MADAGASCAR	2986.9	234.00	200.00
MADAGASCAR	3570.0	251.00	201.00
MADAGASCAR	3583.1	185.00	301.12
MADAGASCAR	3593.8	156.00	400.00
MEXICO	27790.0	51.30	207.92
MEXICO	23220.0	56.60	2938.97

COUNTRY	FERTILIZER (100 GRAMS/HA.)	TRACTOR (HORSEPOWER)
MALAWAI	118	51.0
MALAWAI	6	52.0
MADAGASCAR	21	72.0
MADAGASCAR	30	87.5
MADAGASCAR	33	75.0
MADAGASCAR	33	89.0
MADAGASCAR	25	91.0
MADAGASCAR	33	106.0
MADAGASCAR	23	107.0
MADAGASCAR	33	108.0
MADAGASCAR	34	109.0
MADAGASCAR	33	110.0
MEXICO	393	4350.0
MEXICO	440	4900.0

COUNTRY	AG.OUTPUT ($MILLION)	LIVESTOCK (ANIMAL UNITS)	LABOR (MILLIONS)
MEXICO	15348.0	36144.9	10.9762
MEXICO	16194.4	36435.1	13.0081
MEXICO	16256.0	36914.7	12.3598
MEXICO	15595.0	60771.9	12.9904
MEXICO	16378.0	42872.7	13.4436
MEXICO	27185.0	42829.9	13.8384
MEXICO	19327.0	43986.8	13.8384
MEXICO	19044.0	43785.0	14.6992
MOROCCO	2516.6	6589.7	5.0981
MOROCCO	2516.0	5641.2	5.7755
MOROCCO	2445.5	5631.2	5.0430
MOROCCO	2908.3	5951.2	5.2088
MOROCCO	2307.6	5704.4	5.3742
MOROCCO	3259.2	8274.2	5.3173

COUNTRY	LAND (1000 HA.)	AID ($ MILLIONS)	EDUCATION (ENROLLMENTS)
MEXICO	20201.4	60.00	3502.83
MEXICO	23220.0	18.00	3914.25
MEXICO	23220.0	75.00	4285.02
MEXICO	29430.0	56.00	4741.85
MEXICO	29565.0	100.00	5333.13
MEXICO	23450.0	140.00	5716.24
MEXICO	20532.0	132.00	6064.26
MEXICO	24700.0	83.00	6064.26
MOROCCO	4463.1	332.70	486.17
MOROCCO	4468.8	426.40	486.17
MOROCCO	4579.0	403.00	589.61
MOROCCO	4484.8	428.00	662.03
MOROCCO	4407.8	473.00	709.84
MOROCCO	4143.3	896.00	797.11

COUNTRY	FERTILIZER (100 GRAMS/HA.)	TRACTOR (HORSEPOWER)
MEXICO	460	4500.0
MEXICO	459	5425.0
MEXICO	489	3990.0
MEXICO	459	4800.0
MEXICO	666	5000.0
MEXICO	460	6320.0
MEXICO	483	6800.0
MEXICO	460	6320.0
MOROCCO	214	645.0
MOROCCO	217	752.0
MOROCCO	229	660.0
MOROCCO	236	805.0
MOROCCO	289	833.0
MOROCCO	236	980.0

COUNTRY	AG.OUTPUT ($MILLION)	LIVESTOCK (ANIMAL UNITS)	LABOR (MILLIONS)
MOROCCO	2763.9	4111.3	5.5615
MOROCCO	1596.0	4603.5	5.7461
MOROCCO	4926.0	5607.0	5.7461
MOROCCO	3140.0	5598.1	6.0797
NEPAL	1240.6	12501.0	6.6693
NEPAL	1204.6	9668.0	6.9994
NEPAL	1132.6	7448.0	6.8029
NEPAL	1333.3	9803.0	6.9564
NEPAL	1227.7	9936.0	7.1610
NEPAL	1515.7	5781.4	7.5037
NEPAL	1296.9	10120.5	7.4766
NEPAL	1283.0	5885.0	7.6474
NEPAL	1230.3	10492.0	7.6474
NEPAL	1268.6	10591.0	8.0904

COUNTRY	LAND (1000 HA.)	AID ($ MILLIONS)	EDUCATION (ENROLLMENTS)
MOROCCO	4511.0	1034.00	888.12
MOROCCO	4940.2	771.00	968.33
MOROCCO	4415.8	397.00	929.96
MOROCCO	4748.7	286.00	1130.18
NEPAL	2206.2	85.90	262.75
NEPAL	2522.3	79.70	243.23
NEPAL	2535.3	128.00	308.80
NEPAL	2527.7	77.00	370.23
NEPAL	2539.7	137.00	449.04
NEPAL	2524.4	163.00	512.42
NEPAL	2524.4	181.00	313.89
NEPAL	2541.9	201.00	370.08
NEPAL	2541.9	201.00	418.08
NEPAL	2527.7	198.00	455.40

COUNTRY	FERTILIZER (100 GRAMS/HA.)	TRACTOR (HORSEPOWER)
MOROCCO	239	992.0
MOROCCO	229	963.0
MOROCCO	241	963.0
MOROCCO	229	1200.0
NEPAL	61	1.3
NEPAL	57	16.0
NEPAL	73	14.0
NEPAL	101	18.0
NEPAL	90	18.0
NEPAL	101	21.0
NEPAL	94	21.0
NEPAL	73	21.0
NEPAL	64	21.0
NEPAL	3	21.0

COUNTRY	AG.OUTPUT ($MILLION)	LIVESTOCK (ANIMAL UNITS)	LABOR (MILLIONS)
NIGERIA	19701.4	13078.7	35.2810
NIGERIA	19701.4	12577.3	58.6964
NIGERIA	21244.0	11035.0	23.0048
NIGERIA	19463.0	11323.7	23.4707
NIGERIA	16694.6	11523.7	23.6236
NIGERIA	17621.0	13955.0	21.7498
NIGERIA	18432.0	13070.0	21.5136
NIGERIA	12706.0	12443.8	22.2460
NIGERIA	22563.0	12989.8	22.2460
NIGERIA	18592.0	14434.8	25.9406
NIGER	676.8	3494.0	2.2292
NIGER	676.8	3263.1	4.3636
NIGER	635.6	3148.1	2.2991
NIGER	714.8	3415.1	2.3205

COUNTRY	LAND (1000 HA.)	AID ($ MILLIONS)	EDUCATION (ENROLLMENTS)
NIGERIA	23840.0	70.65	998.61
NIGERIA	23990.0	134.40	854.78
NIGERIA	23897.5	59.40	1231.10
NIGERIA	23990.0	43.00	1408.87
NIGERIA	30310.0	27.00	1826.63
NIGERIA	25343.5	36.00	2345.60
NIGERIA	25343.5	41.00	2880.28
NIGERIA	27695.8	37.00	3293.19
NIGERIA	24043.6	48.00	3561.21
NIGERIA	23105.0	33.00	3660.00
NIGER	1800.0	369.40	21.75
NIGER	1800.0	373.20	14.46
NIGER	1638.0	204.20	22.29
NIGER	1618.2	157.00	25.58

COUNTRY	FERTILIZER (100 GRAMS/HA.)	TRACTOR (HORSEPOWER)
NIGERIA	22	231.0
NIGERIA	18	269.0
NIGERIA	31	237.0
NIGERIA	30	284.0
NIGERIA	36	291.0
NIGERIA	30	344.0
NIGERIA	70	352.0
NIGERIA	31	360.0
NIGERIA	26	380.0
NIGERIA	3	400.0
NIGER	1	2.1
NIGER	3	2.4
NIGER	1	2.0
NIGER	5	5.0

COUNTRY	AG.OUTPUT ($MILLION)	LIVESTOCK (ANIMAL UNITS)	LABOR (MILLIONS)
NIGER	629.0	3586.8	2.4133
NIGER	627.5	4257.4	2.4644
NIGER	548.0	4068.1	2.5428
NIGER	616.2	4318.9	2.6203
NIGER	616.2	2954.7	2.6203
NIGER	554.0	5072.3	2.7567
PANAMA	293.4	1229.4	0.3856
PANAMA	314.7	1292.6	0.7470
PANAMA	343.7	1333.5	0.2916
PANAMA	347.5	1338.0	0.3402
PANAMA	335.5	1360.9	0.3305
PANAMA	348.0	1481.1	0.3615
PANAMA	343.0	1323.8	0.3641
PANAMA	344.0	1406.4	0.3724

COUNTRY	LAND (1000 HA.)	AID ($ MILLIONS)	EDUCATION (ENROLLMENTS)
NIGER	1710.8	174.0	38.86
NIGER	1742.0	170.0	38.82
NIGER	1851.2	193.0	44.72
NIGER	1898.0	259.0	42.97
NIGER	1851.2	175.0	42.16
NIGER	1955.2	162.0	47.12
PANAMA	734.5	77.3	154.42
PANAMA	734.5	47.8	133.18
PANAMA	764.1	51.0	154.42
PANAMA	735.8	29.0	164.47
PANAMA	741.0	35.0	170.42
PANAMA	698.5	46.0	171.27
PANAMA	701.9	39.0	174.79
PANAMA	756.6	41.0	176.44

COUNTRY	FERTILIZER (100 GRAMS/HA.)	TRACTOR (HORSEPOWER)
NIGER	5	6.0
NIGER	5	7.2
NIGER	6	7.6
NIGER	5	6.8
NIGER	4	6.7
NIGER	5	7.0
PANAMA	455	146.8
PANAMA	453	132.0
PANAMA	402	49.0
PANAMA	406	137.0
PANAMA	523	138.0
PANAMA	406	160.0
PANAMA	521	162.0
PANAMA	402	164.0

COUNTRY	AG.OUTPUT ($MILLION)	LIVESTOCK (ANIMAL UNITS)	LABOR (MILLIONS)
PANAMA	371.1	1391.3	0.3724
PANAMA	358.8	1407.9	0.3014
PERU	2512.3	5814.9	3.7683
PERU	2288.0	6336.7	3.3105
PERU	2297.2	6235.3	3.4768
PERU	1913.8	6288.0	3.4726
PERU	1754.0	6338.5	3.4439
PERU	1659.0	7597.9	3.7279
PERU	1298.0	4838.7	3.9137
PERU	2099.3	4704.3	4.0243
PERU	4330.7	4816.5	4.0243
PERU	4997.0	5364.5	4.3001
PHILIPPINES	7546.8	7331.8	11.7039
PHILIPPINES	7546.8	9269.1	11.3720

COUNTRY	LAND (1000 HA.)	AID ($ MILLIONS)	EDUCATION (ENROLLMENTS)
PANAMA	788.4	47.0	179.06
PANAMA	733.2	72.0	181.77
PERU	3696.3	17.2	834.55
PERU	3810.6	22.0	813.49
PERU	3794.6	34.0	969.13
PERU	3807.3	143.0	1095.08
PERU	3772.9	200.0	1151.75
PERU	3472.0	203.0	1151.75
PERU	3584.0	233.0	1226.13
PERU	3901.6	188.0	1349.29
PERU	3939.0	297.0	1427.26
PERU	3903.9	310.0	1460.00
PHILIPPINES	10880.0	319.7	2508.52
PHILIPPINES	11016.0	301.4	2291.71

COUNTRY	FERTILIZER (100 GRAMS/HA.)	TRACTOR (HORSEPOWER)
PANAMA	405	166.0
PANAMA	402	340.0
PERU	297	381.0
PERU	388	750.0
PERU	405	390.0
PERU	374	466.0
PERU	345	476.0
PERU	374	556.0
PERU	375	572.0
PERU	405	660.0
PERU	350	98.0
PERU	405	712.0
PHILIPPINES	288	195.0
PHILIPPINES	266	378.0

COUNTRY	AG.OUTPUT ($MILLION)	LIVESTOCK (ANIMAL UNITS)	LABOR (MILLIONS)
PHILIPPINES	8093.3	9349.0	11.5484
PHILIPPINES	8392.5	6157.5	11.1629
PHILIPPINES	8508.2	6366.5	11.1940
PHILIPPINES	8234.3	6492.8	11.7797
PHILIPPINES	8346.5	7240.9	12.3180
PHILIPPINES	8318.0	3475.6	12.6449
PHILIPPINES	10229.0	6610.4	12.6449
PHILIPPINES	9069.0	6509.8	13.7545
PAKISTAN	5334.4	27725.3	21.0040
PAKISTAN	5334.4	25025.1	22.4630
PAKISTAN	5664.4	26352.7	21.7210
PAKISTAN	5955.0	28525.8	22.4170
PAKISTAN	6333.4	29075.1	22.7145
PAKISTAN	6676.8	31244.0	25.3409

COUNTRY	LAND (1000 HA.)	AID ($ MILLIONS)	EDUCATION (ENROLLMENTS)
PHILIPPINES	10296.0	286.0	2696.46
PHILIPPINES	11016.0	249.0	2820.47
PHILIPPINES	13464.0	267.0	2917.91
PHILIPPINES	9588.0	300.0	2928.52
PHILIPPINES	10553.6	376.0	2935.73
PHILIPPINES	11726.0	333.0	3092.13
PHILIPPINES	11700.0	429.0	3080.00
PHILIPPINES	15368.0	397.0	3323.51
PAKISTAN	22915.6	3104.6	2009.47
PAKISTAN	23954.0	1692.0	1935.85
PAKISTAN	23082.5	856.5	2042.58
PAKISTAN	23588.2	639.0	2120.73
PAKISTAN	23954.0	684.0	2261.22
PAKISTAN	23635.4	1075.0	2165.83

COUNTRY	FERTILIZER (100 GRAMS/HA.)	TRACTOR (HORSEPOWER)
PHILIPPINES	322	414.0
PHILIPPINES	385	525.0
PHILIPPINES	321	560.0
PHILIPPINES	385	680.0
PHILIPPINES	531	700.0
PHILIPPINES	322	720.0
PHILIPPINES	273	740.0
PHILIPPINES	322	760.0
PAKISTAN	280	1110.0
PAKISTAN	272	1295.0
PAKISTAN	351	1170.0
PAKISTAN	441	1470.0
PAKISTAN	488	1540.0
PAKISTAN	441	1840.0

COUNTRY	AG.OUTPUT ($MILLION)	LIVESTOCK (ANIMAL UNITS)	LABOR (MILLIONS)
PAKISTAN	6815.0	28710.0	25.9932
PAKISTAN	7625.0	18662.1	26.7470
PAKISTAN	7234.0	34261.3	26.7472
PAKISTAN	7589.0	33749.8	29.8991
PORTUGAL	2715.8	1465.5	1.9958
PORTUGAL	2697.9	1777.4	1.5854
PORTUGAL	2495.8	1879.8	1.6500
PORTUGAL	2569.5	2184.9	1.6670
PORTUGAL	2972.8	2033.0	1.5435
PORTUGAL	2778.4	2913.8	1.7178
PORTUGAL	2740.5	2083.4	1.7478
PORTUGAL	2961.3	2156.8	1.7606
PORTUGAL	2618.0	2238.9	1.7606
PORTUGAL	2119.4	2254.8	1.7934

COUNTRY	LAND (1000 HA.)	AID ($ MILLIONS)	EDUCATION (ENROLLMENTS)
PAKISTAN	23600.0	768.0	2253.30
PAKISTAN	23948.1	850.0	2433.23
PAKISTAN	24178.2	669.0	2266.10
PAKISTAN	23930.0	698.0	2403.10
PORTUGAL	3672.0	1.0	482.59
PORTUGAL	3696.5	1.0	466.49
PORTUGAL	3646.5	375.0	454.18
PORTUGAL	3636.3	68.0	454.18
PORTUGAL	3626.1	136.0	400.00
PORTUGAL	4002.8	113.0	398.32
PORTUGAL	4002.8	82.0	399.34
PORTUGAL	3621.0	49.0	451.43
PORTUGAL	3621.0	45.0	460.00
PORTUGAL	3615.9	98.0	490.00

COUNTRY	FERTILIZER (100 GRAMS/HA.)	TRACTOR (HORSEPOWER)
PAKISTAN	531	1920.0
PAKISTAN	351	4920.0
PAKISTAN	273	5440.0
PAKISTAN	351	5920.0
PORTUGAL	676	1489.0
PORTUGAL	650	1590.0
PORTUGAL	757	1717.0
PORTUGAL	695	2152.0
PORTUGAL	774	2275.0
PORTUGAL	695	2800.0
PORTUGAL	774	2959.0
PORTUGAL	757	3040.0
PORTUGAL	689	3120.0
PORTUGAL	757	322.0

COUNTRY	AG.OUTPUT ($MILLION)	LIVESTOCK (ANIMAL UNITS)	LABOR (MILLIONS)
PARAGUAY	994.30	5257.1	0.70716
PARAGUAY	996.60	4511.8	1.45903
PARAGUAY	1111.00	5176.2	0.74256
PARAGUAY	1156.20	5311.7	0.75400
PARAGUAY	1531.00	4849.1	0.78000
PARAGUAY	1561.00	5023.0	0.82273
PARAGUAY	1298.00	5099.4	0.84896
PARAGUAY	1246.70	4809.5	0.87519
PARAGUAY	1679.50	4715.5	0.87519
PARAGUAY	729.30	4796.0	0.96373
RWANDA	461.70	618.8	1.99200
RWANDA	461.70	653.1	2.13044
RWANDA	543.40	573.4	2.06448
RWANDA	549.00	530.3	2.08845

COUNTRY	LAND (1000 HA.)	AID ($ MILLIONS)	EDUCATION (ENROLLMENTS)
PARAGUAY	993.60	58.8	81.91
PARAGUAY	1075.20	50.7	75.42
PARAGUAY	1676.10	58.0	92.44
PARAGUAY	1108.80	43.0	101.13
PARAGUAY	1709.76	31.0	110.09
PARAGUAY	826.20	31.0	118.83
PARAGUAY	836.40	55.0	126.49
PARAGUAY	1862.40	85.0	164.46
PARAGUAY	1853.40	51.0	143.79
PARAGUAY	1862.40	50.0	150.57
RWANDA	967.17	134.6	12.57
RWANDA	983.64	142.6	12.05
RWANDA	878.60	139.7	13.21
RWANDA	988.80	125.0	17.80

COUNTRY	FERTILIZER (100 GRAMS/HA.)	TRACTOR (HORSEPOWER)
PARAGUAY	11	84.0
PARAGUAY	11	162.0
PARAGUAY	10	87.0
PARAGUAY	24	105.0
PARAGUAY	33	116.0
PARAGUAY	24	128.0
PARAGUAY	48	132.0
PARAGUAY	10	320.0
PARAGUAY	10	340.0
PARAGUAY	10	398.0
RWANDA	9	2.3
RWANDA	4	5.0
RWANDA	3	2.4
RWANDA	3	3.0

COUNTRY	AG.OUTPUT ($MILLION)	LIVESTOCK (ANIMAL UNITS)	LABOR (MILLIONS)
RWANDA	679.00	554.3	2.2741
RWANDA	519.70	655.0	2.4322
RWANDA	460.70	650.0	2.3423
RWANDA	508.30	560.1	2.4176
RWANDA	508.30	695.2	2.4176
RWANDA	626.00	696.8	2.7382
SRILANKA	3496.00	2394.2	4.4020
SRILANKA	3496.70	2253.9	4.4615
SRILANKA	4627.60	2263.4	4.4193
SRILANKA	5267.00	2143.5	4.5101
SRILANKA	5617.40	2156.8	4.5414
SRILANKA	1039.50	2234.5	4.8017
SRILANKA	1885.00	2354.5	4.8953
SRILANKA	1991.80	2466.2	4.9975

COUNTRY	LAND (1000 HA.)	AID ($ MILLIONS)	EDUCATION (ENROLLMENTS)
RWANDA	996.0	148.0	12.17
RWANDA	741.6	155.0	10.67
RWANDA	746.8	154.0	12.50
RWANDA	1065.0	151.0	14.23
RWANDA	1040.3	151.0	14.76
RWANDA	1040.3	165.0	14.23
SRILANKA	3126.8	108.4	1076.50
SRILANKA	3367.0	135.4	1076.50
SRILANKA	3339.2	176.1	970.00
SRILANKA	3389.1	324.0	1243.24
SRILANKA	3382.8	323.0	1159.97
SRILANKA	2619.5	393.0	1258.00
SRILANKA	2633.7	378.0	1258.00
SRILANKA	3434.9	416.0	1315.06

COUNTRY	FERTILIZER (100 GRAMS/HA.)	TRACTOR (HORSEPOWER)
RWANDA	3	3.0
RWANDA	3	3.6
RWANDA	3	3.0
RWANDA	3	4.0
RWANDA	3	3.0
RWANDA	3	3.0
SRILANKA	325	480.0
SRILANKA	437	553.0
SRILANKA	536	488.0
SRILANKA	625	657.0
SRILANKA	682	758.0
SRILANKA	625	971.0
SRILANKA	684	999.0
SRILANKA	536	1022.0

COUNTRY	AG.OUTPUT ($MILLION)	LIVESTOCK (ANIMAL UNITS)	LABOR (MILLIONS)
SRILANKA	1530.70	2430.9	4.9975
SRILANKA	1543.40	2503.9	5.2099
SIERRALEONE	327.40	275.5	1.2053
SIERRALEONE	327.40	262.9	1.1540
SIERRALEONE	352.00	269.0	1.1750
SIERRALEONE	329.90	220.7	1.2120
SIERRALEONE	335.40	229.0	1.2050
SIERRALEONE	316.20	322.0	1.1968
SIERRALEONE	338.90	304.2	1.2302
SIERRALEONE	358.90	338.0	1.2650
SIERRALEONE	389.00	337.2	1.2650
SIERRALEONE	298.00	319.0	1.2425
SENEGAL	839.80	2516.0	2.1624
SENEGAL	839.80	2384.5	2.3105

COUNTRY	LAND (1000 HA.)	AID ($ MILLIONS)	EDUCATION (ENROLLMENTS)
SRILANKA	3453.9	474.0	1367.75
SRILANKA	3479.2	468.0	1382.57
SIERRALEONE	2240.3	22.5	56.48
SIERRALEONE	2245.4	31.0	50.48
SIERRALEONE	2243.2	41.2	53.90
SIERRALEONE	2224.4	40.0	60.16
SIERRALEONE	2252.8	54.0	60.28
SIERRALEONE	2073.6	93.0	63.30
SIERRALEONE	2073.6	61.0	81.51
SIERRALEONE	2266.9	82.0	81.75
SIERRALEONE	2266.9	66.0	81.00
SIERRALEONE	2266.9	61.0	81.75
SENEGAL	1742.4	328.9	58.40
SENEGAL	1730.9	330.4	59.40

COUNTRY	FERTILIZER (100 GRAMS/HA.)	TRACTOR (HORSEPOWER)
SRILANKA	448	1043.00
SRILANKA	536	1068.00
SIERRALEONE	11	39.00
SIERRALEONE	11	15.00
SIERRALEONE	4	4.30
SIERRALEONE	57	5.00
SIERRALEONE	15	4.00
SIERRALEONE	57	12.60
SIERRALEONE	19	13.00
SIERRALEONE	4	15.00
SIERRALEONE	8	16.00
SIERRALEONE	4	18.00
SENEGAL	182	11.40
SENEGAL	84	22.00

COUNTRY	AG.OUTPUT ($MILLION)	LIVESTOCK (ANIMAL UNITS)	LABOR (MILLIONS)
SENEGAL	843.40	2558.8	2.1221
SENEGAL	544.50	2786.4	2.2037
SENEGAL	689.50	3833.7	2.2154
SENEGAL	519.70	2416.4	2.2863
SENEGAL	620.00	2235.4	2.3267
SENEGAL	692.20	2471.8	2.3896
SENEGAL	706.00	2600.0	2.3896
SENEGAL	588.60	2503.6	2.5425
SYRIA	1833.48	1682.0	1.9634
SYRIA	2151.30	1143.9	1.3702
SYRIA	2006.70	1528.8	1.9110
SYRIA	2484.00	1558.0	1.9845
SYRIA	2192.00	1604.5	1.3760
SYRIA	2786.00	2043.0	1.4230

COUNTRY	LAND (1000 HA.)	AID ($ MILLIONS)	EDUCATION (ENROLLMENTS)
SENEGAL	1718.0	249.3	79.69
SENEGAL	1730.9	223.0	83.71
SENEGAL	3744.0	307.0	87.75
SENEGAL	3758.4	262.0	95.60
SENEGAL	3759.8	397.0	103.82
SENEGAL	3763.4	285.0	109.94
SENEGAL	3762.0	322.0	110.00
SENEGAL	3762.0	333.0	111.00
SYRIA	3006.2	1914.6	512.19
SYRIA	2919.8	2177.0	488.41
SYRIA	3029.9	2487.0	545.57
SYRIA	2961.6	728.0	579.74
SYRIA	3013.6	1803.0	588.86
SYRIA	4445.5	1275.0	604.33

COUNTRY	FERTILIZER (100 GRAMS/HA.)	TRACTOR (HORSEPOWER)
SENEGAL	209	12.00
SENEGAL	132	15.00
SENEGAL	56	15.00
SENEGAL	47	18.00
SENEGAL	47	19.00
SENEGAL	209	18.00
SENEGAL	79	18.00
SENEGAL	209	18.00
SYRIA	119	557.00
SYRIA	101	648.00
SYRIA	150	620.00
SYRIA	176	817.00
SYRIA	220	887.00
SYRIA	176	1102.00

COUNTRY	AG.OUTPUT ($MILLION)	LIVESTOCK (ANIMAL UNITS)	LABOR (MILLIONS)
SYRIA	2457.0	2870.2	1.5088
SYRIA	2496.0	2016.3	1.0119
SYRIA	3551.5	2290.8	1.0119
SYRIA	2212.0	2356.1	1.6476
THAILAND	7345.2	9218.6	17.8880
THAILAND	7859.6	10387.6	17.1789
THAILAND	7667.4	14430.5	17.5375
THAILAND	8218.7	11504.6	17.8178
THAILAND	8394.0	10646.7	18.2180
THAILAND	8519.0	11522.6	19.7670
THAILAND	8851.0	11504.3	20.4820
THAILAND	8176.0	14492.6	20.9395
THAILAND	9252.0	10676.1	20.9395
THAILAND	8341.0	10702.1	22.6819

COUNTRY	LAND (1000 HA.)	AID ($ MILLIONS)	EDUCATION (ENROLLMENTS)
SYRIA	4483.8	1495.0	635.35
SYRIA	3074.5	952.0	687.43
SYRIA	3083.8	970.0	755.09
SYRIA	2996.6	859.0	815.07
THAILAND	21886.0	326.3	1324.54
THAILAND	21886.0	151.6	1193.74
THAILAND	19818.9	208.0	1386.14
THAILAND	21700.0	260.0	1737.92
THAILAND	22421.6	393.0	1807.00
THAILAND	19750.0	418.0	1919.98
THAILAND	10113.0	407.0	1990.87
THAILAND	11385.0	389.0	1990.87
THAILAND	22081.8	432.0	2191.70
THAILAND	24390.8	475.0	2230.00

COUNTRY	FERTILIZER (100 GRAMS/HA.)	TRACTOR (HORSEPOWER)
SYRIA	234	1256.0
SYRIA	150	1421.0
SYRIA	123	1489.0
SYRIA	150	410.0
THAILAND	109	660.0
THAILAND	124	1150.0
THAILAND	156	915.0
THAILAND	165	1155.0
THAILAND	180	1225.0
THAILAND	165	1480.0
THAILAND	173	2880.0
THAILAND	156	4301.0
THAILAND	140	4524.0
THAILAND	156	4720.0

COUNTRY	AG.OUTPUT ($MILLION)	LIVESTOCK (ANIMAL UNITS)	LABOR (MILLIONS)
TOGO	249.4	365.5	1.7197
TOGO	249.4	366.8	1.7067
TOGO	383.0	329.4	0.8446
TOGO	295.6	370.1	0.8446
TOGO	249.9	309.6	0.8323
TOGO	250.0	405.9	0.8645
TOGO	242.0	371.7	0.9243
TOGO	238.0	357.5	0.9527
TOGO	304.0	443.9	0.9527
TOGO	219.5	435.9	0.9514
TRINIDAD	153.7	60.7	0.1212
TRINIDAD	178.7	74.5	0.2147
TRINIDAD	183.1	79.5	0.1000
TRINIDAD	199.2	83.1	0.1021

COUNTRY	LAND (1000 HA.)	AID ($ MILLIONS)	EDUCATION (ENROLLMENTS)
TOGO	2079.3	74.0	81.16
TOGO	2020.2	68.2	66.40
TOGO	1287.6	99.0	96.06
TOGO	1292.2	103.0	113.73
TOGO	1292.2	46.0	127.89
TOGO	1233.0	91.0	130.23
TOGO	1235.8	63.0	130.23
TOGO	1297.7	77.0	119.11
TOGO	1298.6	112.0	101.99
TOGO	1298.6	110.0	119.11
TRINIDAD	177.4	7.0	95.62
TRINIDAD	177.4	8.3	67.87
TRINIDAD	178.0	10.0	70.00
TRINIDAD	178.5	5.0	83.90

COUNTRY	FERTILIZER (100 GRAMS/HA.)	TRACTOR (HORSEPOWER)
TOGO	10	3.6
TOGO	17	4.3
TOGO	6	3.9
TOGO	11	6.0
TOGO	21	6.0
TOGO	11	4.0
TOGO	16	8.9
TOGO	6	9.6
TOGO	20	10.0
TOGO	6	11.0
TRINIDAD	471	64.5
TRINIDAD	493	76.0
TRINIDAD	500	79.0
TRINIDAD	544	79.0

COUNTRY	AG.OUTPUT ($MILLION)	LIVESTOCK (ANIMAL UNITS)	LABOR (MILLIONS)
TRINIDAD	179.8	85.0	0.1114
TRINIDAD	132.0	104.4	0.0673
TRINIDAD	151.0	95.7	0.0747
TRINIDAD	108.1	76.1	0.0757
TRINIDAD	178.6	89.9	0.0757
TRINIDAD	158.4	90.0	0.0674
TUNISIA	1162.0	1604.6	1.5105
TUNISIA	1221.0	1434.0	1.4884
TUNISIA	1134.4	1350.0	1.3446
TUNISIA	1114.9	1586.3	1.4310
TUNISIA	1102.3	1623.5	1.1501
TUNISIA	1195.1	1933.7	1.2530
TUNISIA	1281.6	1777.4	1.2883
TUNISIA	1186.4	1389.0	1.3077

COUNTRY	LAND (1000 HA.)	AID ($ MILLIONS)	EDUCATION (ENROLLMENTS)
TRINIDAD	178.5	4.0	89.90
TRINIDAD	179.1	5.0	89.35
TRINIDAD	179.1	1.0	89.35
TRINIDAD	178.5	6.0	90.72
TRINIDAD	195.5	6.0	90.81
TRINIDAD	180.8	5.0	92.02
TUNISIA	2249.1	297.3	213.05
TUNISIA	2249.1	316.7	201.84
TUNISIA	2225.9	253.0	232.86
TUNISIA	2251.6	299.0	250.20
TUNISIA	2514.3	210.0	264.39
TUNISIA	2934.8	233.0	293.35
TUNISIA	2903.5	252.0	331.61
TUNISIA	2548.5	210.0	355.16

COUNTRY	FERTILIZER (100 GRAMS/HA.)	TRACTOR (HORSEPOWER)
TRINIDAD	492	81.0
TRINIDAD	544	94.0
TRINIDAD	417	96.8
TRINIDAD	318	99.0
TRINIDAD	473	100.0
TRINIDAD	318	102.0
TUNISIA	112	900.0
TUNISIA	108	1050.0
TUNISIA	99	930.0
TUNISIA	125	1120.0
TUNISIA	122	1155.0
TUNISIA	125	1360.0
TUNISIA	180	1420.0
TUNISIA	99	1064.0

COUNTRY	AG.OUTPUT ($MILLION)	LIVESTOCK (ANIMAL UNITS)	LABOR (MILLIONS)
TUNISIA	1543.2	1521.4	1.3077
TUNISIA	1231.0	1331.5	1.3802
TURKEY	13054.0	20523.4	15.4126
TURKEY	13054.0	16409.7	13.5815
TURKEY	14888.0	18601.3	14.0280
TURKEY	13421.2	18987.0	13.9644
TURKEY	12466.0	19376.3	12.8887
TURKEY	12155.0	23448.9	14.1675
TURKEY	12299.0	16811.0	14.7750
TURKEY	12429.2	20452.7	15.1500
TURKEY	11664.0	22876.1	15.1501
TURKEY	11607.0	22892.9	15.2876
TANZANIA	1450.8	12266.4	6.6228
TANZANIA	1450.8	11862.6	7.2924

COUNTRY	LAND (1000 HA.)	AID ($ MILLIONS)	EDUCATION (ENROLLMENTS)
TUNISIA	2507.2	214.0	387.44
TUNISIA	2390.4	180.0	419.34
TURKEY	20497.2	55.3	1887.52
TURKEY	20667.0	35.0	1746.16
TURKEY	22118.0	39.0	2028.48
TURKEY	20753.3	178.0	2075.00
TURKEY	21306.0	594.0	2225.50
TURKEY	28142.9	952.0	2900.00
TURKEY	28286.0	725.0	2310.11
TURKEY	18057.0	659.0	2310.10
TURKEY	30348.5	353.0	2393.48
TURKEY	20284.0	242.0	2450.60
TANZANIA	5409.4	295.0	47.88
TANZANIA	4386.0	267.0	62.03

COUNTRY	FERTILIZER (100 GRAMS/HA.)	TRACTOR (HORSEPOWER)
TUNISIA	110	1040
TUNISIA	99	1152
TURKEY	298	8444
TURKEY	307	9851
TURKEY	464	9740
TURKEY	518	12959
TURKEY	45	15417
TURKEY	518	17411
TURKEY	455	18297
TURKEY	464	19593
TURKEY	412	20491
TURKEY	464	24600
TANZANIA	49	234
TANZANIA	61	276

COUNTRY	AG.OUTPUT ($MILLION)	LIVESTOCK (ANIMAL UNITS)	LABOR (MILLIONS)
TANZANIA	2165.3	12169.0	7.0258
TANZANIA	2205.9	12594.6	7.1538
TANZANIA	2204.3	12573.0	7.6194
TANZANIA	2137.0	11038.1	7.9877
TANZANIA	2018.5	10776.5	7.8353
TANZANIA	599.9	11406.6	8.0897
TANZANIA	589.9	12060.6	8.0897
TANZANIA	785.0	12628.3	9.0096
URUGUAY	840.9	12108.6	0.2740
URUGUAY	799.3	11191.6	0.5874
URUGUAY	930.7	10038.7	0.2192
URUGUAY	847.1	10484.7	0.2192
URUGUAY	988.4	10532.9	0.2010
URUGUAY	857.0	11471.2	0.2015

COUNTRY	LAND (1000 HA.)	AID ($ MILLIONS)	EDUCATION (ENROLLMENTS)
TANZANIA	4386.0	340.0	57.30
TANZANIA	4420.4	424.0	78.96
TANZANIA	4420.4	588.0	105.26
TANZANIA	3534.6	678.0	78.71
TANZANIA	3551.8	702.0	76.41
TANZANIA	4472.0	683.0	78.65
TANZANIA	4463.4	621.0	81.79
TANZANIA	4463.4	599.0	78.65
URUGUAY	1696.5	23.5	183.49
URUGUAY	1661.7	29.6	182.19
URUGUAY	1683.0	22.0	185.60
URUGUAY	1661.7	11.0	180.68
URUGUAY	1661.7	14.0	170.43
URUGUAY	1850.0	10.0	148.29

COUNTRY	FERTILIZER (100 GRAMS/HA.)	TRACTOR (HORSEPOWER)
TANZANIA	73	216
TANZANIA	64	263
TANZANIA	58	269
TANZANIA	64	744
TANZANIA	56	749
TANZANIA	73	742
TANZANIA	61	742
TANZANIA	3	742
URUGUAY	231	826
URUGUAY	335	964
URUGUAY	331	831
URUGUAY	304	977
URUGUAY	633	980
URUGUAY	304	1128

COUNTRY	AG.OUTPUT ($MILLION)	LIVESTOCK (ANIMAL UNITS)	LABOR (MILLIONS)
URUGUAY	629.3	9807.2	0.2041
URUGUAY	783.6	12029.5	0.2055
URUGUAY	1069.0	10766.8	0.2055
URUGUAY	1032.0	10612.5	0.2072
VENEZUELA	2965.6	8688.3	2.9335
VENEZUELA	3011.0	8281.4	2.6409
VENEZUELA	3471.0	9014.3	1.5025
VENEZUELA	3732.9	9257.6	1.4840
VENEZUELA	3553.6	9307.0	1.4601
VENEZUELA	3428.4	10213.8	1.5464
VENEZUELA	3527.0	10179.7	1.5994
VENEZUELA	3626.5	10430.2	1.6536
VENEZUELA	3816.0	10817.0	1.6536
VENEZUELA	2131.0	11410.7	1.7641

COUNTRY	LAND (1000 HA.)	AID ($ MILLIONS)	EDUCATION (ENROLLMENTS)
URUGUAY	1850.0	8.0	188.12
URUGUAY	1260.6	4.0	190.05
URUGUAY	1879.8	3.0	197.89
URUGUAY	1258.0	4.0	200.00
VENEZUELA	5173.1	33.3	719.68
VENEZUELA	5176.9	31.0	669.14
VENEZUELA	3701.4	10.0	751.43
VENEZUELA	5196.3	1.0	787.03
VENEZUELA	3593.8	7.0	820.66
VENEZUELA	2811.8	15.0	850.47
VENEZUELA	2808.0	14.0	884.23
VENEZUELA	3642.3	12.0	939.68
VENEZUELA	3764.8	13.0	993.25
VENEZUELA	2987.6	14.0	1000.00

COUNTRY	FERTILIZER (100 GRAMS/HA.)	TRACTOR (HORSEPOWER)
URUGUAY	439	1136
URUGUAY	331	1342
URUGUAY	388	1346
URUGUAY	331	1620
VENEZUELA	262	840
VENEZUELA	400	980
VENEZUELA	451	900
VENEZUELA	367	1225
VENEZUELA	599	1295
VENEZUELA	367	1520
VENEZUELA	388	1560
VENEZUELA	451	1600
VENEZUELA	448	1660
VENEZUELA	451	6800

COUNTRY	AG.OUTPUT ($MILLION)	LIVESTOCK (ANIMAL UNITS)	LABOR (MILLIONS)
YUGOSLAVIA	7047.6	6525.7	5.1610
YUGOSLAVIA	7686.0	8146.9	4.0725
YUGOSLAVIA	6764.0	7706.2	4.0152
YUGOSLAVIA	6764.3	7895.8	4.7916
YUGOSLAVIA	6693.7	7546.6	4.5217
YUGOSLAVIA	7723.9	7466.7	4.3531
YUGOSLAVIA	7767.9	7593.7	4.3756
YUGOSLAVIA	9699.0	7417.6	4.4069
YUGOSLAVIA	9477.0	7332.4	4.4069
YUGOSLAVIA	9256.0	7464.2	4.4611
ZAIRE	1284.3	1196.0	10.8356
ZAIRE	1284.4	1305.4	10.6838
ZAIRE	1717.0	1131.6	10.5473
ZAIRE	1810.8	1138.2	10.9987

COUNTRY	LAND (1000 HA.)	AID ($ MILLIONS)	EDUCATION (ENROLLMENTS)
YUGOSLAVIA	5614.1	198.2	2311.75
YUGOSLAVIA	6120.0	114.0	2264.10
YUGOSLAVIA	10729.8	20.0	2356.32
YUGOSLAVIA	6103.8	1.0	2413.79
YUGOSLAVIA	6079.9	1.0	2413.65
YUGOSLAVIA	7102.0	1.0	2426.08
YUGOSLAVIA	7136.0	1.0	2412.81
YUGOSLAVIA	6036.0	1.0	2389.62
YUGOSLAVIA	6547.5	3.0	2370.10
YUGOSLAVIA	5973.7	3.0	2362.75
ZAIRE	6334.5	109.6	360.89
ZAIRE	6365.4	102.6	511.48
ZAIRE	6365.4	129.0	512.00
ZAIRE	6386.0	317.0	704.33

COUNTRY	FERTILIZER (100 GRAMS/HA.)	TRACTOR (HORSEPOWER)
YUGOSLAVIA	896	7825
YUGOSLAVIA	885	8954
YUGOSLAVIA	1350	8905
YUGOSLAVIA	1079	11968
YUGOSLAVIA	1102	13479
YUGOSLAVIA	1079	16626
YUGOSLAVIA	1284	17800
YUGOSLAVIA	1009	19673
YUGOSLAVIA	922	20920
YUGOSLAVIA	1009	18148
ZAIRE	7	39
ZAIRE	17	45
ZAIRE	14	40
ZAIRE	15	60

COUNTRY	AG.OUTPUT ($MILLION)	LIVESTOCK (ANIMAL UNITS)	LABOR (MILLIONS)
ZAIRE	1857.5	1144.8	11.1375
ZAIRE	1766.4	1447.8	11.1267
ZAIRE	2004.8	1483.5	11.3506
ZAIRE	2699.4	1340.0	11.6797
ZAIRE	1953.1	1658.2	11.6797
ZAIRE	2228.0	1297.1	12.2706
ZAMBIA	503.5	1501.7	1.8987
ZAMBIA	579.0	1814.1	1.6529
ZAMBIA	627.1	1533.8	1.7947
ZAMBIA	617.3	1481.9	1.8380
ZAMBIA	530.9	1481.9	1.9421
ZAMBIA	550.0	1802.9	1.8921
ZAMBIA	631.7	1882.9	1.9969
ZAMBIA	549.2	1895.4	2.0646

COUNTRY	LAND (1000 HA.)	AID ($ MILLIONS)	EDUCATION (ENROLLMENTS)
ZAIRE	6444.71	416.0	704.33
ZAIRE	5936.92	428.0	1207.11
ZAIRE	5974.00	394.0	1461.10
ZAIRE	6597.15	348.0	1771.18
ZAIRE	6653.80	215.0	2151.90
ZAIRE	6696.03	314.0	771.18
ZAMBIA	3004.80	118.9	77.87
ZAMBIA	3004.80	161.5	77.67
ZAMBIA	3557.28	196.0	87.87
ZAMBIA	3034.80	185.0	94.78
ZAMBIA	3034.80	277.0	97.55
ZAMBIA	3060.00	318.0	95.77
ZAMBIA	3094.80	231.0	98.86
ZAMBIA	3662.18	309.0	104.86

COUNTRY	FERTILIZER (100 GRAMS/HA.)	TRACTOR (HORSEPOWER)
ZAIRE	12	63
ZAIRE	15	76
ZAIRE	12	80
ZAIRE	14	82
ZAIRE	12	86
ZAIRE	14	89
ZAMBIA	156	126
ZAMBIA	141	147
ZAMBIA	141	129
ZAMBIA	141	154
ZAMBIA	112	158
ZAMBIA	141	184
ZAMBIA	151	186
ZAMBIA	141	178

COUNTRY	AG.OUTPUT ($MILLION)	LIVESTOCK (ANIMAL UNITS)	LABOR (MILLIONS)
ZAMBIA	623.0	1994.3	2.06460
ZAMBIA	585.8	1131.5	2.11589

COUNTRY	LAND (1000 HA.)	AID ($ MILLIONS)	EDUCATION (ENROLLMENTS)
ZAMBIA	3693.78	216	106.477
ZAMBIA	3094.80	238	204.000

COUNTRY	FERTILIZER (100 GRAMS/HA.)	TRACTOR (HORSEPOWER)
ZAMBIA	127	176
ZAMBIA	141	174

APPENDIX B

CITATION OF DATA SOURCES

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