

**Aggregate Agricultural Inputs and Outputs
in Developing Countries: A Data Set**

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CONTENTS

List of Tables	iv
Abstract	v
Production	1
Prices	2
Output Price Index	2
Agricultural Wages	4
Agricultural Wage Index	6
Fertilizer Price Index	7
Input Quantities	8
Fertilizer Consumption	8
Land	8
Labor and Capital	8
Input Quality	10
Labor Quality	10
Land Quality	11
Research Stock and Infrastructure	12
Agricultural Research Personnel	12
Agricultural Research Expenditure	13
Gross Domestic Product for Transportation and Communication	14
Road Density	16
References	115

TABLES

1. Aggregate values of production	17
2. Prices	31
3. Average product price in 1980 U.S. dollars official exchange rate	44
4. Fertilizer consumption	45
5. Land	58
6. Labor and capital	72
7. Measures of labor quality	85
8. Measures of land quality	98
9. Research stock and infrastructure	99

ABSTRACT

This report presents aggregate data on agricultural inputs and outputs for 18 developing countries: Argentina, Brazil, Chile, Colombia, Dominican Republic, Egypt, Ghana, Ivory Coast, Malaysia, Morocco, Pakistan, Philippines, Portugal, South Korea, Sri Lanka, Thailand, Turkey, and Zambia for 1961-88.

AGGREGATE AGRICULTURAL INPUTS AND OUTPUTS IN DEVELOPING COUNTRIES: A DATA SET

This publication describes and presents a time-series data set of agricultural inputs and outputs for 18 developing countries: Argentina, Brazil, Chile, Colombia, Dominican Republic, Egypt, Ghana, Ivory Coast, Malaysia, Morocco, Pakistan, Philippines, Portugal, South Korea, Sri Lanka, Thailand, Turkey, and Zambia. The data are compiled in comparable units across countries, using, for example, international dollars for the production variable and scientist man-years (SMY) for research personnel. The sources of the original data were international agencies such as the World Bank (WB), the United Nations (UN), and the International Labor Organization (ILO), supplemented by individual government and private agencies. In order to have a complete time-series for each variable, missing observations were generated by extrapolation, interpolation, or regression analysis on related variables.

Production

The four production variables are the values of total crop production (*CPN*), total livestock production (*LPN*), total agricultural production (*TPN*), and an index of total agricultural production (*IIPN*). The data for these four variables were collected from *World Agricultural Trends and Indicators, 1970-1988*, a tape distributed by the Economic Research Service of the USDA.

The first three variables are defined as total current output values of crop, livestock, and total agricultural output in millions of 1979-81 international dollars. An international dollar is an expression for "international commodity prices" derived from the Geary-Khamis formula for the agricultural sector. These "prices" were developed by FAO to avoid the use of exchange rates (ERS 1989). The method assigns a single world price to each commodity; that is, one ton of rice has the same price in whatever country rice is produced. Each price represents the 1979-81 actual average export price in the principal exporting country for heavily traded commodities, or the actual average wholesale price in the largest free market producing country for the other commodities (ERS 1989).

The agricultural output variable includes food production, industrial oilseeds, tobacco, fibers (vegetables and animal), and rubber, excluding all intermediate products (agricultural inputs of

agricultural origin). The index of total agricultural production is a Laspeyres-type index that shows the level of aggregate agricultural output for each year relative to the base period 1979-81 (FAO).

Prices

In this section, there are four price variables: output price index (P), agricultural wages ($AWAGES$), the index of agricultural wages ($WAGEI$) and fertilizer price index (I). The commodities aggregated for each country and different methods were used to complete missing values.

Output Price Index

The output price index (P) represents domestic prices relative to world prices all evaluated at official dollar exchange rates. The commodities aggregated for each country represent 60 to 80 percent of total value of production for that country. The commodities included are listed here by country.

Argentina	: beef, corn, sorghum, soybeans, sunflower, and wheat.
Brazil	: corn, cotton, rice, soybeans, and wheat.
Chile	: apples, beef, grapes, milk, and wheat.
Colombia	: coffee, cotton, rice, and wheat.
Dominican Republic	: coffee, rice, and sugar.
Egypt	: corn, cotton, rice, sugar, and wheat.
Ghana	: cocoa, corn, and rice.
Ivory Coast	: cocoa, corn, and rice.
Malaysia	: palm oil, rice, and rubber.
Morocco	: barley, sugar, and wheat.
Philippines	: copra, corn, rice, and sugar.
Portugal	: beef, corn, milk, potatoes, rice, sheep, tomatoes, wheat, and wine.
South Korea	: barley, beef, pork, rice, and soybeans.
Sri Lanka	: rice, rubber, and tea.
Thailand	: corn, rice, rubber, and sugar.
Turkey	: barley, cotton, hazelnuts, sheep, sugar, tobacco, and wheat.
Zambia	: corn, cotton, and tobacco.

Original price data on domestic currency, as well as official exchange rates, were obtained from country reports from the IBRD project # 673-64. Let R be the official exchange rate, q be the quantity produced of each commodity, p be the domestic price in domestic currency, ρ be the dollar price, and s be the share of the commodity in the value of production and let the subscript i represent the commodity, j represent the country, and t represent the year. Dollar prices were calculated as

$$\rho_{ijt} = R_{jt} \cdot p_{ijt} \quad (1)$$

The world average price of commodity i across all years was calculated as

$$\rho_{i..} = \frac{\sum_j \sum_t \rho_{ijt} \cdot q_{ijt}}{\sum_j \sum_t q_{ijt}} \quad (2)$$

The world average share of each commodity was calculated as

$$s_{i..} = \frac{\sum_j \sum_t \rho_{ijt} \cdot q_{ijt}}{\sum_i \sum_j \sum_t \rho_{ijt} \cdot q_{ijt}} \quad (3)$$

The base period (1980) world average price is

$$\rho_{i.o} = \frac{\sum_j \rho_{ijo} \cdot q_{ijo}}{\sum_j q_{ijo}} = 278.54 \quad (4)$$

and the base period world average share is

$$s_{i.o} = \frac{\sum_j \rho_{ijo} \cdot q_{ijo}}{\sum_i \sum_j \rho_{ijo} \cdot q_{ijo}} \quad (5)$$

where 0 refers to the base year of 1980.

The output price index for country j in year t was obtained as

$$I_{jt} = \frac{\prod_i \rho_{ijt}^{s_{ij0}} \cdot \prod_i \rho_{ijo}^{s_{ij0}}}{\prod_i \rho_{i..}^{s_{i..}} \cdot \prod_i \rho_{i.o}^{s_{i.o}}} \quad (6)$$

Agricultural Wages

The agricultural wages (*AWAGES*) are defined as monthly wages in agriculture measured in current domestic currency. These data were collected either from the International Labor Office, *Yearbook of Labor Statistics* (various issues), *FAO Production Yearbook* (various issues), or country-specific sources listed here.

Argentina : Domenech, R. A., D. F. Cavallo, and Y. Mundlak (1986).

Brazil : Brandao, A. S. P. and J. L. Carvalho (1987).

Dominican

Republic : Greene, D. D. and T. L. Roe (1987).

Egypt : Dethier, J. J. (1988).

Ivory Coast : Atsain, A., A. M'Bet and S. Ehouman (1985).

The following conversion factors from Hayami and Ruttan (1985) were used to convert wages into a common time unit: 1 day = 8 hours, 1 week = 5 days, and 1 month = 4.3 weeks. In addition, if wage data were available for male, female, and total employment, the total value was used. If only male and female wages were available, the proportion of males and females in the agricultural sector labor force was used as weights. If data were classified into skilled and nonskilled labor, the nonskilled wage rates were used.

Missing observations were obtained with regressions on the following variables: Nominal Nonagricultural Wages (*NNAW*), Real Agricultural Wages (*RAW*), Consumer Price Index (*CPI*), Average Annual Growth Rate of CPI (*AGRCPI*), Time (*T*), or Year (*Y*). These variables were obtained from the *World Tables 1987*.

Brazil

For the whole series:

$$\begin{aligned} \text{RAW} &= -55380.87 + 28.47 Y & R^2 &= 84.51 \\ & (63.58) \quad (3.15) & n &= 17 \end{aligned}$$

where RAW is Real Agricultural Wages.

This series is multiplied by the CPI (1977 = 100) to obtain the estimates of nominal agricultural wages.

Colombia

For 1970 < year < 1975:

$$\begin{aligned} \text{AWAGES} &= -113.703 + 39.8394 \text{NNAW} & R^2 &= 99.69 \\ & (79.59) \quad (0.7786) & n &= 10 \end{aligned}$$

Dominican Republic

For year > 1978:

$$\underline{AWAGES} = 25.8467 + 0.4149 \text{ NNAW} \quad R^2 = 67.03$$

$$(5.7857) \quad (0.0877) \quad n = 13$$

For year < 1966:

$$\underline{AWAGES} = 46.3963 + 0.0043 \text{ T} \quad R^2 = 86.31$$

$$(6.2299) \quad (0.0004) \quad n = 20$$

where T is time.

Egypt

For 1965 < year < 1969:

$$\underline{AWAGES} = -4.7395 + 0.3671 \text{ NNAW} \quad R^2 = 98.87$$

$$(1.3186) \quad (0.0119) \quad n = 13$$

For year < 1965:

$$\underline{AWAGES} = (1 - \text{AGRCPI}) \times \text{AWAGES}(+1).$$

Ghana

For years 1973, 1974 and 1983:

$$\underline{AWAGES} = -5.7679 + 3.2947 \text{ NNAW} \quad R^2 = 98.49$$

$$(22.6118) \quad (0.1100) \quad n = 15$$

For year > 1983:

$$\underline{AWAGES} = (1 + \text{AGRCPI}) \times \text{AWAGES}(-1).$$

Ivory Coast

For year > 1982:

$$\underline{AWAGES} = -14411.6471 + 7.4099 \text{ Y} \quad R^2 = 77.48$$

$$(26.5788) \quad (0.8932) \quad n = 22$$

where Y is year.

Malaysia

For year < 1969 and year > 1979:

$$\underline{AWAGES} = -1.6899 + 1.6226 \text{ NNAW} \quad R^2 = 93.61$$

$$(7.8606) \quad (0.1413) \quad n = 11$$

Morocco

For 1972:

$$\underline{AWAGES} = -18.0343 + 2.5911 \text{ NNAW} \quad R^2 = 79.36$$

$$(12.7763) \quad (0.4995) \quad n = 9$$

Pakistan

For year < 1966:

$$\underline{AWAGES} = (1 - \text{AGRCPI}) \times \text{AWAGES}(+1).$$

For year 1985:

$$\underline{AWAGES} = -38.9163 + 4.0261 \text{ NNAW} \quad R^2 = 93.35$$

$$(58.5633) \quad (0.2606) \quad n = 19$$

Philippines

For 1963 < Year < 1970:

$$\underline{AWAGES} = (1 + \text{AGRCPI}) \times \underline{AWAGES}(-1).$$

For year 1974:

$$\underline{AWAGES} = -41.1658 + 3.2756 \text{ NNAW} \quad R^2 = 89.61 \\ (40.3121) \quad (0.3219) \quad n = 14$$

Portugal

For 1985:

$$\underline{AWAGES} = 603.7307 + 59.0354 \text{ NNAW} \quad R^2 = 98.25 \\ (547.5385) \quad (1.8952) \quad n = 19$$

Thailand

Since there were no data on Thailand's agricultural wage but there were for nonagricultural wages, this series was estimated using the following steps:

a. Using the following regression for Philippines:

$$\underline{NNAW} = -203.5027 + 0.1060 \text{ Y} \quad R^2 = 46.26 \\ (0.3994) \quad (0.0381) \quad n = 11$$

b. Using the ratio of Philippines' AWAGES to NNAW (called RWGS), WAGES for Thailand was defined as $\underline{AWAGES} = \text{RWGS} \times \text{NNAW}$ of Thailand.

Turkey

For 1975 and 1976:

$$\underline{AWAGES} = 329.7506 + 79.9172 \text{ NNAW} \quad R^2 = 99.75 \\ (412.0457) \quad (1.0302) \quad n = 17$$

Zambia

For 1979:

$$\underline{AWAGES} = -4.7347 + 0.7468 \text{ NNAW} \quad R^2 = 95.77 \\ (5.7368) \quad (0.0405) \quad n = 17$$

Agricultural Wage Index

AWAGES were converted to dollars at the official exchange rate reported for each country and then indexed (WAGEI) relative to the base year average ratio; that is,

$$\text{WAGEI}_j^t = \frac{w_j^t}{w_o}, \quad (7)$$

where j is the country, t is the year, and w is the dollar-denominated wage rate. If q represents the number of workers in agriculture, the base year average wage rate was calculated as

$$w_{.0} = \frac{\sum_j w_{j0} \cdot q_{j0}}{\sum_j q_{j0}} = 66.76 , \quad (8)$$

where 0 is the base year taken to be 1980.

Fertilizer Price Index

The basic data for fertilizer prices paid by farmers are obtained from FAO, in various issues of the *Fertilizer and Production Yearbooks*. The data are also available on tape through the MATRIC ONLINE component of the CARD Information Systems database. The fertilizer price indexes (*FPI*) reported are weighted average prices relative to a base of world average prices for each nutrient in 1984. These indexes were derived as follows.

1. For each country the price per ton of nutrient (N, P₂O₅, and K₂O) of the primary fertilizer materials was converted to U.S. dollars at the current official exchange rate.
2. A world average price for each material for each year was calculated as the simple average of the prices reported in these 18 countries plus the United States.
3. Missing observations on the primary N, P, and K source materials in each country were estimated, with interpolations and extrapolations based on regressions of the available price data on either the relevant U.S. price or world average price, whichever provided a better fit. For scattered years in some countries, the FAO data were augmented with information about prices or price policies from other sources to aid in interpolation.
4. For countries not using the base materials (urea as the base nitrogen source, simple superphosphate as the base phosphate source, and muriate of potash as the base potash source), an estimated price per ton of nutrient in the base material was calculated by multiplying the price for the reported material by the ratio of world average prices of the base material over the reported material.
5. For each country, a Tornquist-Theil price index (base 1984) was calculated using fixed weights (the average share of N, P₂O₅, and K₂O for 1974/75 and 1984/85) and the prices of the nutrients in the base materials as described in step 4.
6. Finally, the index for each country was adjusted to reflect differences in nutrient mix for 1984. Specifically, the index for country j was multiplied by $(1 + \sum_i w_{ij} (\ln P_{ij} - \ln W_i))$, where w_{ij} is the share of nutrient i relative to all nutrients in country j, $\ln P_{ij}$ is the log of the 1984 price for nutrient i in country j, and $\ln W_i$ is the log of the 1984 world average price of nutrient i.

Input Quantities

This section contains a series of tables that list variables representing the quantities of fertilizer consumption, land, labor, and capital.

Fertilizer Consumption

The data on fertilizer (N, P₂O₅, K₂O, TOTAL, and FER), in metric tons of plant nutrients for N, P₂O₅, and K₂O in commercial fertilizers consumed were obtained from the FAO, *Fertilizer Yearbooks*, for various issues (also available through MATRIC ONLINE). Therefore, the four variables under this category are *NITROGEN*, *PHOSPHATE*, *POTASH*, and *TOTAL*. This last variable is the sum of the first three.

FER is defined as total fertilizer utilization in nutrient content equivalent (nitrogen, phosphate, and potash) per hectare of arable and permanent cropland. These data were taken from *World Agricultural Trends and Indicators, 1970-1988* (USDA-ERS 1989).

Land

The four land variables are:

1. *ILAN*, irrigated land, is land area that is purposely provided with water, measured in 1000-hectare units.
2. *CLAN* is the arable and permanent crop land in 1000-hectare units. Arable land includes land under temporary crops, temporary meadows, kitchen and garden land, and land temporarily fallowed. Permanent cropland refers to land that is not planted after each harvest (for example, fruit trees, rubber, and others; excludes land used for timber).
3. *PLAN*, permanent pastures, is land used for permanent forage crops (five or more years), in 1000-hectare units.
4. *TAREA* is total area in the country including bodies of water, in 1000-hectare units.

These data values were collected from the USDA-ERS tape.

Labor and Capital

Labor. There are two variables in this category, *TTLAF* and *TALAF*.

1. *TTLAF* is total labor force in millions of workers, defined as $TTLAF = TLAF \times POP$, where *TLAF* is the percentage of total population employed full time (FAO), and *POP* is total population in millions of inhabitants (ERS).

2. *TALAF* is the agricultural labor force in millions of workers, defined as $TALAF = ALAF \times POP$, where *ALAF* is the percentage of total population that are economically active agricultural laborers (FAO).

These variables are taken from USDA-ERS 1988.

Livestock. The weighted average of various kinds of livestock animals (*TWLVSTK*) on farms is

$$TWLVSTK = \sum_1^n wL_i \quad (9)$$

where *w* is the weight, *L* is the number of head, and $i = 1, \dots, n =$ asses to turkeys. The following weights were used: camel, 1.1; buffalo, horses, and mules, 1.0; cattle and asses, 0.8; pigs, 0.2; sheep and goats, 0.1; poultry (chicken, ducks, and turkeys), 0.01 (Hayami and Ruttan 1985).

The original data on numbers of animals were collected from the *FAO Production Yearbook*, various issues, and are available through the Midwest Agribusiness and Trade Research and Information Center's (MATRIC) online computer network.

Machinery. There are two types of machinery measurements (*HPTRACT*, *THPTRACM*) obtained from different sources. First, *HPTRACT* is horsepower per 1000 hectares of cropland, defined as $HPTRACT = TRTHA \times 30$ hp. The average size of a tractor is assumed to be equivalent to 30 horsepower. *TRTHA* is the number of tractors per 1000 hectares of cropland. *TRTHA* are collected from USDA-ERS 1988.

Second, *THPTRACM* is the horsepower of all tractors including crawler, wheeler, and garden tractors. The original data were collected from *FAO Production Yearbook*, various issues (available through the MATRIC network). Following Hayami and Ruttan (1985), it was assumed that crawler and wheeler tractors will average 30 horsepower per tractor, and garden tractors will average 5 horsepower per tractor. For countries who report the number of garden tractors used (called *garden*), such as Korea, Ghana, Ivory Coast, Sri Lanka, and Turkey, $THPTRACM = (\text{total ag} \times 30) + (\text{garden} \times 5)$, where *total ag* refers to the sum of crawler and wheeler tractors. Because the *garden* data were not complete, extrapolations were applied as follows:

Ghana (available data 1961-1975)

$$\text{Garden} = -22623.4286 + 11.8036 T \quad R^2 = 88.44$$

$$(2329.3048) \quad (1.1836)$$

where *T* is Time

Ivory Coast (available data 1961-1973)

$$\text{Garden} = -8744.1524 + 4.4607 T \quad R^2 = 78.28$$

$$(1282.6923) \quad (0.6518)$$

where T is Time

Sri Lanka (available data 1961-1976)

$$\text{Garden} = -59915.9515 + 30.5103 T \quad R^2 = 82.13$$

$$(7486.7931) \quad (3.8033)$$

where T is Time

Input Quality

Two groups representing measures of quality are labor quality and land quality.

Labor Quality

There are three measures of labor quality: School Enrollment Ratio, Adult Literacy Rate, and Life Expectancy.

School Enrollment Ratio. The first variable in this ratio is *AGERIMF*, defined as gross enrollment of all ages at the primary level as a percentage of children in the country's school age group (World Bank 1987). For some countries with universal primary education, the gross enrollment may exceed 100 percent because some pupils are younger or older than the country's standard primary school age (6 to 11 years).

The second variable is *AGER2MF*, defined as gross enrollment of all ages in secondary school, including pupils enrolled in vocational, or teacher training, secondary school as a percentage of teenagers in the country's school age group. The definition of secondary school age differs among countries, but the common ages are 12 to 17.

Both variables were completed by regressing each variable on the time variable and were collected from World Bank 1987.

Adult Literacy Rate. *ALR* is the number of adults with the ability to both read and write, and is expressed as a percentage of the adult population 15 years and older. These values were obtained from World Bank 1987.

Life Expectancy. *POPLIFE* is defined as the number of years a newborn infant would live if prevailing patterns of mortality for all people at the time of his or her birth were to stay the same throughout his or her life. This variable was also obtained from the World Bank 1987 Tables.

Land Quality

Land quality is measured by five indices (*WPDM*, *WFWD*, *WDCC*, *WMPDMI*, *LQIND*), each with a single value across time for each country. The first four land quality indices were taken from Linneman 1979. *WPDM* is the weighted potential production of dry matter, where the potential production of dry matter (*PDM*) is in 100 kilograms per hectares per year. *WFWD* is the weighted factor for water deficiency, where the factor for water deficiency (*FWD*) is the ratio between the actual and potential transpiration. *WDCC* is the weighted development cost classed as an indicator of the capital inputs required. *WMPDMI* is the weighted maximum production of dry matter, including that produced for irrigated land. For nonirrigated land, *WMPDMI* equals *WMPDM* (maximum production of dry matter). This variable is in million tons per year.

The values of *PDM*, *DCC*, *FWD*, and *MPDMI* were taken from *MOIRA: Model of International Relations in Agriculture* (Linneman et al. 1979). Weights were the percentage values of each soil type for each country.

Finally, *LQIND* is the international land quality index for all agricultural land, constructed by Peterson (1987) as an attempt to provide a superior alternative to the "simple measure of land." This index for a specific nation is determined by the antilog of the *LPV*, the log of the predicted per acre value of agricultural land, of that nation divided by the average of these transformed *LPVs* for 126 nations, and then multiplied by 100. For example, the land quality index of country *i* is

$$LQIND = \frac{\exp LPV_i}{\frac{1}{126} \sum_1^{126} \exp LPV_j} \cdot 100 \quad (10)$$

The *LPV* was given by Peterson 1987:

$$LPV = 0.0077 PNICL + 0.0133 PIL + 0.4161 LP$$

where *PNICL* is nonirrigated crop land in each state as a percentage of all crop land plus land in farms designated as permanent pasture, *PIL* is irrigated land as a percentage of all cropland in farms, and *LP* is the log of long-run average annual precipitation. Data on *LQIND* were taken from *International Land Quality Indices* (Peterson 1987).

Research Stock and Infrastructure

The following four variables are measures of research stock and infrastructure. The first two, *APERSON* and *AEXPEND*, are measures of agricultural research activities financed and/or executed by the public sector, and include private nonprofit agricultural research. However, private and/or for-profit agricultural research are excluded.

Agricultural Research Personnel

APERSON is the total number of research personnel "who engaged directly in the conception or creation of new knowledge, products, processes, methods and systems, excluding technicians and support and clerical staff who normally perform scientific and technical tasks under the supervision of a scientist." This variable is measured in scientist man-years (SMY) or manpower (Pardey and Roseboom 1989). Educational levels rather than occupational classes are used to distinguish scientific from nonscientific staff.

The original data for the 1960s were obtained primarily from Boyce and Evenson (1983). The data series from Pardey and Roseboom (1989) were used as complementary.

Missing observations were generated using the following procedures:

1. Estimating the missing observations that are bounded by the years with observations, as follows:

- a. One year missing: Given the values for 1963 and 1965,

$$EST.APERSON_{1964} = (1/2)(APERSON_{1963} + APERSON_{1965}) \quad (11)$$

where *EST.* = estimate.

- b. Two years missing: Given the values for 1962 and 1965, calculate the average growth rate = *w*:

$$w = \left(\frac{1}{3}\right) \cdot \frac{(APERSON_{1965} - APERSON_{1962})}{APERSON_{1962}} \quad (12)$$

and the estimates for 1963 and 1964 are

$$EST.APERSON_{1963} = (1 + w) \cdot APERSON_{1962} \quad (13)$$

$$EST.APERSON_{1964} = (1 - w) \cdot APERSON_{1965} \quad (14)$$

- c. Three years missing: The estimates are calculated by using the two previous methods where (b) has to be done before (a). For example, given data for 1971 and 1975, the

average annual growth rate and method (b) are used to calculate the estimates for 1972 and 1974. Then, by using method (a), the estimate for 1973 was the average of 1972 and 1974.

- d. Four years missing: The estimates are calculated sequentially by using method (b) twice.
 - e. Five years missing: The estimates are calculated by combining (d) and (a).
2. Estimating the missing starting and ending observations: Using the whole series, regress the series on a trend and estimate the missing observations. If the estimated values are not as expected, that is, negative or much lower or bigger than the series, extrapolation of the growth rates of the five years closest to the missing observations is used.

These regressions were performed:

Brazil

$$\begin{array}{l} \underline{\text{APERSON}} = 42.8542 + 158.2298 T \quad R^2 = 97.94 \\ \quad \quad \quad (183.7178) \quad (5.4175) \quad \quad \quad n = 24 \end{array}$$

Chile

$$\begin{array}{l} \underline{\text{APERSON}} = 120.6085 + 7.4045 T \quad R^2 = 92.27 \\ \quad \quad \quad (14.2639) \quad (0.4793) \quad \quad \quad n = 22 \end{array}$$

Korea

$$\begin{array}{l} \underline{\text{APERSON}} = 420.8019 + 38.9149 T \quad R^2 = 91.24 \\ \quad \quad \quad (76.7459) \quad (2.7657) \quad \quad \quad n = 21 \end{array}$$

Morocco

$$\begin{array}{l} \underline{\text{APERSON}} = 72.1481 + 5.6115 T \quad R^2 = 59.98 \\ \quad \quad \quad (33.1416) \quad (0.9773) \quad \quad \quad n = 24 \end{array}$$

Zambia

$$\begin{array}{l} \underline{\text{APERSON}} = 8.7448 + 4.3411 T \quad R^2 = 79.28 \\ \quad \quad \quad (16.0433) \quad (0.4731) \quad \quad \quad n = 24 \end{array}$$

Agricultural Research Expenditure

AEXPEND is actual research expenditures, including salaries and operating and capital expenses that are measured in constant 1980 U.S. dollars using purchasing power parity (PPP). PPP is defined as "a measurement of the domestic cost of buying a bundle of goods and services in a particular country as its own price relative to the corresponding cost, say, in dollars of the same bundle in the United States" (Pardey and Roseboom 1989).

The data series were collected from the same sources as the agricultural research personnel variable. The same procedure was also applied to generate missing observations for this variable. The following regressions were performed:

Brazil

$$\underline{\text{AEXPEND}} = -62.3572 + 17.7679 T \quad R^2 = 83.22 \\ (53.0881) \quad (1.7840) \quad n = 22$$

Chile

$$\underline{\text{AEXPEND}} = 13.2770 + 0.7008 T \quad R^2 = 55.03 \\ (4.2156) \quad (0.1417) \quad n = 22$$

Colombia

$$\underline{\text{AEXPEND}} = 27.4236 + 0.8614 T \quad R^2 = 23.03 \\ (8.2125) \quad (0.1417) \quad n = 17$$

Dominican Republic

$$\underline{\text{AEXPEND}} = 0.0166 + 0.1963 T \quad R^2 = 76.05 \\ (0.7646) \quad (0.0240) \quad n = 23$$

Egypt

$$\underline{\text{AEXPEND}} = 14.1245 + 0.9749 T \quad R^2 = 82.63 \\ (3.2322) \quad (0.0953) \quad n = 24$$

Gross Domestic Product for Transportation and Communication

These time-series data (*AGDPTC*) are a measure of infrastructure that are defined and completed as follows. *AGDPTC* comprises "compensation of employees, operating surplus and provision for the consumption of fixed capital" (World Bank 1984). This variable is measured at current factor cost. While the data for Morocco were collected from the *Annual Statistics of the United Nations*, the data for other countries were collected from *World Tables 1984* and *World Tables 1976*.

Two primary procedures were used to estimate the missing observations.

Missing values that lie between two known values, $t - n$ and $t + n$. For some countries, like Ghana, the missing data for 1961-64 were completed by using the average annual growth rate given the values in 1960 and 1965. However, for other countries, the annual growth rate from the time series in *World Tables 1976* was used to complete the data series.

Missing values at the beginning or the end of the series. Given the time-series data of Gross Domestic Product for Services (*GDPS*) in *World Tables 1987*, the percentage values of *GDPTC* over *GDPS* (*%AGDPTC*) could be found. These percentage values were regressed on Time (*T*) and used

to estimate the percentage values for years for which *GDPTC* data were missing. This was true for Morocco before 1970 and for other countries in 1982 and 1983. These estimated percentages were multiplied by GDPS values in order to get the estimates for the *GDPTC (AGDPTC)*.

The exception was made for Portugal, which did not have a GDPS time series. The estimates were calculated from a regression analysis of *GDPTC* on Time (*T*). The regressions are:

Argentina

$$\begin{aligned} \underline{\%AGDPTC} &= 4.7214 - 0.0023 T & R^2 &= 29.73 \\ & (0.0163) (0.0009) & n &= 15 \end{aligned}$$

Brazil

$$\begin{aligned} \underline{\%AGDPTC} &= 1.9891 - 0.0009 T & R^2 &= 57.91 \\ & (0.0038) (0.0002) & n &= 15 \end{aligned}$$

Chile

$$\begin{aligned} \underline{\%AGDPTC} &= 0.7176 - 0.0003 T & R^2 &= 1.99 \\ & (0.0108) (0.0006) & n &= 16 \end{aligned}$$

Colombia

$$\begin{aligned} \underline{\%AGDPTC} &= -0.5705 + 0.0004 T & R^2 &= 57.91 \\ & (0.0058) (0.0003) & n &= 16 \end{aligned}$$

Dominican Republic

$$\begin{aligned} \underline{\%AGDPTC} &= 3.3009 - 0.0016 T & R^2 &= 27.67 \\ & (0.0120) (0.0007) & n &= 15 \end{aligned}$$

Egypt

$$\begin{aligned} \underline{\%AGDPTC} &= -31.2116 + 0.0159 T & R^2 &= 95.62 \\ & (0.0080) (0.0015) & n &= 7 \end{aligned}$$

Ghana

$$\begin{aligned} \underline{\%AGDPTC} &= 3.9311 - 0.0019 T & R^2 &= 22.71 \\ & (0.0176) (0.0009) & n &= 16 \end{aligned}$$

Ivory Coast

$$\begin{aligned} \underline{\%AGDPTC} &= -11.8707 - 0.0006 T & R^2 &= 78.69 \\ & (0.0151) (0.0008) & n &= 16 \end{aligned}$$

Korea, Rep. of

$$\begin{aligned} \underline{\%AGDPTC} &= -0.0434 + 0.0001 T & R^2 &= 2.92 \\ & (0.0084) (0.0005) & n &= 16 \end{aligned}$$

Malaysia

$$\begin{aligned} \underline{\%AGDPTC} &= -6.6846 + 0.0035 T & R^2 &= 83.29 \\ & (0.0072) (0.0004) & n &= 15 \end{aligned}$$

Morocco

$$\begin{aligned} \underline{\%AGDPTC} &= -0.0021 + 0.000001 T & R^2 &= 8.05 \\ & (0.000012) \quad (0.000001) & n &= 10 \end{aligned}$$

Pakistan

$$\begin{aligned} \underline{\%AGDPTC} &= -1.3989 + 0.0008 T & R^2 &= 1.76 \\ & (0.0045) \quad (0.0007) & n &= 8 \end{aligned}$$

Philippines

$$\begin{aligned} \underline{\%AGDPTC} &= -9.8709 + 0.0051 T & R^2 &= 89.48 \\ & (0.0086) \quad (0.0005) & n &= 16 \end{aligned}$$

Portugal (exception)

$$\begin{aligned} \underline{AGDPTC} &= -2296600 + 1172.058 T & R^2 &= 85.31 \\ & (2397.089) \quad (130.0004) & n &= 16 \end{aligned}$$

Thailand

$$\begin{aligned} \underline{\%AGDPTC} &= -0.7814 + 0.0005 T & R^2 &= 14.41 \\ & (0.0056) \quad (0.0003) & n &= 16 \end{aligned}$$

Sri Lanka

$$\begin{aligned} \underline{\%AGDPTC} &= -0.2395 + 0.0002 T & R^2 &= 1.39 \\ & (0.0091) \quad (0.0005) & n &= 16 \end{aligned}$$

Turkey

$$\begin{aligned} \underline{\%AGDPTC} &= -1.8582 + 0.0010 T & R^2 &= 22.67 \\ & (0.0095) \quad (0.0005) & n &= 16 \end{aligned}$$

Zambia

$$\begin{aligned} \underline{\%AGDPTC} &= 0.1698 - 0.000001 T & R^2 &= 0.004 \\ & (0.0149) \quad (0.0008) & n &= 16 \end{aligned}$$

Road Density

In addition to *AGDPTC* as a measure of infrastructure, *ROADDEN* is the density of the total network measured in kilometers per square kilometer and obtained from the International Road Federation (IRF), *World Road Statistics 1978-1982* and *1980-1984*. The data available were for 1978 and 1980-84.

Table 1. Aggregate value of production

Year	Crop Value (CPN)	Livestock Value (LPN)	Total Value (TPN)	Total Index (ITPN)
----- (million 1979-81 international dollars) -----				(1979-81 = 100)
Argentina				
1961	4,718	7,008	11,725	67.3
1962	4,788	7,442	12,230	71.1
1963	5,310	7,970	13,280	77.8
1964	5,770	6,719	12,489	72.6
1965	4,975	6,772	11,747	67.8
1966	5,374	7,682	13,057	74.9
1967	5,903	8,063	13,966	80.7
1968	5,179	8,154	13,334	76.2
1969	5,607	8,838	14,446	82.5
1970	6,023	8,186	14,209	81.2
1971	6,192	7,033	13,224	74.4
1972	5,689	7,453	13,142	73.2
1973	6,496	7,341	13,837	77.6
1974	7,127	7,428	14,555	81.9
1975	6,935	8,134	15,069	85.0
1976	7,433	8,943	16,376	93.3
1977	7,364	9,072	16,436	94.2
1978	8,087	9,652	17,739	101.9
1979	8,481	9,371	17,852	102.8
1980	7,378	9,004	16,382	94.6
1981	8,553	9,241	17,793	102.5
1982	9,845	8,478	18,324	105.1
1983	9,473	8,020	17,493	100.3
1984	10,095	8,443	18,538	106.7
1985	9,568	8,896	18,464	105.5
1986	9,794	9,042	18,836	108.3
1987	9,076	8,838	17,914	103.8
1988	9,556	8,665	18,221	105.5
Brazil				
1961	12,797	5,431	18,227	54.2
1962	13,416	5,554	18,970	55.8
1963	13,082	5,628	18,710	54.4
1964	12,500	6,022	18,523	53.7
1965	15,722	6,369	22,091	65.2
1966	13,821	6,424	20,245	58.6
1967	15,310	6,583	21,894	64.0
1968	14,959	7,189	22,148	64.0
1969	15,527	7,559	23,085	67.2
1970	15,560	7,752	23,311	67.8
1971	17,243	7,719	24,962	73.2

Table 1. (Continued)

Year	Crop Value (CPN)	Livestock Value (LPN)	Total Value (TPN)	Total Index (ITPN)
----- (million 1979-81 international dollars) -----				(1979-81 = 100)
1972	17,678	8,418	26,097	76.5
1973	16,693	8,788	25,481	74.4
1974	18,967	8,981	27,948	82.3
1975	18,985	9,422	28,407	83.3
1976	18,700	9,793	28,493	83.3
1977	20,870	10,374	31,244	91.8
1978	19,791	10,427	30,218	88.9
1979	21,047	10,555	31,601	92.4
1980	23,144	11,411	34,555	100.9
1981	24,767	11,580	36,347	106.6
1982	24,251	12,257	36,507	107.9
1983	24,479	12,136	36,615	109.9
1984	26,300	11,635	37,935	112.9
1985	29,578	12,076	41,654	125.0
1986	26,550	11,445	37,994	112.0
1987	30,576	12,815	43,391	127.8
1988	31,891	13,761	45,652	133.5
Chile				
1961	927	603	1,530	71.7
1962	941	639	1,580	75.0
1963	953	676	1,629	76.6
1964	978	635	1,613	75.4
1965	922	699	1,621	75.8
1966	1,043	749	1,792	83.4
1967	1,042	763	1,805	83.2
1968	1,065	844	1,908	87.8
1969	924	868	1,792	82.5
1970	1,005	897	1,902	87.4
1971	1,093	776	1,869	85.9
1972	1,082	659	1,741	79.6
1973	928	659	1,587	72.7
1974	1,004	902	1,905	85.9
1975	1,020	955	1,975	91.8
1976	1,022	900	1,921	89.3
1977	1,204	860	2,064	95.5
1978	1,097	864	1,961	89.9
1979	1,190	908	2,098	96.9
1980	1,158	978	2,136	97.6
1981	1,203	1,092	2,295	105.5
1982	1,186	1,076	2,262	104.6
1983	1,157	1,019	2,176	100.6

Table 1. (Continued)

Year	Crop Value (CPN)	Livestock Value (LPN)	Total Value (TPN)	Total Index (ITPN)
	----- (million 1979-81 international dollars) -----			(1979-81 = 100)
1984	1,318	972	2,290	105.3
1985	1,341	969	2,310	107.0
1986	1,480	1,022	2,502	115.6
1987	1,513	1,024	2,537	117.4
1988	1,505	1,059	2,564	118.4
Colombia				
1961	1,876	1,368	3,244	54.4
1962	2,053	1,455	3,508	59.1
1963	1,969	1,497	3,466	58.3
1964	2,053	1,536	3,589	60.3
1965	2,084	1,589	3,673	61.7
1966	2,146	1,529	3,675	61.7
1967	2,159	1,541	3,699	61.7
1968	2,302	1,585	3,887	64.8
1969	2,306	1,658	3,964	66.1
1970	2,390	1,766	4,156	69.0
1971	2,419	1,900	4,319	70.8
1972	2,492	1,853	4,345	71.1
1973	2,678	1,781	4,459	72.5
1974	2,805	1,866	4,671	75.7
1975	3,069	2,020	5,089	82.9
1976	3,108	2,228	5,337	87.1
1977	3,303	2,247	5,550	90.4
1978	3,537	2,217	5,755	93.8
1979	3,671	2,354	6,025	98.6
1980	3,717	2,341	6,057	98.7
1981	3,794	2,495	6,289	102.6
1982	3,744	2,492	6,236	102.0
1983	3,756	2,372	6,127	99.4
1984	3,589	2,481	6,070	98.9
1985	3,613	2,552	6,164	100.2
1986	3,763	2,760	6,522	106.4
1987	3,783	2,893	6,676	108.0
1988	3,969	2,989	6,957	112.4
Dominican Republic				
1961	594	150	744	68.6
1962	612	149	761	70.2
1963	606	150	756	69.5

Table 1. (Continued)

Year	Crop Value (CPN)	Livestock Value (LPN)	Total Value (TPN)	Total Index (ITPN)
----- (million 1979-81 international dollars) -----				(1979-81 = 100)
1964	632	154	786	72.1
1965	541	155	696	63.4
1966	581	163	745	68.4
1967	570	171	740	68.0
1968	550	188	738	67.3
1969	645	196	841	76.2
1970	681	201	883	79.9
1971	725	218	943	85.0
1972	738	234	972	87.5
1973	797	246	1,043	93.5
1974	796	249	1,045	92.8
1975	751	250	1,000	89.7
1976	834	269	1,103	98.5
1977	831	278	1,110	98.3
1978	871	286	1,158	102.0
1979	829	316	1,145	102.3
1980	799	324	1,123	98.4
1981	815	320	1,136	99.2
1982	882	321	1,203	105.9
1983	907	344	1,251	109.1
1984	907	367	1,274	110.9
1985	861	383	1,244	109.2
1986	835	401	1,236	107.7
1987	824	415	1,239	107.3
1988	832	375	1,207	103.5
Egypt				
1961	2,537	792	3,329	59.2
1962	3,158	825	3,984	71.1
1963	3,265	806	4,071	73.2
1964	3,325	816	4,140	74.3
1965	3,368	840	4,208	75.4
1966	3,385	858	4,243	76.2
1967	3,268	892	4,160	74.3
1968	3,512	1,074	4,586	82.3
1969	3,774	1,067	4,841	86.8
1970	3,734	1,076	4,809	86.4
1971	3,823	1,114	4,937	89.1
1972	3,883	1,134	5,017	90.1
1973	3,916	1,141	5,057	90.7
1974	3,945	1,164	5,110	91.4
1975	4,002	1,186	5,188	92.6

Table 1. (Continued)

Year	Crop Value (CPN)	Livestock Value (LPN)	Total Value (TPN)	Total Index (ITPN)
(million 1979-81 international dollars)				(1979-81 = 100)
1976	4,140	1,206	5,346	94.9
1977	4,034	1,225	5,260	92.7
1978	4,200	1,249	5,449	95.2
1979	4,456	1,251	5,707	99.5
1980	4,560	1,269	5,829	100.6
1981	4,536	1,279	5,815	99.8
1982	4,684	1,420	6,104	104.8
1983	4,712	1,485	6,198	106.0
1984	4,670	1,574	6,244	106.3
1985	4,977	1,690	6,667	113.4
1986	4,939	1,800	6,738	114.0
1987	5,237	1,843	7,079	120.2
1988	5,321	1,920	7,241	123.0
Ghana				
1961	1,018	36	1,054	102.4
1962	1,036	38	1,074	104.5
1963	1,041	40	1,082	105.2
1964	1,237	49	1,285	126.1
1965	1,052	53	1,105	107.5
1966	1,069	56	1,125	109.2
1967	1,157	61	1,218	118.2
1968	1,072	64	1,136	109.3
1969	1,180	69	1,250	120.7
1970	1,253	72	1,326	127.0
1971	1,328	73	1,401	134.7
1972	1,237	79	1,317	125.8
1973	1,228	80	1,308	123.4
1974	1,375	86	1,461	137.8
1975	1,306	87	1,393	131.4
1976	1,137	85	1,222	113.9
1977	987	92	1,079	101.3
1978	969	92	1,061	97.8
1979	1,017	91	1,109	101.6
1980	1,019	89	1,108	101.5
1981	970	86	1,056	96.8
1982	917	83	1,000	90.8
1983	834	79	913	82.4
1984	1,156	86	1,242	115.4
1985	1,146	97	1,243	114.9
1986	1,182	107	1,290	119.4

Table 1. (Continued)

Year	Crop Value (CPN)	Livestock Value (LPN)	Total Value (TPN)	Total Index (ITPN)
	(million 1979-81 international dollars)			(1979-81 = 100)
1987	1,170	117	1,287	118.9
1988	1,200	121	1,321	122.2
Ivory Coast				
1961	739	30	739	38.0
1962	695	31	695	35.4
1963	839	33	839	43.2
1964	1,004	35	1,004	52.1
1965	912	37	912	47.0
1966	1,070	38	1,070	55.6
1967	896	41	896	46.1
1968	1,147	44	1,147	59.7
1969	1,106	46	1,106	57.0
1970	1,222	48	1,222	62.8
1971	1,257	50	1,257	64.5
1972	1,269	53	1,269	64.6
1973	1,372	56	1,372	70.0
1974	1,322	60	1,322	66.2
1975	1,589	65	1,589	79.5
1976	1,621	70	1,621	81.7
1977	1,660	79	1,660	85.0
1978	1,607	90	1,607	82.0
1979	1,845	96	1,845	95.4
1980	1,863	107	1,863	95.5
1981	2,101	116	2,101	109.0
1982	1,857	114	1,857	95.0
1983	1,909	126	1,909	98.8
1984	1,931	120	1,931	99.0
1985	2,411	124	2,411	124.5
1986	2,393	129	2,393	123.0
1987	2,420	132	2,420	124.6
1988	2,508	136	2,508	129.2
Malaysia				
1961	1,107	316	1,275	48.3
1962	1,120	315	1,307	49.0
1963	1,176	327	1,373	51.4
1964	1,171	321	1,383	51.8
1965	1,293	349	1,523	57.0
1966	1,332	355	1,576	57.9

Table 1. (Continued)

Year	Crop Value (CPN)	Livestock Value (LPN)	Total Value (TPN)	Total Index (ITPN)
	----- (million 1979-81 international dollars) -----			(1979-81 = 100)
1967	1,369	360	1,618	56.8
1968	1,524	396	1,778	61.7
1969	1,690	433	1,964	67.8
1970	1,774	449	2,066	70.2
1971	1,920	480	2,233	74.5
1972	1,984	490	2,330	76.2
1973	2,209	539	2,565	83.2
1974	2,354	567	2,744	86.5
1975	2,380	567	2,835	87.1
1976	2,577	606	3,069	93.7
1977	2,664	622	3,134	92.3
1978	2,652	620	3,142	89.6
1979	2,965	690	3,447	98.0
1980	3,115	723	3,654	100.6
1981	3,237	747	3,787	101.3
1982	3,544	818	4,098	103.0
1983	3,362	775	3,934	96.2
1984	3,644	838	4,298	94.8
1985	3,912	895	4,677	103.0
1986	4,190	958	4,937	110.4
1987	4,262	-	5,031	111.6
1988	4,603	-	5,407	120.6
Morocco				
1961	748	488	1,235	55.3
1962	1,048	460	1,508	67.1
1963	1,161	450	1,611	72.2
1964	1,193	444	1,636	74.4
1965	1,299	482	1,781	81.2
1966	1,048	519	1,566	70.6
1967	1,153	542	1,695	76.0
1968	1,782	568	2,350	105.2
1969	1,323	587	1,910	84.9
1970	1,391	588	1,979	87.7
1971	1,655	589	2,244	99.3
1972	1,535	635	2,170	94.5
1973	1,335	643	1,978	86.7
1974	1,648	622	2,270	99.2
1975	1,459	592	2,051	88.1
1976	1,734	599	2,333	100.1
1977	1,258	656	1,914	83.0
1978	1,631	716	2,347	101.3

Table 1. (Continued)

Year	Crop Value (CPN)	Livestock Value (LPN)	Total Value (TPN)	Total Index (ITPN)
	----- (million 1979-81 international dollars) -----			(1979-81 = 100)
1979	1,634	785	2,419	105.2
1980	1,609	798	2,407	105.9
1981	1,174	860	2,035	88.7
1982	1,748	907	2,655	117.2
1983	1,526	871	2,397	106.1
1984	1,586	862	2,448	107.4
1985	1,828	911	2,740	119.2
1986	2,339	925	3,264	143.1
1987	1,762	959	2,721	116.1
1988	1,832	992	2,824	120.9
Pakistan				
1961	2,752	2,377	5,130	49.6
1962	2,987	2,451	5,438	52.7
1963	3,221	2,515	5,736	55.3
1964	3,194	2,589	5,784	56.1
1965	3,428	2,653	6,080	58.8
1966	3,495	2,687	6,182	59.7
1967	3,913	2,750	6,664	64.4
1968	4,334	2,824	7,158	69.8
1969	4,494	2,899	7,393	72.0
1970	4,651	2,972	7,623	74.2
1971	4,789	3,050	7,838	76.1
1972	4,845	3,140	7,984	77.4
1973	4,892	3,241	8,134	79.3
1974	4,993	3,337	8,330	81.3
1975	4,870	3,430	8,300	81.2
1976	4,991	3,543	8,534	83.6
1977	5,497	3,660	9,157	89.6
1978	5,328	3,773	9,102	89.4
1979	5,955	3,904	9,859	96.6
1980	6,016	4,043	10,059	98.9
1981	6,434	4,173	10,608	104.4
1982	6,696	4,310	11,005	108.2
1983	6,354	4,470	10,823	107.2
1984	7,014	4,756	11,770	115.7
1985	7,306	5,067	12,373	121.2
1986	8,133	5,287	13,420	132.0
1987	7,769	5,531	13,300	130.6
1988	8,033	5,738	13,771	135.3

Table 1. (Continued)

Year	Crop Value (CPN)	Livestock Value (LPN)	Total Value (TPN)	Total Index (ITPN)
----- (million 1979-81 international dollars) -----				(1979-81 = 100)
Philippines				
1961	2,403	582	2,985	46.5
1962	2,683	632	3,314	52.2
1963	2,772	660	3,433	54.0
1964	2,781	687	3,468	54.5
1965	2,861	736	3,597	56.6
1966	2,965	832	3,798	59.8
1967	2,917	839	3,756	58.8
1968	2,911	899	3,810	59.5
1969	3,104	963	4,067	63.3
1970	3,275	907	4,183	64.8
1971	3,447	944	4,390	68.0
1972	3,433	951	4,384	67.8
1973	3,720	1,089	4,808	74.7
1974	3,689	1,312	5,000	77.2
1975	4,308	1,064	5,373	82.9
1976	4,842	1,053	5,894	91.4
1977	4,885	1,070	5,955	92.1
1978	5,159	1,150	6,309	97.9
1979	4,998	1,209	6,207	95.9
1980	5,218	1,274	6,492	100.0
1981	5,462	1,295	6,757	104.0
1982	5,410	1,194	6,604	101.0
1983	5,345	1,295	6,640	101.7
1984	5,025	1,461	6,486	99.0
1985	5,284	1,411	6,695	102.7
1986	5,735	1,340	7,075	108.0
1987	5,579	1,355	6,934	105.3
1988	5,313	1,377	6,690	100.5
Portugal				
1961	1,487	487	1,974	108.3
1962	1,575	512	2,087	114.8
1963	1,719	515	2,235	123.3
1964	1,574	520	2,094	115.1
1965	1,727	572	2,299	127.3
1966	1,318	586	1,904	101.4
1967	1,646	578	2,224	120.6
1968	1,605	599	2,204	118.1
1969	1,485	680	2,165	116.0
1970	1,622	695	2,317	124.7
1971	1,453	663	2,116	109.4

Table 1. (Continued)

Year	Crop Value (CPN)	Livestock Value (LPN)	Total Value (TPN)	Total Index (ITPN)
----- (million 1979-81 international dollars) -----				(1979-81 = 100)
1972	1,469	685	2,154	110.3
1973	1,498	743	2,241	114.3
1974	1,579	780	2,358	117.8
1975	1,448	834	2,281	114.7
1976	1,367	816	2,183	105.7
1977	1,157	868	2,025	93.4
1978	1,230	907	2,137	96.0
1979	1,514	906	2,420	112.9
1980	1,325	970	2,295	98.2
1981	1,116	1,034	2,150	88.8
1982	1,435	1,052	2,487	110.8
1983	1,135	1,020	2,156	92.2
1984	1,357	961	2,317	104.2
1985	1,373	959	2,332	106.9
1986	1,289	1,017	2,306	104.5
1987	1,355	1,056	2,411	109.8
1988	1,362	1,070	2,432	111.5
South Korea				
1961	1,780	203	1,983	44.5
1962	1,692	182	1,874	41.8
1963	1,840	237	2,077	46.2
1964	2,178	285	2,463	55.2
1965	2,192	293	2,486	55.7
1966	2,404	300	2,703	60.9
1967	2,233	287	2,520	56.2
1968	2,251	304	2,554	56.6
1969	2,567	384	2,950	65.3
1970	2,524	410	2,934	63.6
1971	2,584	435	3,020	65.4
1972	2,656	474	3,130	68.2
1973	2,695	487	3,182	69.1
1974	2,794	537	3,331	73.1
1975	3,175	629	3,804	82.9
1976	3,558	653	4,211	91.3
1977	3,841	734	4,575	98.8
1978	4,115	813	4,928	105.4
1979	4,166	1,078	5,244	110.1
1980	3,314	1,167	4,481	92.5
1981	3,688	1,140	4,828	97.3
1982	3,864	1,166	5,030	103.1
1983	3,843	1,402	5,245	102.7

Table 1. (Continued)

Year	Crop Value (CPN)	Livestock Value (LPN)	Total Value (TPN)	Total Index (ITPN)
----- (million 1979-81 international dollars) -----				(1979-81 = 100)
1984	3,838	1,593	5,430	107.2
1985	3,863	1,778	5,641	110.2
1986	4,014	1,769	5,783	109.4
1987	3,840	1,844	5,684	107.4
1988	3,903	1,961	5,864	112.6
Sri Lanka				
1961	1,053	69	1,121	66.2
1962	1,098	71	1,168	69.0
1963	1,101	88	1,189	70.1
1964	1,183	98	1,281	76.0
1965	1,100	102	1,202	71.2
1966	1,109	105	1,214	71.8
1967	1,204	98	1,302	77.1
1968	1,265	106	1,371	81.1
1969	1,256	103	1,359	80.3
1970	1,330	104	1,434	84.8
1971	1,289	112	1,402	83.0
1972	1,297	129	1,426	84.4
1973	1,230	126	1,356	80.4
1974	1,330	109	1,439	85.1
1975	1,351	114	1,464	86.8
1976	1,340	117	1,457	86.4
1977	1,326	118	1,444	85.7
1978	1,420	117	1,538	91.0
1979	1,534	123	1,656	98.1
1980	1,556	136	1,692	100.4
1981	1,568	142	1,710	101.4
1982	1,533	133	1,666	98.9
1983	1,655	141	1,796	106.5
1984	1,561	150	1,711	101.1
1985	1,681	155	1,837	107.9
1986	1,704	126	1,830	108.4
1987	1,557	158	1,714	101.2
1988	1,595	161	1,757	103.9
Thailand				
1961	3,385	639	4,024	42.0
1962	3,645	667	4,312	45.0
1963	3,983	652	4,634	48.4

Table 1. (Continued)

Year	Crop Value (CPN)	Livestock Value (LPN)	Total Value (TPN)	Total Index (ITPN)
(million 1979-81 international dollars)				(1979-81 = 100)
1964	3,852	705	4,557	47.6
1965	4,002	697	4,699	49.2
1966	4,787	727	5,515	57.8
1967	4,188	746	4,934	51.8
1968	4,548	773	5,321	55.7
1969	4,890	805	5,695	59.9
1970	5,101	845	5,946	62.6
1971	5,165	850	6,015	63.4
1972	4,932	927	5,858	61.7
1973	5,983	1,062	7,045	74.5
1974	5,861	1,092	6,953	73.5
1975	6,485	1,126	7,611	80.5
1976	6,942	1,172	8,113	85.9
1977	6,909	1,196	8,104	85.8
1978	8,116	1,379	9,496	100.6
1979	7,534	1,322	8,856	93.6
1980	8,361	1,324	9,685	101.9
1981	8,566	1,347	9,913	104.3
1982	8,538	1,467	10,005	105.2
1983	9,093	1,557	10,650	111.7
1984	9,487	1,544	11,031	115.3
1985	9,818	1,672	11,489	119.6
1986	9,079	1,734	10,813	112.8
1987	9,000	1,825	10,825	113.0
1988	9,321	1,887	11,208	116.7
Turkey				
1961	5,835	2,304	8,138	56.2
1962	6,092	2,311	8,403	57.6
1963	6,594	2,311	8,905	59.8
1964	6,633	2,286	8,920	61.3
1965	6,453	2,331	8,784	60.1
1966	7,132	2,418	9,550	65.2
1967	7,322	2,423	9,746	66.5
1968	7,571	2,479	10,050	69.3
1969	7,440	2,582	10,022	68.7
1970	7,835	2,591	10,426	72.5
1971	8,649	2,621	11,271	77.2
1972	8,846	2,625	11,471	79.4
1973	7,787	2,741	10,528	72.9
1974	8,710	2,885	11,596	81.2
1975	9,436	3,070	12,506	87.2

Table 1. (Continued)

Year	Crop Value (CPN)	Livestock Value (LPN)	Total Value (TPN)	Total Index (ITPN)
----- (million 1979-81 international dollars) -----				(1979-81 = 100)
1976	10,470	3,055	13,525	94.0
1977	10,339	3,212	13,551	94.1
1978	10,760	3,238	13,998	97.8
1979	11,011	3,209	14,219	98.4
1980	11,168	3,218	14,386	100.7
1981	11,101	3,442	14,542	100.7
1982	11,883	3,414	15,297	106.3
1983	11,702	3,422	15,124	105.0
1984	12,139	3,292	15,431	104.6
1985	12,398	3,588	15,986	108.2
1986	13,332	3,560	16,891	114.0
1987	13,487	3,622	17,110	114.5
1988	12,414	3,648	16,063	107.6
Zambia				
1961	184	70	255	65.8
1962	182	70	252	65.2
1963	175	72	247	63.0
1964	191	76	267	69.4
1965	196	80	276	71.6
1966	215	85	301	77.5
1967	212	89	301	77.6
1968	210	95	305	78.3
1969	214	96	311	78.4
1970	199	102	301	75.4
1971	244	98	343	86.4
1972	290	109	399	101.9
1973	241	113	354	89.4
1974	261	113	379	95.5
1975	323	134	457	117.0
1976	371	149	519	135.1
1977	340	148	487	125.2
1978	294	145	439	112.8
1979	236	145	381	96.9
1980	245	152	397	102.5
1981	248	143	391	100.5
1982	216	153	369	94.3
1983	252	144	396	101.2
1984	266	150	416	105.6
1985	295	158	452	117.1
1986	323	160	483	125.8

Table 1. (Continued)

Year	Crop Value (CPN)	Livestock Value (LPN)	Total Value (TPN)	Total Index (ITPN)
	(million 1979-81 international dollars)			(1979-81 = 100)
1987	299	166	465	123.4
1988	358	169	527	132.8

Note: Letters in parentheses in the column refer to the variable names assigned in the SAS data set.

SOURCE: USDA-ERS 1988.

Table 2. Prices

Year	Output Price Index (P)	Monthly Agricultural Wages (AWAGES)	Agricultural Wage Index (WAGEI)	Fertilizer Price Index (FPI)
(10 ⁶ australes)				
Argentina				
1961	2.04352	3.24	0.59170	0.532
1962	2.44051	4.26	0.56403	0.513
1963	3.19967	5.17	0.56135	0.557
1964	3.30799	7.62	0.82088	0.541
1965	2.24158	10.99	0.98003	0.540
1966	1.75373	14.05	1.01669	0.573
1967	1.65201	16.60	0.75110	0.522
1968	1.50586	18.95	0.81111	0.517
1969	1.53127	21.20	0.90734	0.535
1970	1.60729	25.78	1.02413	0.569
1971	1.72679	39.48	1.32281	0.564
1972	2.06971	61.01	1.14231	0.529
1973	1.87268	103.30	1.79928	0.664
1974	1.56770	147.37	2.54316	0.894
1975	1.06920	387.21	2.16336	0.947
1976	1.17511	1159.11	0.95136	0.834
1977	1.49356	2449.81	0.90589	0.812
1978	1.19929	4753.88	0.89143	0.800
1979	1.14613	14048.49	1.59419	0.837
1980	1.06769	38506.86	3.13305	1.000
1981	1.07714	77087.89	2.61778	1.000
1982	1.45060	226469.80	1.56327	1.050
1983	1.31981	1555027.71	2.20994	1.000
1984	1.05559	11469897.02	2.53441	1.000
1985	0.70642	-	2.37984	1.000
1986	-	-	-	-
(CR\$)				
Brazil				
1961	-	4.37	-	-
1962	-	7.05	-	-
1963	-	9.63	-	-
1964	-	20.75	-	-
1965	-	21.85	-	-
1966	0.77755	45.88	0.31013	0.834
1967	0.66117	72.24	0.40649	0.794
1968	0.57210	70.16	0.30964	0.731
1969	0.55467	101.73	0.37431	0.705
1970	0.48777	129.79	0.42319	0.719
1971	0.55461	162.94	0.46155	0.723

Table 2. (Continued)

Year	Output Price Index (P)	Monthly Agricultural Wages (AWAGES)	Agricultural Wage Index (WAGEI)	Fertilizer Price Index (FPI)
		(CR\$)		
1972	0.53432	193.35	0.48807	0.757
1973	0.66145	248.41	0.60740	0.856
1974	0.72504	331.51	0.73133	1.380
1975	0.71389	460.22	0.84824	1.220
1976	0.64460	642.93	0.90232	1.050
1977	0.60439	965.00	1.02197	1.150
1978	0.61216	1408.65	1.16718	1.010
1979	0.66422	2206.20	1.23226	0.971
1980	0.65084	3862.58	1.09556	1.270
1981	0.69858	7998.58	1.28347	1.360
1982	0.49599	16196.72	1.34510	1.220
1983	0.77844	34418.05	0.89359	1.150
1984	-	124715.65	-	-
1985	-	418051.26	-	-
1986	-	1050931.62	-	-
		(pesos)		
Chili				
1961	2.15084	0.15	0.13617	0.590
1962	2.12689	0.18	0.27235	0.736
1963	2.24854	0.28	0.23651	0.715
1964	2.14577	0.41	0.24965	0.718
1965	2.32030	0.70	0.32767	0.711
1966	2.49874	0.88	0.33703	0.720
1967	2.28175	1.03	0.29958	0.661
1968	2.11447	1.20	0.26434	0.603
1969	2.15112	1.61	0.26629	0.604
1970	2.17927	2.58	0.33574	0.606
1971	2.45142	4.30	0.51943	0.593
1972	1.87638	6.45	0.49162	0.731
1973	2.37611	13.62	0.18413	1.030
1974	0.87708	76.90	0.31852	1.460
1975	1.61363	93.53	0.28533	1.350
1976	2.00008	382.92	0.43939	1.090
1977	2.16944	890.96	0.61932	0.950
1978	1.98581	1299.68	0.61491	1.190
1979	1.95674	1719.36	0.69139	1.270
1980	1.94612	2327.38	0.89389	1.330
1981	1.73431	3923.32	1.50686	1.250
1982	1.62407	4459.75	1.31217	1.760
1983	1.78577	4571.12	0.86903	1.550

Table 2. (Continued)

Year	Output Price Index (P)	Monthly Agricultural Wages (AWAGES)	Agricultural Wage Index (WAGEI)	Fertilizer Price Index (FPI)
		(pesos)		
1984	-	4682.70	-	-
1985	-	5805.00	-	-
1986	-	6703.27	-	-
Colombia				
1961	4.73910	140.02	0.31826	0.568
1962	4.78026	156.99	0.35738	0.655
1963	4.48851	203.73	0.34021	0.557
1964	4.60844	243.60	0.40543	0.568
1965	4.21442	254.46	0.38854	0.550
1966	4.18958	302.84	0.35110	0.533
1967	4.22417	313.63	0.33342	0.495
1968	4.93353	331.24	0.30952	0.434
1969	4.90116	403.72	0.35118	0.522
1970	4.87427	352.91	0.28808	0.493
1971	4.75026	571.53	0.42634	0.466
1972	5.30592	640.69	0.43603	0.460
1973	6.24432	728.58	0.45835	0.695
1974	7.65710	886.66	0.49009	0.886
1975	6.97998	1087.93	0.52231	0.715
1976	6.68000	1327.20	0.56849	0.659
1977	6.73308	1980.80	0.80364	0.807
1978	5.35273	2561.30	0.97747	1.080
1979	4.47225	3163.30	1.14176	0.922
1980	4.41185	3902.25	1.29749	1.090
1981	4.36266	5011.67	1.46650	1.030
1982	4.11313	6401.23	1.60101	1.060
1983	3.57778	8099.18	1.65396	1.070
1984	-	9948.12	-	-
1985	-	12328.61	-	-
1986	-	-	-	-
		(DR\$)		
Dominican Republic				
1961	-	47	-	-
1962	-	47	-	-
1963	-	47	-	-
1964	-	47	-	-
1965	-	47	-	-

Table 2. (Continued)

Year	Output Price Index (P)	Monthly Agricultural Wages (AWAGES)	Agricultural Wage Index (WAGEI)	Fertilizer Price Index (FPI)
		(DR\$)		
1966	0.30048	44	0.65515	0.636
1967	0.26775	44	0.65385	0.612
1968	0.24392	44	0.65320	0.563
1969	0.22000	44	0.65385	0.615
1970	0.23048	44	0.65126	0.645
1971	0.24748	44	0.65255	0.666
1972	0.25591	44	0.65385	0.669
1973	0.28984	44	0.65126	0.679
1974	0.27859	55	0.81569	1.160
1975	0.23924	55	0.81247	1.410
1976	0.19176	55	0.80849	0.949
1977	0.50104	55	0.80141	0.971
1978	0.67824	77	1.11009	1.120
1979	0.59791	65	0.93260	1.160
1980	0.38024	67	0.95946	1.280
1981	0.21302	70	0.97720	1.340
1982	0.18269	75	0.94247	1.320
1983	0.23808	75	0.86020	1.220
1984	0.19918	90	0.56810	1.570
1985	0.16680	94	0.45129	1.570
1986	-	-	-	-
		(LE)		
Egypt				
1961	0.62976	3.06	0.13096	0.539
1962	0.59395	3.06	0.11459	0.450
1963	0.55504	2.95	0.10276	0.453
1964	0.53590	2.95	0.10276	0.457
1965	0.51770	3.06	0.10659	0.459
1966	0.54588	3.59	0.12506	0.457
1967	0.59374	4.05	0.14108	0.454
1968	0.45082	4.13	0.14387	0.454
1969	0.44561	3.44	0.11983	0.455
1970	0.48041	4.09	0.14247	0.461
1971	0.49844	4.73	0.16477	0.476
1972	0.51192	5.38	0.18741	0.468
1973	0.51804	6.02	0.22543	0.485
1974	0.56097	7.31	0.28076	0.547
1975	0.46104	11.61	0.44591	0.541
1976	0.55646	13.12	0.50391	0.572
1977	0.74640	15.26	0.58610	0.393

Table 2. (Continued)

Year	Output Price Index (P)	Monthly Agricultural Wages (AWAGES)	Agricultural Wage Index (WAGED)	Fertilizer Price Index (FPI)
		(LE)		
1978	0.69368	19.78	0.75971	0.393
1979	0.68104	22.58	0.48318	0.460
1980	0.69348	33.33	0.71322	0.459
1981	0.66037	40.85	0.87413	0.538
1982	0.64893	61.06	1.30660	0.605
1983	0.75651	76.54	1.63785	0.605
1984	0.65127	78.91	1.68856	0.605
1985	-	111.16	-	-
1986	-	-	-	-
		(cedis)		
Ghana				
1961	6.8908	14.70	0.31013	0.638
1962	6.4104	20.94	0.44178	0.633
1963	5.8117	23.52	0.49621	0.643
1964	5.0147	26.05	0.54958	0.634
1965	4.4477	27.12	0.57216	0.621
1966	4.7248	25.87	0.54579	0.654
1967	4.8832	24.17	0.43100	0.276
1968	4.9827	28.53	0.41897	0.266
1969	5.0556	31.21	0.45833	0.262
1970	5.1380	30.51	0.44805	0.257
1971	4.7668	33.14	0.48195	0.142
1972	4.3630	35.65	0.46435	0.168
1973	4.6239	44.39	0.57819	0.200
1974	5.2147	53.70	0.69946	0.196
1975	4.5159	67.00	0.87269	0.191
1976	5.2310	72.00	0.93782	0.187
1977	8.7852	155.00	2.01891	0.686
1978	15.8068	172.00	1.70622	0.682
1979	5.0899	186.00	1.01313	0.551
1980	5.9216	329.00	1.79204	1.110
1981	7.3509	503.00	2.73980	1.040
1982	5.9441	559.00	3.04483	1.010
1983	6.0348	1234.42	5.35954	1.220
1984	2.9021	1724.01	0.73073	0.961
1985	-	1901.85	-	-
1986	-	2368.42	-	-

Table 2. (Continued)

Year	Output Price Index (P)	Monthly Agricultural Wages (AWAGES)	Agricultural Wage Index (WAGEI)	Fertilizer Price Index (FPI)
(CFA francs)				
Ivory Coast				
1961	2.62249	3354.00	0.20352	0.695
1962	2.47442	3354.00	0.20352	0.713
1963	2.62679	3354.00	0.20352	0.705
1964	3.01336	3354.00	0.20352	0.558
1965	2.50515	3354.00	0.20352	0.626
1966	2.94802	3354.00	0.20352	0.626
1967	2.94646	3354.00	0.20352	0.626
1968	2.75774	3354.00	0.19345	0.532
1969	3.11921	3354.00	0.18091	0.450
1970	3.18548	3354.00	0.18091	0.513
1971	3.17931	3354.00	0.18091	0.519
1972	3.04883	3354.00	0.19898	0.621
1973	3.70864	3440.00	0.23118	0.759
1974	4.00338	4300.00	0.26759	0.910
1975	2.94157	4300.00	0.30055	1.300
1976	3.26173	5375.00	0.33694	1.070
1977	4.55710	5375.00	0.32771	1.030
1978	4.51523	5912.50	0.39246	1.150
1979	5.09428	5912.50	0.41634	1.350
1980	4.61906	5912.50	0.41918	1.480
1981	4.34249	5912.50	0.32592	1.500
1982	4.12376	6514.50	0.29695	1.430
1983	-	6068.59	-	-
1984	-	6227.90	-	-
1985	-	6387.22	-	-
1986	-	6546.53	-	-
(ringgits)				
Malaysia				
1961	3.48861	64.97	0.32013	0.513
1962	3.19322	64.97	0.31908	0.535
1963	2.91135	67.52	0.33052	0.535
1964	2.78469	66.25	0.32324	0.561
1965	2.77908	66.25	0.32430	0.551
1966	2.59842	67.52	0.32944	0.551
1967	2.09375	67.09	0.32841	0.558
1968	1.79929	69.09	0.33710	0.572
1969	2.21395	71.86	0.34948	0.584
1970	1.88753	70.99	0.34525	0.598
1971	1.71102	69.10	0.35815	0.608

Table 2. (Continued)

Year	Output Price Index (P)	Monthly Agricultural Wages (AWAGES)	Agricultural Wage Index (WAGEI)	Fertilizer Price Index (FPI)
		(ringgits)		
1972	1.40977	70.10	0.37235	0.628
1973	1.98054	78.31	0.47878	0.873
1974	2.21711	105.05	0.68119	1.010
1975	1.74125	96.10	0.55579	0.954
1976	1.92911	129.63	0.76446	0.755
1977	2.26940	122.16	0.77536	0.685
1978	2.24913	129.73	0.87929	0.689
1979	2.36382	149.62	1.02336	0.976
1980	2.21952	163.65	1.10420	1.120
1981	1.92555	193.92	1.29676	1.100
1982	1.54857	219.28	1.41578	0.926
1983	1.68791	243.84	1.56089	0.815
1984	-	282.66	-	-
1985	-	178.82	-	-
1986	-	-	-	-
		(dirhams)		
Morocco				
1961	0.85675	77.58	0.22966	0.159
1962	1.02285	82.01	0.24277	0.120
1963	0.72524	82.01	0.24277	0.134
1964	0.68780	82.01	0.24277	0.146
1965	0.76844	82.01	0.24277	0.121
1966	0.83765	82.01	0.24277	0.131
1967	1.12893	82.01	0.24277	0.132
1968	0.99769	82.01	0.24277	0.131
1969	0.50544	82.01	0.24277	0.132
1970	0.55129	82.01	0.24277	0.139
1971	0.62485	105.23	0.31213	0.143
1972	0.57685	116.36	0.37890	0.144
1973	0.65809	126.28	0.46023	0.168
1974	0.75587	129.00	0.44217	0.146
1975	0.67413	149.00	0.55108	0.138
1976	0.59374	147.06	0.49837	0.117
1977	0.55737	173.97	0.57909	0.144
1978	0.84733	204.19	0.73347	0.185
1979	0.83981	221.29	0.84993	0.196
1980	0.78025	241.08	0.91653	0.195
1981	0.65918	258.82	0.74988	0.160
1982	0.80323	269.85	0.67144	0.140
1983	0.78300	284.32	0.59899	0.187

Table 2. (Continued)

Year	Output Price Index (P)	Monthly Agricultural Wages (AWAGES)	Agricultural Wage Index (WAGEI)	Fertilizer Price Index (FPI)
		(dirhams)		
1984	0.94865	295.66	0.50269	0.154
1985	-	319.85	-	-
1986	-	-	-	-
		(rupees)		
Pakistan				
1961	0.5962	37.05	0.11659	0.249
1962	0.5852	37.05	0.11659	0.284
1963	0.5800	37.05	0.11659	0.284
1964	0.5949	38.74	0.12191	0.326
1965	0.5569	40.42	0.12720	0.326
1966	0.4997	41.28	0.12990	0.426
1967	0.5234	46.66	0.14683	0.423
1968	0.8601	53.32	0.16779	0.462
1969	0.8512	53.54	0.16848	0.462
1970	0.8882	64.50	0.20297	0.487
1971	0.8522	67.73	0.21314	0.487
1972	0.8538	70.95	0.10036	0.316
1973	0.5793	123.63	0.18706	0.450
1974	0.4820	169.42	0.25634	0.533
1975	0.4518	161.90	0.24496	0.529
1976	0.5829	165.34	0.25016	0.500
1977	0.6316	194.79	0.29472	0.500
1978	0.6826	215.00	0.32530	0.488
1979	0.5791	243.17	0.36792	0.522
1980	0.5498	285.95	0.43265	0.589
1981	0.5463	419.90	0.59618	0.576
1982	0.6501	430.00	0.50518	0.568
1983	0.6603	537.50	0.59727	0.598
1984	0.6464	913.75	0.90344	0.566
1985	-	806.94	-	-
1986	-	-	-	-
		(pesos)		
Philippines				
1961	0.79840	42.57	0.31567	0.769
1962	0.80309	42.79	0.16735	0.392
1963	0.89213	43.25	0.16569	0.458
1964	0.86154	45.80	0.17546	0.555

Table 2. (Continued)

Year	Output Price Index (P)	Monthly Agricultural Wages (AWAGES)	Agricultural Wage Index (WAGEI)	Fertilizer Price Index (FPI)
		(pesos)		
1965	0.89477	48.34	0.18425	0.559
1966	0.92532	50.89	0.19546	0.562
1967	0.92947	53.43	0.20365	0.531
1968	0.94727	53.43	0.20365	0.497
1969	0.94791	55.98	0.21337	0.451
1970	0.99205	63.61	0.16122	0.326
1971	1.13850	76.33	0.17781	0.348
1972	1.07139	79.98	0.17961	0.370
1973	1.23036	94.60	0.20962	0.514
1974	1.44252	109.75	0.24211	1.190
1975	1.19437	134.80	0.27851	1.260
1976	1.06361	184.26	0.37097	0.996
1977	0.98208	203.18	0.41128	0.951
1978	1.01590	216.08	0.43917	0.954
1979	1.29462	232.63	0.47216	1.040
1980	0.71740	246.18	0.49102	1.110
1981	0.70451	253.70	0.48104	1.220
1982	0.69566	275.42	0.48308	1.200
1983	-	306.81	-	-
1984	-	384.42	-	-
1985	-	510.41	-	-
1986	-	-	-	-
		(escudos)		
Portugal				
1961	1.22753	553.04	0.28814	0.392
1962	0.98651	652.97	0.34020	0.373
1963	0.87401	686.10	0.35746	0.397
1964	0.86832	775.39	0.40399	0.395
1965	0.85576	819.20	0.42681	0.407
1966	1.08318	876.83	0.45684	0.408
1967	1.29167	1050.03	0.54708	0.406
1968	1.19490	1243.64	0.67130	0.405
1969	1.48750	1236.93	0.64445	0.402
1970	1.28179	1310.75	0.68291	0.375
1971	1.51175	1484.92	0.78540	0.387
1972	1.70033	1666.24	0.92405	0.432
1973	1.79414	1882.10	1.14277	0.420
1974	1.11766	2520.09	1.48558	0.582
1975	1.14473	3162.81	1.85424	0.633

Table 2. (Continued)

Year	Output Price Index (P)	Monthly Agricultural Wages (AWAGES)	Agricultural Wage Index (WAGEI)	Fertilizer Price Index (FPI)
(escudos)				
1976	1.22265	3616.51	1.79199	0.503
1977	1.60301	4170.31	1.63185	0.479
1978	2.15792	4341.64	1.48005	0.431
1979	1.05327	5265.94	1.61240	0.497
1980	1.16010	6156.48	1.84215	0.495
1981	1.49168	9006.81	2.19193	0.520
1982	1.15418	10652.87	2.00792	0.565
1983	1.06508	12459.94	1.68476	0.560
1984	-	13669.65	-	-
1985	-	18442.80	-	-
1986	-	-	-	-
(wons)				
South Korea				
1961	1.39823	1969.38	0.23600	0.533
1962	1.42703	2140.76	0.24667	0.533
1963	2.02112	2691.16	0.31008	0.533
1964	2.08456	3725.60	0.26200	0.455
1965	1.60294	4194.12	0.23618	0.455
1966	1.37596	4746.96	0.26238	0.456
1967	1.37462	5768.59	0.31885	0.387
1968	1.43458	7134.97	0.38583	0.372
1969	1.59962	8670.95	0.45098	0.380
1970	1.65428	10783.39	0.51937	0.341
1971	1.97740	12918.07	0.55603	0.323
1972	2.32473	14933.95	0.56920	0.266
1973	2.38045	16579.18	0.62397	0.400
1974	2.65632	21470.24	0.80401	0.390
1975	2.86560	27252.29	0.84341	0.565
1976	3.10257	35882.05	1.11049	0.865
1977	3.52400	44667.93	1.38240	0.864
1978	4.42147	64519.79	1.99678	0.865
1979	3.92308	97813.91	3.02718	0.863
1980	4.27119	123660.94	3.05160	0.804
1981	5.07083	140304.48	3.08609	0.997
1982	4.88134	156449.61	3.20583	1.020
1983	4.29505	166205.01	3.20823	0.990
1984	4.00520	173500.63	3.22441	0.985
1985	-	182741.13	-	-
1986	-	209601.84	-	-

Table 2. (Continued)

Year	Output Price Index (P)	Monthly Agricultural Wages (AWAGES)	Agricultural Wage Index (WAGEI)	Fertilizer Price Index (FPI)
(rupees)				
Sri Lanka				
1961	1.59732	53.91	0.16965	0.100
1962	1.47818	54.80	0.17281	0.105
1963	1.42508	56.99	0.17934	0.126
1964	1.36900	57.64	0.18100	0.165
1965	1.34997	58.82	0.18432	0.189
1966	1.33984	58.25	0.18254	0.234
1967	1.29614	59.41	0.18087	0.222
1968	1.26674	68.33	0.17260	0.183
1969	1.11132	68.17	0.17162	0.175
1970	1.09574	69.58	0.17487	0.178
1971	1.07127	74.07	0.18616	0.179
1972	0.97663	83.78	0.20208	0.178
1973	1.17216	82.10	0.19215	0.233
1974	1.40144	100.20	0.22570	0.367
1975	1.14252	124.18	0.26535	0.437
1976	1.39181	137.48	0.24487	0.304
1977	1.69829	153.30	0.25888	0.338
1978	1.59809	182.12	0.17476	0.229
1979	1.36846	255.53	0.24583	0.189
1980	1.54005	309.94	0.28086	0.367
1981	1.46331	320.51	0.24940	0.338
1982	1.42350	367.37	0.26443	0.398
1983	1.69174	382.89	0.24375	0.363
1984	1.94523	456.28	0.26866	0.339
1985	1.56338	529.82	0.29177	0.339
1986	-	538.71	-	-
(bahts)				
Thailand				
1961	1.44155	189.62	0.13610	0.594
1962	1.47788	177.97	0.12885	0.330
1963	1.34322	201.49	0.14616	0.349
1964	1.19901	219.10	0.15893	0.423
1965	1.21346	214.67	0.15572	0.505
1966	1.48156	182.10	0.13228	0.568
1967	1.44760	217.45	0.15835	0.598
1968	1.16952	192.79	0.13991	0.632
1969	1.33314	189.26	0.13662	0.685

Table 2. (Continued)

Year	Output Price Index (P)	Monthly Agricultural Wages (AWAGES)	Agricultural Wage Index (WAGEI)	Fertilizer Price Index (FPI)
		(bahts)		
1970	1.22725	227.93	0.16391	0.731
1971	1.03047	286.71	0.20618	0.762
1972	1.17345	251.20	0.18064	0.914
1973	1.34631	270.50	0.19775	1.140
1974	1.41911	282.82	0.20920	1.340
1975	1.51129	326.42	0.24134	1.340
1976	1.72045	561.95	0.41465	1.050
1977	1.65280	570.83	0.42121	1.000
1978	1.55442	550.11	0.40712	0.949
1979	1.65245	546.85	0.40292	1.070
1980	1.75464	553.35	0.40670	1.210
1981	1.72187	415.73	0.28670	1.270
1982	1.47803	328.94	0.21516	1.200
1983	1.46592	331.62	0.21691	1.160
1984	1.44503	357.64	0.22757	1.140
1985	-	436.94	-	-
1986	-	-	-	-
		(liras)		
Turkey				
1961	1.79470	245.53	0.40864	0.245
1962	1.78844	269.83	0.44909	0.284
1963	1.60098	294.77	0.49060	0.318
1964	1.84006	314.12	0.52280	0.281
1965	1.59607	352.82	0.58721	0.279
1966	1.58795	463.33	0.77114	0.267
1967	1.34549	633.61	1.05454	0.254
1968	1.27571	609.31	1.01410	0.233
1969	1.37558	779.59	1.29750	0.231
1970	1.43878	762.18	0.99276	0.246
1971	1.32664	948.37	0.95212	0.245
1972	1.29269	832.91	0.88171	0.229
1973	1.10162	1081.67	1.14504	0.166
1974	1.39641	1159.50	1.24682	0.341
1975	1.37985	1330.23	1.37989	0.313
1976	1.29798	1613.54	1.43438	0.270
1977	1.63812	1940.16	1.61454	0.215
1978	1.61496	2955.82	1.82353	0.159
1979	1.18160	4666.15	2.24885	0.391
1980	0.95138	8084.65	1.59259	0.327

Table 2. (Continued)

Year	Output Price Index (P)	Monthly Agricultural Wages (AWAGES)	Agricultural Wage Index (WAGEI)	Fertilizer Price Index (FPI)
		(liras)		
1981	2.59932	11203.87	1.50893	0.333
1982	1.35061	14165.49	1.30535	0.246
1983	1.00447	19998.66	1.32866	0.203
1984	-	27464.10	-	-
1985	-	40965.27	-	-
1986	-	-	-	-
		(pounds)		
Zambia				
1961	-	10.00	-	-
1962	-	10.60	-	-
1963	-	11.00	-	-
1964	-	14.60	-	-
1965	-	14.40	-	-
1966	0.94348	16.70	0.35021	0.762
1967	0.90782	20.70	0.43447	0.734
1968	0.68380	29.30	0.61493	0.741
1969	0.69853	30.00	0.62953	0.733
1970	0.77416	23.30	0.48881	0.560
1971	0.84214	28.10	0.58928	0.641
1972	0.99220	36.00	0.75506	0.647
1973	0.84211	35.00	0.73397	0.692
1974	0.79655	37.00	0.85009	0.727
1975	0.98986	38.00	0.88537	0.940
1976	1.13895	50.00	1.05059	0.897
1977	0.93582	53.00	1.00500	0.854
1978	0.84267	60.00	1.12330	0.958
1979	0.85328	63.46	1.19854	1.100
1980	0.87627	88.00	1.67089	1.030
1981	1.16750	86.00	1.48403	1.050
1982	1.44890	88.00	1.42036	1.140
1983	1.35591	102.00	1.22119	1.210
1984	1.19193	117.56	0.98150	1.020
1985	-	163.42	-	-
1986	-	202.05	-	-

SOURCES for AWAGES: Argentina - Domenech, Cavallo, and Mundlak 1986. Brazil - Brandao 1987. Chile - ILO, FAO. Colombia - ILO, FAO. Dominican Republic - Green and Roe 1987. Egypt - Dethier 1988. Ghana - ILO, FAO. Ivory Coast - Atsain 1985. Malaysia - ILO, FAO. Morocco - ILO, FAO. Pakistan - ILO, FAO. Philippines - ILO, FAO. Portugal - ILO, FAO. South Korea - ILO, FAO. Sri Lanka - ILO, FAO. Thailand - ILO, FAO. Turkey - ILO, FAO. Zambia - ILO, FAO.

Table 3. Average product price in 1980, U.S. dollars, official exchange rate

Country	Average Product Price
	(1980 U.S. dollars)
Argentina	296.72
Brazil	181.28
Chile	542.08
Colombia	1,228.89
Dominican Republic	105.91
Egypt	193.16
Ghana	1,649.40
Ivory Coast	1,286.60
Malaysia	618.23
Morocco	217.33
Pakistan	153.13
Philippines	199.83
Portugal	323.14
South Korea	1,189.71
Sri Lanka	428.97
Thailand	488.74
Turkey	346.92
Zambia	244.08

SOURCES: Argentina - Domenech et al. (1986). Brazil - Brando (1987). Chile - Hurtado et al. (1990). Colombia - Garcia (1989). Dominican Republic - Greene et al. (1989). Egypt - Dettiner (1988). Ghana - Stryker (1990). Ivory Coast - Atsain et al. (1988). South Korea - Moon et al. (1989). Malaysia - Jenkins (1989). Morocco - Tuluy et al. (1989). Pakistan - Hamid (1990). Philippines - Intal P. (1990). Portugal - Avillez (1988). Sri Lanka - Bhalla (1988). Thailand - Stamivalla (1989). Turkey - Olgun (1988). Zambia - Jansen (1988).

Table 4. Fertilizer consumption

Year	Nitrogen (N)	Phosphate (P ₂ O ₅)	Potash (K ₂ O)	Total* (TOTAL)	Fertilizer per Hectare ^b (FER)
----- (metric tons of plant nutrients) -----					(kg)
Argentina					
1961	8,390	4,716	3,135	16,241	1
1962	8,605	2,187	1,919	12,711	1
1963	16,671	2,224	2,185	21,080	1
1964	20,000	5,000	4,500	29,500	1
1965	25,000	10,000	5,500	40,500	1
1966	25,505	21,044	6,019	52,568	2
1967	37,035	23,805	7,620	68,460	2
1968	30,661	29,500	7,505	67,666	2
1969	35,046	38,010	6,498	79,554	2
1970	41,003	38,890	7,143	87,036	3
1971	45,000	23,900	8,200	77,100	2
1972	49,000	29,200	8,000	86,200	3
1973	43,843	32,400	7,000	83,243	2
1974	42,000	28,100	5,000	75,100	2
1975	28,000	27,700	4,600	60,300	2
1976	39,200	34,800	4,229	78,229	2
1977	41,700	28,169	4,436	74,305	2
1978	47,718	49,943	9,414	107,075	3
1979	58,915	59,400	11,767	130,082	4
1980	62,652	44,164	8,752	115,568	3
1981	51,173	40,000	5,302	96,475	3
1982	53,200	48,400	10,954	112,554	3
1983	64,600	56,100	10,400	131,100	4
1984	90,000	46,500	11,400	147,900	4
1985	104,600	50,000	7,100	161,700	5
1986	93,000	51,744	10,400	155,144	4
Brazil					
1961	55,064	144,213	70,727	270,004	6
1962	50,284	137,631	68,167	256,082	5
1963	62,061	143,971	91,750	297,782	6
1964	50,808	127,279	69,564	247,651	5
1965	70,569	108,577	99,732	278,878	5
1966	71,134	111,588	93,337	276,059	5
1967	106,382	204,606	136,937	447,925	9
1968	144,320	273,094	184,295	601,709	11
1969	164,430	265,666	200,288	630,384	12
1970	278,595	417,470	305,852	1,001,917	19
1971	278,281	493,829	350,608	1,122,718	20
1972	411,642	756,465	456,232	1,624,339	29

Table 4. (Continued)

Year	Nitrogen (N)	Phosphate (P ₂ O ₅)	Potash (K ₂ O)	Total* (TOTAL)	Fertilizer per Hectare ^b (FER)
—————(metric tons of plant nutrients)—————					(kg)
1973	347,591	796,434	528,532	1,672,557	29
1974	389,183	914,151	521,303	1,824,637	31
1975	406,234	1,013,848	557,614	1,977,696	33
1976	498,272	1,308,329	721,540	2,528,141	40
1977	700,480	1,545,476	962,938	3,208,894	50
1978	702,243	1,530,992	989,151	3,222,386	48
1979	778,653	1,685,012	1,103,374	3,567,039	52
1980	905,460	1,988,486	1,306,573	4,200,519	59
1981	667,840	1,318,300	766,646	2,752,786	38
1982	642,300	1,210,400	876,381	2,729,081	37
1983	553,141	991,800	727,062	2,272,003	30
1984	813,804	1,476,400	1,073,497	3,363,701	45
1985	852,300	1,312,100	1,058,700	3,223,100	43
1986	980,000	1,682,200	1,283,400	3,945,600	51
Chile					
1961	15,586	44,204	10,581	70,371	18
1962	22,389	45,995	12,668	81,052	20
1963	25,908	66,954	12,637	105,499	25
1964	31,208	62,771	14,440	108,419	25
1965	31,794	63,001	14,157	108,952	25
1966	36,432	77,883	19,391	133,706	29
1967	36,926	69,024	10,980	116,930	25
1968	32,485	89,918	8,141	130,544	28
1969	43,647	94,852	11,905	150,404	31
1970	42,906	96,742	13,169	152,817	31
1971	48,082	98,452	14,717	161,251	33
1972	52,755	87,843	16,361	156,959	31
1973	59,324	127,468	13,893	200,685	39
1974	52,086	99,956	15,091	167,133	32
1975	36,730	54,672	7,531	98,933	19
1976	48,649	59,098	13,232	120,979	23
1977	37,357	56,285	9,040	102,682	19
1978	50,032	65,947	13,463	129,442	24
1979	50,710	57,514	12,582	120,806	22
1980	51,361	67,690	13,116	132,167	24
1981	48,214	52,643	12,036	112,893	20
1982	48,291	44,935	11,450	104,676	19
1983	64,871	60,925	11,694	137,490	25
1984	86,291	79,957	13,800	180,048	33

Table 4. (Continued)

Year	Nitrogen (N)	Phosphate (P ₂ O ₅)	Potash (K ₂ O)	Total* (TOTAL)	Fertilizer per Hectare ^b (FER)
----- (metric tons of plant nutrients) -----					(kg)
1985	106,063	95,602	14,625	216,290	39
1986	110,000	97,000	15,000	222,000	40
Colombia					
1961	23,000	30,000	18,000	71,000	14
1962	40,000	40,000	24,000	104,000	21
1963	36,608	58,741	43,446	138,795	28
1964	53,088	55,794	52,361	161,243	32
1965	45,000	55,800	30,000	130,800	26
1966	44,715	51,787	34,346	130,848	26
1967	47,000	56,500	40,000	143,500	29
1968	53,000	50,163	45,000	148,163	30
1969	54,295	56,188	30,123	140,606	28
1970	63,520	49,058	31,806	144,384	29
1971	78,173	65,394	40,653	184,220	37
1972	109,000	57,251	40,008	206,259	41
1973	125,700	75,900	54,000	255,600	50
1974	122,700	74,500	52,700	249,900	49
1975	111,305	65,262	38,700	215,267	42
1976	142,740	68,800	34,539	246,079	48
1977	144,000	76,300	72,100	292,400	57
1978	133,749	79,465	77,900	291,114	56
1979	151,024	81,700	79,700	312,424	60
1980	151,200	81,100	80,000	312,300	60
1981	143,000	70,000	67,000	280,000	54
1982	149,800	97,500	77,200	324,500	62
1983	157,400	82,800	77,500	317,700	61
1984	180,900	90,500	91,500	362,900	69
1985	184,900	87,300	92,100	364,300	69
1986	211,532	94,127	102,310	407,969	77
Dominican Republic					
1961	10,691	1,087	2,219	13,997	14
1962	7,794	1,122	2,082	10,998	11
1963	6,000	1,000	1,500	8,500	8
1964	8,000	1,000	1,000	10,000	10
1965	10,000	1,000	1,000	12,000	11
1966	14,308	685	876	15,869	15
1967	15,000	800	2,000	17,800	17

Table 4. (Continued)

Year	Nitrogen (N)	Phosphate (P ₂ O ₅)	Potash (K ₂ O)	Total* (TOTAL)	Fertilizer per Hectare ^b (FER)
----- (metric tons of plant nutrients) -----					(kg)
1968	13,000	1,000	2,500	16,500	15
1969	15,000	5,200	10,100	30,300	27
1970	15,676	9,341	12,864	37,881	33
1971	25,996	12,192	14,549	52,737	46
1972	41,300	16,350	18,412	76,062	65
1973	40,625	13,879	21,333	75,837	63
1974	46,700	25,179	26,197	98,076	80
1975	30,000	22,600	20,400	73,000	58
1976	35,000	21,400	19,400	75,800	58
1977	32,000	8,000	10,000	50,000	37
1978	27,878	15,800	13,400	57,078	42
1979	34,325	17,600	20,000	71,925	52
1980	28,200	10,600	12,800	51,600	36
1981	31,400	11,000	15,800	58,200	41
1982	30,700	6,700	13,800	51,200	35
1983	25,000	7,000	10,000	42,000	29
1984	31,300	13,800	14,300	59,400	40
1985	33,000	15,000	13,000	61,000	42
1986	34,000	17,000	10,000	61,000	41
Egypt					
1961	191,872	48,407	2,000	242,279	94
1962	196,126	41,584	1,252	238,962	95
1963	227,144	47,949	1,025	276,118	111
1964	260,613	43,138	919	304,670	122
1965	284,845	52,182	591	337,618	126
1966	243,811	43,362	694	287,867	104
1967	244,055	35,493	1,202	280,750	100
1968	281,379	38,589	1,104	321,072	115
1969	310,146	36,200	1,521	347,867	123
1970	330,809	40,175	1,909	372,893	131
1971	324,504	46,256	1,640	372,400	131
1972	360,923	55,654	2,120	418,697	147
1973	358,161	44,397	1,923	404,481	142
1974	360,000	65,000	3,600	428,600	151
1975	415,000	83,000	3,192	501,192	177
1976	427,724	66,445	2,841	497,010	182
1977	459,504	80,800	2,943	543,247	206
1978	490,461	86,900	3,800	581,161	229
1979	500,000	97,500	6,700	604,200	247
1980	554,000	102,000	7,500	663,500	271

Table 4. (Continued)

Year	Nitrogen (N)	Phosphate (P ₂ O ₅)	Potash (K ₂ O)	Total* (TOTAL)	Fertilizer per Hectare ^b (FER)
----- (metric tons of plant nutrients) -----					(kg)
1981	585,000	110,000	12,910	707,910	287
1982	667,800	149,600	9,200	826,600	335
1983	722,200	159,600	17,500	899,300	364
1984	649,190	181,000	21,000	851,190	344
1985	640,300	198,200	25,000	863,500	347
1986	655,450	121,600	30,100	807,150	319
Ghana					
1961	175	133	410	718	0
1962	713	324	893	1,930	1
1963	800	500	800	2,100	1
1964	154	700	619	1,473	1
1965	200	434	500	1,134	0
1966	300	500	400	1,200	0
1967	512	507	300	1,319	1
1968	433	713	210	1,356	1
1969	369	699	120	1,188	0
1970	1,375	1,323	645	3,343	1
1971	1,107	938	840	2,885	1
1972	2,586	866	1,050	4,502	2
1973	2,946	2,097	1,599	6,642	3
1974	3,782	3,217	2,730	9,729	4
1975	11,000	8,900	4,600	24,500	9
1976	12,000	5,200	3,300	20,500	8
1977	10,100	12,200	8,900	31,200	12
1978	10,600	4,200	4,200	19,000	7
1979	8,400	5,900	4,200	18,500	7
1980	5,000	2,000	5,000	12,000	4
1981	13,000	8,000	8,000	29,000	11
1982	12,500	5,600	9,000	27,100	10
1983	11,000	7,000	3,400	21,400	8
1984	5,000	1,400	2,000	8,400	3
1985	5,000	4,300	3,200	12,500	4
1986	4,100	2,000	1,500	7,600	3
Ivory Coast					
1961	1,716	721	4,626	7,063	3
1962	1,762	967	3,482	6,211	2
1963	2,452	1,388	5,276	9,116	3

Table 4. (Continued)

Year	Nitrogen (N)	Phosphate (P ₂ O ₅)	Potash (K ₂ O)	Total* (TOTAL)	Fertilizer per Hectare ^b (FER)
----- (metric tons of plant nutrients) -----					(kg)
1964	3,459	1,498	6,176	11,133	4
1965	3,769	1,984	6,039	11,792	4
1966	4,000	2,000	6,500	12,500	5
1967	4,482	3,075	6,312	13,869	5
1968	3,564	2,117	6,023	11,704	4
1969	4,486	2,022	7,337	13,845	5
1970	6,130	2,500	11,844	20,474	7
1971	6,473	3,222	13,975	23,670	9
1972	8,765	4,029	17,902	30,696	11
1973	7,942	4,175	17,716	29,833	11
1974	7,799	4,471	18,602	30,872	11
1975	10,900	5,600	21,200	37,700	13
1976	12,000	6,300	19,000	37,300	13
1977	17,500	9,300	21,000	47,800	16
1978	15,900	7,100	18,000	41,000	14
1979	16,600	8,400	25,266	50,266	17
1980	19,700	9,900	23,500	53,100	17
1981	11,300	8,800	29,000	49,100	16
1982	7,400	7,300	19,100	33,800	11
1983	10,000	6,500	21,200	37,700	12
1984	11,000	8,500	22,000	41,500	12
1985	8,200	7,300	26,000	41,500	12
1986	8,000	7,000	15,000	30,000	8
Malaysia					
1961	26,195	37,624	10,708	74,527	21
1962	27,089	38,118	12,402	77,609	22
1963	24,278	39,913	14,450	78,641	22
1964	31,687	36,351	15,043	83,081	23
1965	40,000	42,000	15,600	97,600	26
1966	44,000	42,000	29,100	115,100	31
1967	42,000	42,500	32,500	117,000	31
1968	43,000	49,200	29,600	121,800	32
1969	52,400	43,628	56,100	152,128	39
1970	66,080	50,906	75,987	192,973	49
1971	66,698	45,435	59,125	171,258	43
1972	80,817	52,176	80,823	213,816	53
1973	112,181	65,961	89,305	267,447	65
1974	68,878	54,361	102,897	226,136	55
1975	77,573	56,755	113,692	248,020	59
1976	90,000	67,742	141,104	298,846	70

Table 4. (Continued)

Year	Nitrogen (N)	Phosphate (P ₂ O ₅)	Potash (K ₂ O)	Total* (TOTAL)	Fertilizer per Hectare ^b (FER)
----- (metric tons of plant nutrients) -----					(kg)
1977	102,000	71,000	147,100	320,100	75
1978	109,500	90,500	168,600	368,600	86
1979	137,500	101,100	195,800	434,400	101
1980	139,300	118,800	194,900	453,000	105
1981	127,900	98,600	173,600	400,100	92
1982	138,000	110,800	193,900	442,700	102
1983	235,000	123,000	208,000	566,000	130
1984	216,000	111,000	229,000	556,000	128
1985	243,000	118,400	250,000	611,400	140
1986	247,000	150,000	290,000	687,000	157
Morocco					
1961	8,597	14,568	5,758	28,923	4
1962	15,788	18,417	10,058	44,263	6
1963	14,865	17,077	7,724	39,666	6
1964	11,804	20,236	7,002	39,042	6
1965	18,198	22,537	8,815	49,550	7
1966	25,265	21,980	12,222	59,467	8
1967	26,000	34,000	17,400	77,400	11
1968	37,038	42,568	17,341	96,947	13
1969	34,309	40,834	19,387	94,530	13
1970	37,100	34,700	16,000	87,800	12
1971	47,921	39,200	21,808	108,929	15
1972	53,623	40,000	21,000	114,623	15
1973	62,500	47,000	24,200	133,700	18
1974	62,000	58,700	28,900	149,600	20
1975	63,200	67,300	35,300	165,800	22
1976	82,200	72,400	32,200	186,800	24
1977	75,200	70,400	33,900	179,500	23
1978	80,700	72,300	33,000	186,000	24
1979	100,800	77,900	44,500	223,200	28
1980	122,600	95,500	40,800	258,900	32
1981	81,100	78,800	40,300	200,200	25
1982	94,400	94,800	40,000	229,200	28
1983	111,500	95,800	38,700	246,000	30
1984	103,579	100,700	43,840	248,119	30
1985	136,450	109,840	52,800	299,090	36
1986	153,340	118,550	51,000	322,890	38

Table 4. (Continued)

Year	Nitrogen (N)	Phosphate (P ₂ O ₅)	Potash (K ₂ O)	Total* (TOTAL)	Fertilizer per Hectare ^b (FER)
------(metric tons of plant nutrients)-----					(kg)
Pakistan					
1961	41,659	500	0	42,159	3
1962	41,160	210	0	41,370	2
1963	67,620	630	0	68,250	4
1964	84,147	1,029	0	85,176	5
1965	69,242	1,245	0	70,487	4
1966	107,779	3,911	144	111,834	6
1967	177,441	12,777	212	190,430	10
1968	203,521	38,642	2,486	244,649	13
1969	272,566	33,801	1,344	307,711	16
1970	251,519	30,462	1,225	283,206	15
1971	343,973	37,231	744	381,948	20
1972	386,230	48,730	1,400	436,360	23
1973	341,944	58,066	2,670	402,680	21
1974	362,900	60,500	2,100	425,500	22
1975	443,451	108,500	1,900	553,851	28
1976	511,000	117,900	2,400	631,300	32
1977	554,100	157,300	5,800	717,200	36
1978	684,300	187,900	7,600	879,800	44
1979	775,804	201,086	9,618	986,508	49
1980	843,574	226,487	9,643	1,079,704	53
1981	832,572	225,502	21,772	1,079,846	53
1982	952,647	265,285	25,652	1,243,584	61
1983	914,317	261,400	28,478	1,204,195	59
1984	934,757	293,829	24,677	1,253,263	62
1985	1,128,138	349,776	33,205	1,511,119	73
1986	1,332,358	408,848	42,636	1,783,842	86
Philippines					
1961	35,815	16,006	19,400	71,221	11
1962	48,057	24,952	15,300	88,309	13
1963	52,000	22,000	19,000	93,000	14
1964	52,600	23,000	12,600	88,200	13
1965	58,000	25,000	30,200	113,200	16
1966	66,000	28,000	12,500	106,500	15
1967	64,330	23,774	30,000	118,104	17
1968	63,440	45,124	40,000	148,564	21
1969	101,437	64,000	37,725	203,162	29
1970	119,152	44,000	38,000	201,152	29
1971	122,000	50,000	36,900	208,900	29
1972	114,500	39,900	38,800	193,200	27

Table 4. (Continued)

Year	Nitrogen (N)	Phosphate (P ₂ O ₅)	Potash (K ₂ O)	Total* (TOTAL)	Fertilizer per Hectare ^b (FER)
----- (metric tons of plant nutrients) -----					(kg)
1973	151,902	51,018	55,621	258,541	36
1974	177,381	47,774	60,054	285,209	39
1975	144,100	34,000	48,800	226,900	31
1976	177,200	40,000	51,500	268,700	36
1977	174,249	40,414	45,938	260,601	35
1978	205,400	49,768	56,584	311,752	41
1979	226,700	51,900	63,700	342,300	44
1980	224,800	53,400	55,800	334,000	43
1981	210,713	47,758	61,138	319,609	41
1982	231,422	51,016	57,676	340,114	43
1983	240,193	54,570	64,573	359,336	46
1984	177,858	45,368	38,612	261,838	33
1985	205,364	42,778	35,039	283,181	36
1986	245,367	45,700	46,300	337,367	43
Portugal					
1961	68,393	59,409	10,371	138,173	42
1962	55,066	62,924	11,127	129,117	40
1963	86,848	50,536	17,889	155,273	48
1964	108,803	72,409	17,800	199,012	62
1965	88,306	61,272	16,321	165,899	52
1966	70,032	46,570	16,173	132,775	42
1967	101,604	55,939	21,145	178,688	58
1968	101,209	60,959	19,013	181,181	59
1969	112,660	81,679	8,195	202,534	67
1970	76,644	34,704	17,742	129,090	43
1971	90,475	34,287	8,726	133,488	45
1972	130,378	73,378	25,623	229,379	78
1973	127,722	78,901	30,204	236,827	81
1974	126,834	57,900	27,668	212,402	73
1975	141,000	73,700	30,000	244,700	85
1976	136,602	77,952	33,648	248,202	87
1977	154,442	77,578	38,014	270,034	95
1978	138,607	73,593	35,499	247,699	88
1979	155,043	78,580	41,590	275,213	99
1980	136,603	81,224	41,147	258,974	94
1981	145,043	84,684	45,108	274,835	99
1982	138,554	80,577	40,172	259,303	94
1983	125,694	67,200	32,009	224,903	81
1984	123,200	61,400	32,000	216,600	79

Table 4. (Continued)

Year	Nitrogen (N)	Phosphate (P ₂ O ₅)	Potash (K ₂ O)	Total* (TOTAL)	Fertilizer per Hectare ^b (FER)
	----- (metric tons of plant nutrients) -----				(kg)
1985	137,200	69,600	34,000	240,800	87
1986	149,800	78,900	40,700	269,400	98
South Korea					
1961	216,860	82,143	17,111	316,114	151
1962	200,000	90,000	25,000	315,000	153
1963	199,297	117,425	29,130	345,852	166
1964	173,234	146,456	41,002	360,692	166
1965	201,163	95,179	40,124	336,466	149
1966	239,691	124,796	58,782	423,269	185
1967	277,556	132,722	76,213	486,491	210
1968	285,919	121,361	71,180	478,460	206
1969	320,123	130,749	83,717	534,589	231
1970	355,550	124,354	82,998	562,902	245
1971	347,200	158,200	92,800	598,200	263
1972	372,585	170,945	104,172	647,702	289
1973	411,236	196,062	149,796	757,094	338
1974	447,377	245,554	155,462	848,393	379
1975	467,678	236,422	161,398	865,498	386
1976	361,289	142,145	139,829	643,263	287
1977	387,890	210,253	137,987	736,130	330
1978	461,610	235,617	173,674	870,901	392
1979	443,900	215,724	191,514	851,138	386
1980	447,224	172,500	183,326	803,050	366
1981	431,838	137,767	199,146	768,751	351
1982	308,600	149,000	156,500	614,100	282
1983	367,300	171,100	179,100	717,500	331
1984	401,800	181,200	195,100	778,100	361
1985	414,000	186,000	207,000	807,000	376
1986	418,000	192,000	215,000	825,000	385
Sri Lanka					
1961	36,442	19,500	27,648	83,590	54
1962	45,468	22,979	27,020	95,467	63
1963	36,087	21,305	33,396	90,788	48
1964	38,477	19,684	26,352	84,513	45
1965	42,479	19,516	34,422	96,417	51
1966	45,000	21,000	38,433	104,433	56
1967	43,454	24,864	33,400	101,718	54

Table 4. (Continued)

Year	Nitrogen (N)	Phosphate (P ₂ O ₅)	Potash (K ₂ O)	Total ^a (TOTAL)	Fertilizer per Hectare ^b (FER)
------(metric tons of plant nutrients)-----					(kg)
1968	55,829	30,896	43,558	130,283	69
1969	49,000	15,000	25,000	89,000	47
1970	51,000	20,700	33,400	105,100	56
1971	57,000	21,100	34,200	112,300	59
1972	51,200	17,500	31,200	99,900	52
1973	56,800	22,700	31,600	111,100	58
1974	55,300	15,300	31,300	101,900	53
1975	40,100	10,800	21,500	72,400	38
1976	52,300	14,500	28,500	95,300	50
1977	65,400	22,400	23,800	111,600	59
1978	80,900	24,662	30,324	135,886	72
1979	77,200	34,414	34,300	145,914	78
1980	91,600	27,664	46,000	165,264	88
1981	78,500	27,600	41,300	147,400	79
1982	79,400	31,233	45,000	155,633	84
1983	83,009	34,913	49,794	167,716	90
1984	100,313	37,503	53,081	190,897	102
1985	101,727	38,606	55,150	195,483	104
1986	99,261	37,978	54,303	191,542	102
Thailand					
1961	11,058	4,720	2,109	17,887	2
1962	12,346	6,478	2,960	21,784	2
1963	18,364	11,064	4,313	33,741	3
1964	16,202	9,940	4,687	30,829	3
1965	17,917	11,275	4,569	33,761	3
1966	34,793	24,255	7,902	66,950	5
1967	52,193	35,667	12,689	100,549	8
1968	51,000	38,100	10,200	99,300	8
1969	49,000	45,300	10,800	105,100	8
1970	42,500	23,544	15,000	81,044	6
1971	62,000	43,339	22,800	128,139	9
1972	62,000	55,900	42,000	159,900	11
1973	60,212	51,381	38,378	149,971	10
1974	79,845	70,407	50,929	201,181	12
1975	78,852	62,223	39,074	180,149	11
1976	136,300	80,300	20,500	237,100	14
1977	160,100	90,000	22,000	272,100	16
1978	153,500	104,400	30,000	287,900	16
1979	160,000	121,355	44,132	325,487	18
1980	159,000	101,600	40,300	300,900	16

Table 4. (Continued)

Year	Nitrogen (N)	Phosphate (P ₂ O ₅)	Potash (K ₂ O)	Total* (TOTAL)	Fertilizer per Hectare ^b (FER)
----- (metric tons of plant nutrients) -----					(kg)
1981	162,000	126,200	48,100	336,300	18
1982	199,100	130,000	45,100	374,200	20
1983	236,200	163,000	85,400	484,600	25
1984	248,900	141,800	74,300	465,000	24
1985	238,000	108,100	65,400	411,500	21
1986	256,000	124,000	88,600	468,600	24
Turkey					
1961	54,479	18,657	1,649	74,785	3
1962	38,362	34,277	1,490	74,129	3
1963	50,099	58,464	574	109,137	4
1964	53,260	41,735	1,354	96,349	4
1965	72,299	69,270	7,475	149,044	6
1966	95,865	90,720	3,640	190,225	7
1967	138,140	132,190	8,565	278,895	11
1968	186,628	181,691	11,730	380,049	14
1969	231,068	200,560	14,335	445,963	16
1970	243,300	175,950	11,500	430,750	16
1971	287,200	194,650	12,700	494,550	18
1972	369,300	236,900	27,200	633,400	22
1973	429,900	280,000	12,700	722,600	26
1974	282,899	227,003	12,851	522,753	19
1975	482,204	388,577	20,389	891,170	32
1976	630,750	532,751	15,492	1,178,993	43
1977	703,415	552,649	2,860	1,258,924	45
1978	851,995	693,095	3,861	1,548,951	55
1979	685,537	589,075	24,483	1,299,095	45
1980	807,490	619,000	29,508	1,455,998	51
1981	798,852	489,335	8,733	1,296,920	46
1982	863,402	565,433	30,926	1,459,761	54
1983	1,021,440	617,635	24,887	1,663,962	63
1984	954,779	554,765	31,389	1,540,933	56
1985	967,974	476,085	37,981	1,482,040	54
1986	1,056,080	545,945	59,594	1,661,619	60
Zambia					
1961	5,280	3,520	1,400	10,200	2
1962	4,500	2,550	1,460	8,510	2
1963	4,600	2,550	2,000	9,150	2

Table 4. (Continued)

Year	Nitrogen (N)	Phosphate (P ₂ O ₅)	Potash (K ₂ O)	Total ^a (TOTAL)	Fertilizer per Hectare ^b (FER)
----- (metric tons of plant nutrients) -----					(kg)
1964	6,000	2,550	2,000	10,550	2
1965	6,000	3,000	2,000	11,000	2
1966	6,000	4,000	2,200	12,200	3
1967	6,500	5,800	2,500	14,800	3
1968	12,000	5,200	1,900	19,100	4
1969	9,126	4,480	2,803	16,409	3
1970	19,676	10,424	6,099	36,199	7
1971	32,795	12,912	7,591	53,298	11
1972	25,000	11,863	4,900	41,763	8
1973	24,000	11,551	7,900	43,451	9
1974	35,900	14,700	11,400	62,000	12
1975	33,700	14,400	5,200	53,300	11
1976	39,800	14,100	4,600	58,500	12
1977	46,200	15,600	5,700	67,500	14
1978	31,000	14,000	5,600	50,600	10
1979	38,172	14,643	4,900	57,715	11
1980	53,000	19,500	6,100	78,600	15
1981	57,600	20,900	6,700	85,200	17
1982	54,100	23,700	7,000	84,800	16
1983	43,300	17,200	5,400	65,900	13
1984	37,800	14,100	4,500	56,400	11
1985	53,400	18,700	8,100	80,200	16
1986	53,816	16,492	6,668	76,976	15

SOURCE: FAO and USDA-ERS 1988.

^a(TOTAL) total metric tons of plant nutrients: N, P₂O₅, and K₂O contained in commercial fertilizers consumed.

^b(FER) total fertilizer utilization in nutrient contents: N, P₂O₅, and K₂O per hectare of arable and permanent cropland.

Table 5. Land

Year	Irrigated Land (ILAN)	Arable and Permanent Cropland (CLAN)	Permanent Pastures (PLAN)	Total Area (TAREA)
----- (thousand hectares) -----				
Argentina				
1961	980	27,150	147,000	276,689
1962	1,010	27,630	146,700	276,689
1963	1,050	28,100	146,500	276,689
1964	1,080	28,550	146,300	276,689
1965	1,110	29,061	146,000	276,689
1966	1,140	30,248	145,802	276,689
1967	1,180	31,131	145,441	276,689
1968	1,210	33,007	144,947	276,689
1969	1,250	33,101	144,700	276,689
1970	1,280	33,201	144,500	276,689
1971	1,310	33,850	144,300	276,689
1972	1,340	33,950	144,150	276,689
1973	1,380	34,250	144,000	276,689
1974	1,410	34,400	143,800	276,689
1975	1,440	34,550	143,700	276,689
1976	1,477	35,000	143,600	276,689
1977	1,510	35,000	143,500	276,689
1978	1,540	35,100	143,400	276,689
1979	1,560	35,120	143,300	276,689
1980	1,580	35,200	143,200	276,689
1981	1,600	35,200	143,100	276,689
1982	1,620	35,800	143,000	276,689
1983	1,640	35,700	142,900	276,689
1984	1,660	35,600	142,800	276,689
1985	1,680	36,050	142,700	276,689
1986	1,700	36,050	142,600	276,689
1987	1,700	-	142,600	276,689
1988	1,700	-	142,600	276,689
Brazil				
1961	490	49,320	115,400	851,197
1962	520	49,840	118,600	851,197
1963	540	50,350	121,800	851,197
1964	570	50,870	125,000	851,197
1965	610	51,390	128,200	851,197
1966	640	51,910	131,400	851,197
1967	680	52,430	134,600	851,197
1968	710	52,950	137,800	851,197
1969	750	53,470	141,000	851,197
1970	796	53,984	144,138	851,197

Table 5. (Continued)

Year	Irrigated Land (ILAN)	Arable and Permanent Cropland (CLAN)	Permanent Pastures (PLAN)	Total Area (TAREA)
----- (thousand hectares) -----				
1971	900	55,260	146,400	851,197
1972	1,000	56,540	148,800	851,197
1973	1,100	57,820	151,200	851,197
1974	1,200	59,100	153,600	851,197
1975	1,300	60,385	156,000	851,197
1976	1,400	62,530	157,000	851,197
1977	1,500	64,680	158,000	851,197
1978	1,600	66,820	159,000	851,197
1979	1,700	68,970	160,000	851,197
1980	1,800	71,120	161,000	851,197
1981	1,900	73,270	162,000	851,197
1982	2,000	74,670	163,000	851,197
1983	2,100	74,700	164,000	851,197
1984	2,200	75,250	165,000	851,197
1985	2,300	75,780	166,000	851,197
1986	2,400	76,780	167,000	851,197
1987	2,500	-	168,000	851,197
1988	2,600	-	169,000	851,197
Chile				
1961	1,075	4,000	9,550	75,695
1962	1,080	4,100	9,700	75,695
1963	1,085	4,200	9,850	75,695
1964	1,091	4,298	10,000	75,695
1965	1,100	4,434	10,151	75,695
1966	1,110	4,548	10,300	75,695
1967	1,120	4,680	10,500	75,695
1968	1,140	4,750	10,700	75,695
1969	1,160	4,820	10,850	75,695
1970	1,180	4,890	11,000	75,695
1971	1,200	4,960	11,200	75,695
1972	1,220	5,030	11,400	75,695
1973	1,238	5,100	11,538	75,695
1974	1,240	5,180	11,600	75,695
1975	1,242	5,260	11,650	75,695
1976	1,245	5,340	11,700	75,695
1977	1,247	5,420	11,750	75,695
1978	1,250	5,500	11,821	75,695
1979	1,252	5,530	11,850	75,695
1980	1,255	5,530	11,880	75,695
1981	1,257	5,528	11,900	75,695

Table 5. (Continued)

Year	Irrigated Land (ILAN)	Arable and Permanent Cropland (CLAN)	Permanent Pastures (PLAN)	Total Area (TAREA)
(thousand hectares)				
1982	1,257	5,528	11,900	75,695
1983	1,257	5,528	11,900	75,695
1984	1,257	5,528	11,900	75,695
1985	1,257	5,528	11,900	75,695
1986	1,257	5,550	11,900	75,695
1987	1,300	-	11,900	75,695
1988	1,300	-	11,900	75,695
Colombia				
1961	226	4,970	33,000	113,891
1962	230	4,972	33,270	113,891
1963	230	4,993	33,540	113,891
1964	235	4,995	33,820	113,891
1965	235	5,008	34,090	113,891
1966	240	5,020	34,360	113,891
1967	240	5,023	34,630	113,891
1968	245	5,025	34,900	113,891
1969	245	5,030	35,180	113,891
1970	250	5,030	35,450	113,891
1971	260	5,054	35,720	113,891
1972	270	5,069	35,990	113,891
1973	280	5,085	36,260	113,891
1974	290	5,102	36,540	113,891
1975	300	5,118	36,810	113,891
1976	320	5,133	37,080	113,891
1977	340	5,151	37,350	113,891
1978	360	5,166	37,620	113,891
1979	380	5,182	37,900	113,891
1980	400	5,199	38,170	113,891
1981	420	5,215	38,440	113,891
1982	430	5,230	38,710	113,891
1983	440	5,249	38,980	113,891
1984	452	5,264	39,260	113,891
1985	465	5,280	39,530	113,891
1986	470	5,298	39,800	113,891
1987	496	5,318	40,083	113,891
1988	509	-	40,400	113,891

Table 5. (Continued)

Year	Irrigated Land (ILAN)	Arable and Permanent Cropland (CLAN)	Permanent Pastures (PLAN)	Total Area (TAREA)
----- (thousand hectares) -----				
Dominican Republic				
1961	110	990	2,092	4,873
1962	110	1,005	2,092	4,873
1963	115	1,020	2,092	4,873
1964	115	1,035	2,092	4,873
1965	115	1,050	2,092	4,873
1966	120	1,065	2,092	4,873
1967	120	1,080	2,092	4,873
1968	120	1,090	2,092	4,873
1969	125	1,130	2,092	4,873
1970	125	1,135	2,092	4,873
1971	125	1,144	2,092	4,873
1972	125	1,170	2,092	4,873
1973	130	1,205	2,092	4,873
1974	135	1,225	2,092	4,873
1975	140	1,255	2,092	4,873
1976	145	1,310	2,092	4,873
1977	150	1,340	2,092	4,873
1978	155	1,365	2,092	4,873
1979	160	1,390	2,092	4,873
1980	165	1,420	2,092	4,873
1981	170	1,425	2,092	4,873
1982	176	1,450	2,092	4,873
1983	180	1,460	2,092	4,873
1984	190	1,470	2,092	4,873
1985	198	1,470	2,092	4,873
1986	200	1,475	2,092	4,873
1987	206	-	2,100	4,873
1988	212	-	2,100	4,873
Egypt				
1961	2,568	2,568	0	100,145
1962	2,505	2,505	0	100,145
1963	2,490	2,490	0	100,145
1964	2,506	2,506	0	100,145
1965	2,672	2,672	0	100,145
1966	2,780	2,780	0	100,145
1967	2,801	2,801	0	100,145
1968	2,801	2,801	0	100,145
1969	2,835	2,835	0	100,145
1970	2,843	2,843	0	100,145

Table 5. (Continued)

Year	Irrigated Land (ILAN)	Arable and Permanent Cropland (CLAN)	Permanent Pastures (PLAN)	Total Area (TAREA)
----- (thousand hectares) -----				
1971	2,852	2,852	0	100,145
1972	2,855	2,855	0	100,145
1973	2,855	2,855	0	100,145
1974	2,843	2,843	0	100,145
1975	2,825	2,825	0	100,145
1976	2,730	2,730	0	100,145
1977	2,635	2,635	0	100,145
1978	2,540	2,540	0	100,145
1979	2,449	2,447	0	100,145
1980	2,447	2,445	0	100,145
1981	2,470	2,468	0	100,145
1982	2,470	2,468	0	100,145
1983	2,471	2,471	0	100,145
1984	2,474	2,474	0	100,145
1985	2,486	2,486	0	100,145
1986	2,528	2,528	0	100,145
1987	2,500	-	0	100,145
1988	2,500	-	0	100,145
Ghana				
1961	0	2,470	3,660	23,854
1962	0	2,520	3,650	23,854
1963	0	2,502	3,640	23,854
1964	0	2,609	3,630	23,854
1965	0	2,544	3,620	23,854
1966	1	2,727	3,610	23,854
1967	2	2,780	3,600	23,854
1968	3	2,835	3,590	23,854
1969	5	2,650	3,580	23,854
1970	8	2,574	3,570	23,854
1971	8	2,600	3,560	23,854
1972	8	2,600	3,550	23,854
1973	8	2,700	3,540	23,854
1974	8	2,700	3,530	23,854
1975	8	2,700	3,520	23,854
1976	8	2,700	3,510	23,854
1977	8	2,705	3,500	23,854
1978	8	2,720	3,490	23,854
1979	8	2,750	3,480	23,854
1980	8	2,760	3,470	23,854
1981	8	2,760	3,460	23,854

Table 5. (Continued)

Year	Irrigated Land (ILAN)	Arable and Permanent Cropland (CLAN)	Permanent Pastures (PLAN)	Total Area (TAREA)
(thousand hectares)				
1982	8	2,770	3,450	23,854
1983	8	2,770	3,440	23,854
1984	8	2,820	3,430	23,854
1985	8	2,820	3,420	23,854
1986	8	2,860	3,410	23,854
1987	8	-	3,400	23,854
1988	8	-	3,400	23,854
Ivory Coast				
1961	4	2,630	3,000	32,246
1962	4	2,640	3,000	32,246
1963	4	2,650	3,000	32,246
1964	6	2,660	3,000	32,246
1965	6	2,670	3,000	32,246
1966	9	2,680	3,000	32,246
1967	12	2,720	3,000	32,246
1968	14	2,730	3,000	32,246
1969	17	2,750	3,000	32,246
1970	20	2,770	3,000	32,246
1971	22	2,780	3,000	32,246
1972	23	2,800	3,000	32,246
1973	28	2,840	3,000	32,246
1974	32	2,875	3,000	32,246
1975	34	2,915	3,000	32,246
1976	36	2,950	3,000	32,246
1977	38	2,990	3,000	32,246
1978	40	3,030	3,000	32,246
1979	42	3,055	3,000	32,246
1980	44	3,095	3,000	32,246
1981	46	3,130	3,000	32,246
1982	48	3,170	3,000	32,246
1983	50	3,219	3,000	32,246
1984	52	3,486	3,000	32,246
1985	54	3,580	3,000	32,246
1986	56	3,620	3,000	32,246
1987	58	-	3,000	32,246
1988	60	-	3,000	32,246

Table 5. (Continued)

Year	Irrigated Land (ILAN)	Arable and Permanent Cropland (CLAN)	Permanent Pastures (PLAN)	Total Area (TAREA)
(thousand hectares)				
Malaysia				
1961	228	3,500	24	32,975
1962	229	3,550	24	32,975
1963	234	3,600	24	32,975
1964	235	3,650	24	32,975
1965	236	3,700	24	32,975
1966	238	3,750	24	32,975
1967	245	3,800	24	32,975
1968	217	3,850	26	32,975
1969	231	3,900	26	32,975
1970	262	3,950	26	32,975
1971	279	4,000	26	32,975
1972	294	4,050	26	32,975
1973	297	4,100	26	32,975
1974	302	4,150	26	32,975
1975	308	4,198	27	32,975
1976	312	4,250	27	32,975
1977	316	4,280	27	32,975
1978	318	4,280	27	32,975
1979	319	4,300	27	32,975
1980	320	4,310	27	32,975
1981	330	4,335	27	32,975
1982	329	4,335	27	32,975
1983	332	4,340	27	32,975
1984	335	4,350	27	32,975
1985	334	4,370	27	32,975
1986	336	4,375	27	32,975
1987	339	-	27	32,975
1988	341	-	27	32,975
Morocco				
1961	875	6,970	16,400	44,655
1962	880	6,980	16,600	44,655
1963	885	7,050	16,800	44,655
1964	890	7,110	17,000	44,655
1965	895	7,220	17,200	44,655
1966	900	7,338	17,400	44,655
1967	905	7,338	17,600	44,655
1968	910	7,438	17,800	44,655
1969	915	7,429	18,000	44,655
1970	920	7,505	18,200	44,655

Table 5. (Continued)

Year	Irrigated Land (ILAN)	Arable and Permanent Cropland (CLAN)	Permanent Pastures (PLAN)	Total Area (TAREA)
----- (thousand hectares) -----				
1971	950	7,504	18,400	44,655
1972	976	7,570	18,600	44,655
1973	1,005	7,625	18,800	44,655
1974	1,032	7,630	19,000	44,655
1975	1,060	7,717	19,200	44,655
1976	1,090	7,750	19,400	44,655
1977	1,124	7,779	19,600	44,655
1978	1,155	7,871	19,800	44,655
1979	1,185	7,968	20,000	44,655
1980	1,217	8,004	20,900	44,655
1981	1,223	8,154	20,900	44,655
1982	1,230	8,261	20,900	44,655
1983	1,234	8,330	20,900	44,655
1984	1,240	8,352	20,900	44,655
1985	1,245	8,404	20,900	44,655
1986	1,250	8,462	20,900	44,655
1987	1,300	8,462	21,000	44,655
1988	1,300	8,462	21,100	44,655
Pakistan				
1961	10,751	16,881	5,000	79,610
1962	11,007	17,178	5,000	79,610
1963	11,026	17,300	5,000	79,610
1964	11,439	18,746	5,000	79,610
1965	11,472	19,263	5,000	79,610
1966	12,029	19,692	5,000	79,610
1967	12,490	19,261	5,000	79,610
1968	13,065	19,235	5,000	79,610
1969	12,775	19,235	5,000	79,610
1970	12,950	19,332	5,000	79,610
1971	12,986	19,279	5,000	79,610
1972	13,059	19,109	5,000	79,610
1973	13,634	19,381	5,000	79,610
1974	13,343	19,555	5,000	79,610
1975	13,630	19,830	5,000	79,610
1976	13,830	19,760	5,000	79,610
1977	14,260	20,110	5,000	79,610
1978	14,270	19,980	5,000	79,610
1979	14,280	20,230	5,000	79,610
1980	14,680	20,300	5,000	79,610
1981	15,300	20,340	5,000	79,610

Table 5. (Continued)

Year	Irrigated Land (ILAN)	Arable and Permanent Cropland (CLAN)	Permanent Pastures (PLAN)	Total Area (TAREA)
(thousand hectares)				
1982	15,390	20,430	5,000	79,610
1983	15,570	20,340	5,000	79,610
1984	15,720	20,330	5,000	79,610
1985	15,760	20,610	5,000	79,610
1986	16,040	20,700	5,000	79,610
1987	16,300	-	5,000	79,610
1988	16,500	-	5,000	79,610
Philippines				
1961	690	6,697	812	30,000
1962	700	6,755	812	30,000
1963	710	6,820	812	30,000
1964	720	6,875	812	30,000
1965	730	6,940	812	30,000
1966	740	7,000	830	30,000
1967	760	7,063	845	30,000
1968	780	7,027	851	30,000
1969	800	7,055	853	30,000
1970	826	7,002	840	30,000
1971	864	7,176	835	30,000
1972	910	7,265	830	30,000
1973	950	7,291	846	30,000
1974	990	7,318	862	30,000
1975	1,040	7,349	842	30,000
1976	1,070	7,440	974	30,000
1977	1,110	7,530	990	30,000
1978	1,124	7,625	990	30,000
1979	1,167	7,710	994	30,000
1980	1,219	7,801	997	30,000
1981	1,269	7,830	1,050	30,000
1982	1,335	7,880	1,100	30,000
1983	1,386	7,875	1,120	30,000
1984	1,408	7,870	1,140	30,000
1985	1,430	7,900	1,160	30,000
1986	1,450	7,930	1,180	30,000
1987	1,500	-	1,200	30,000
1988	1,500	-	1,200	30,000

Table 5. (Continued)

Year	Irrigated Land (ILAN)	Arable and Permanent Cropland (CLAN)	Permanent Pastures (PLAN)	Total Area (TAREA)
(thousand hectares)				
Portugal				
1961	620	3,290	530	9,208
1962	620	3,260	530	9,208
1963	620	3,230	530	9,208
1964	620	3,200	530	9,208
1965	621	3,170	530	9,208
1966	621	3,140	530	9,208
1967	621	3,110	530	9,208
1968	621	3,075	530	9,208
1969	621	3,045	530	9,208
1970	622	3,015	530	9,208
1971	623	2,990	530	9,208
1972	623	2,960	530	9,208
1973	625	2,930	530	9,208
1974	625	2,910	530	9,208
1975	625	2,880	530	9,208
1976	628	2,850	530	9,208
1977	628	2,835	530	9,208
1978	628	2,810	530	9,208
1979	630	2,780	530	9,208
1980	630	2,770	530	9,208
1981	630	2,770	530	9,208
1982	630	2,770	530	9,208
1983	630	2,770	530	9,208
1984	632	2,760	530	9,208
1985	632	2,760	530	9,208
1986	632	2,755	530	9,208
1987	632	-	530	9,208
1988	633	-	530	9,208
South Korea				
1961	820	2,095	18	9,848
1962	830	2,063	18	9,848
1963	840	2,080	20	9,848
1964	850	2,171	20	9,848
1965	860	2,256	22	9,848
1966	870	2,293	22	9,848
1967	880	2,312	24	9,848
1968	880	2,319	24	9,848
1969	960	2,311	26	9,848
1970	1,000	2,298	26	9,848

Table 5. (Continued)

Year	Irrigated Land (ILAN)	Arable and Permanent Cropland (CLAN)	Permanent Pastures (PLAN)	Total Area (TAREA)
----- (thousand hectares) -----				
1971	1,020	2,271	28	9,848
1972	1,020	2,242	28	9,848
1973	1,020	2,241	30	9,848
1974	1,040	2,238	30	9,848
1975	1,060	2,240	32	9,848
1976	1,082	2,238	32	9,848
1977	1,104	2,231	36	9,848
1978	1,122	2,222	41	9,848
1979	1,140	2,207	45	9,848
1980	1,150	2,196	51	9,848
1981	1,160	2,188	57	9,848
1982	1,170	2,180	63	9,848
1983	1,190	2,167	69	9,848
1984	1,200	2,153	76	9,848
1985	1,220	2,144	80	9,848
1986	1,240	2,141	84	9,848
1987	1,300	-	90	9,848
1988	1,300	-	95	9,848
Sri Lanka				
1961	335	1,538	185	6,561
1962	368	1,522	185	6,561
1963	378	1,875	185	6,561
1964	381	1,873	230	6,561
1965	341	1,876	280	6,561
1966	398	1,875	330	6,561
1967	398	1,875	380	6,561
1968	413	1,882	439	6,561
1969	403	1,889	439	6,561
1970	465	1,894	439	6,561
1971	439	1,900	439	6,561
1972	430	1,906	439	6,561
1973	427	1,916	439	6,561
1974	477	1,918	439	6,561
1975	480	1,910	439	6,561
1976	483	1,903	439	6,561
1977	486	1,896	439	6,561
1978	536	1,888	439	6,561
1979	523	1,881	439	6,561
1980	525	1,873	439	6,561
1981	548	1,866	439	6,561

Table 5. (Continued)

Year	Irrigated Land (ILAN)	Arable and Permanent Cropland (CLAN)	Permanent Pastures (PLAN)	Total Area (TAREA)
(thousand hectares)				
1982	519	1,857	439	6,561
1983	538	1,869	439	6,561
1984	550	1,872	439	6,561
1985	583	1,876	439	6,561
1986	607	1,887	439	6,561
1987	614	-	439	6,561
1988	624	-	439	6,561
Thailand				
1961	1,621	11,393	260	51,400
1962	1,730	11,700	280	51,400
1963	1,764	12,160	300	51,400
1964	1,764	12,370	320	51,400
1965	1,768	12,600	340	51,400
1966	1,768	12,850	360	51,400
1967	1,791	13,080	380	51,400
1968	1,795	13,300	400	51,400
1969	1,830	13,500	420	51,400
1970	1,960	13,808	440	51,400
1971	2,106	13,939	460	51,400
1972	2,197	14,750	480	51,400
1973	2,300	15,580	500	51,400
1974	2,378	16,363	520	51,400
1975	2,419	16,680	540	51,400
1976	2,448	16,988	560	51,400
1977	2,576	17,385	580	51,400
1978	2,600	17,776	600	51,400
1979	2,836	18,082	620	51,400
1980	3,015	18,298	640	51,400
1981	3,171	18,681	660	51,400
1982	3,320	19,099	680	51,400
1983	3,472	19,198	700	51,400
1984	3,659	19,331	720	51,400
1985	3,822	19,847	730	51,400
1986	3,900	19,863	740	51,400
1987	4,100	-	759	51,400
1988	4,300	-	777	51,400

Table 5. (Continued)

Year	Irrigated Land (ILAN)	Arable and Permanent Cropland (CLAN)	Permanent Pastures (PLAN)	Total Area (TAREA)
(thousand hectares)				
Turkey				
1961	1,310	25,167	11,350	78,058
1962	1,310	25,348	11,300	78,058
1963	1,310	26,120	11,250	78,058
1964	1,350	26,092	11,200	78,058
1965	1,400	26,146	11,150	78,058
1966	1,500	26,384	11,100	78,058
1967	1,549	26,250	11,050	78,058
1968	1,600	26,601	11,000	78,058
1969	1,700	27,743	10,900	78,058
1970	1,800	27,378	10,800	78,058
1971	1,850	27,614	10,700	78,058
1972	1,939	28,226	10,600	78,058
1973	1,950	28,287	10,500	78,058
1974	1,970	27,928	10,400	78,058
1975	1,980	27,662	10,300	78,058
1976	2,000	27,703	10,200	78,058
1977	2,020	27,929	10,100	78,058
1978	2,030	28,045	10,000	78,058
1979	2,050	28,792	9,800	78,058
1980	2,070	28,479	9,700	78,058
1981	2,080	28,513	9,600	78,058
1982	2,100	27,091	9,400	78,058
1983	2,120	26,618	9,200	78,058
1984	2,140	27,413	9,000	78,058
1985	2,150	27,530	8,900	78,058
1986	2,170	27,516	8,800	78,058
1987	2,200	27,500	8,800	78,058
1988	2,200	27,500	8,800	78,058
Zambia				
1961	2	4,780	35,000	75,261
1962	2	4,800	35,000	75,261
1963	2	4,820	35,000	75,261
1964	2	4,840	35,000	75,261
1965	2	4,860	35,000	75,261
1966	3	4,880	35,000	75,261
1967	4	4,900	35,000	75,261
1968	5	4,920	35,000	75,261
1969	7	4,940	35,000	75,261
1970	9	4,950	35,000	75,261

Table 5. (Continued)

Year	Irrigated Land (ILAN)	Arable and Permanent Cropland (CLAN)	Permanent Pastures (PLAN)	Total Area (TAREA)
----- (thousand hectares) -----				
1971	11	4,980	35,000	75,261
1972	13	4,980	35,000	75,261
1973	15	4,980	35,000	75,261
1974	17	4,985	35,000	75,261
1975	18	5,000	35,000	75,261
1976	18	5,008	35,000	75,261
1977	18	5,008	35,000	75,261
1978	18	5,058	35,000	75,261
1979	19	5,058	35,000	75,261
1980	19	5,108	35,000	75,261
1981	19	5,158	35,000	75,261
1982	20	5,158	35,000	75,261
1983	20	5,158	35,000	75,261
1984	20	5,158	35,000	75,261
1985	20	5,188	35,000	75,261
1986	20	5,188	35,000	75,261
1987	20	-	35,000	75,261
1988	20	-	35,000	75,261

SOURCE: USDA-ERS 1988.

Table 6. Labor and capital

Year	Labor Force		Total Weighted Livestock (TWLVSTK)	Agricultural Tractors	
	Agriculture (TALAF)	Total (TTLAF)		per hectare ^a (HPTRACT)	Total (THPTRACM)
	----- (million) -----		(1,000)	(hp)	(1,000 hp)
Argentina					
1961	1.6170	8.2530	44944.7044	120	3600.000
1962	1.6188	8.3496	44388.6931	150	3900.000
1963	1.5984	8.4456	41962.9554	150	4200.000
1964	1.5768	8,5629	43910.1662	150	4500.000
1965	1.5833	8.6970	47657.1261	150	4650.000
1966	1.5594	8.8140	49348.7674	150	4800.000
1967	1.5572	8.9081	51348.3273	150	4950.000
1968	1.5378	9.0637	50989.9497	150	5100.000
1969	1.5340	9.1804	48360.4077	150	5250.000
1970	1.5120	9.3120	48365.2669	150	5050.500
1971	1.5128	9.4672	49316.3455	150	5130.000
1972	1.5128	9.6224	51078.3530	150	5239.800
1973	1.4868	9.7524	53109.1464	150	5400.000
1974	1.4848	9.9072	52771.3767	150	5400.000
1975	1.4560	10.0360	53710.4777	150	5400.000
1976	1.4575	10.2025	54950.4458	150	5400.000
1977	1.4526	10.3565	56736.1634	150	5400.000
1978	1.4196	10.4832	53980.1504	150	5190.000
1979	1.4178	10.6474	52938.9798	150	5142.000
1980	1.4100	10.7724	52005.8124	150	5001.000
1981	1.3776	10.9634	50920.0442	180	6390.000
1982	1.3677	11.1162	49477.5208	180	6111.000
1983	1.3570	11.2985	50837.0794	180	6054.000
1984	1.3455	11.4517	51332.4690	180	6111.000
1985	1.3376	11.6432	50451.5728	180	6120.000
1986	-	-	53259.8092	180	6180.000
Brazil					
1961	12.1770	23.8374	58535.5774	60	2850.000
1962	12.3880	24.4720	60154.2023	60	3000.000
1963	12.6063	25.2126	62196.8335	60	3150.000
1964	12.8313	25.9047	64248.9715	60	3300.000
1965	13.0467	26.6751	66419.4798	60	3450.000
1966	13.1824	27.3920	68449.9310	60	3750.000
1967	13.3031	28.0158	70215.8207	90	4035.000
1968	13.4994	28.7202	72392.5557	90	4350.000
1969	13.6857	29.5127	74552.4678	90	4662.000
1970	13.7808	30.2412	76613.2132	90	4976.100
1971	13.9586	30.9645	79235.8774	90	5505.000
1972	14.0112	31.7520	83062.5520	120	6030.000
1973	14.1658	32.4676	85542.1733	120	6555.000

Table 6. (Continued)

Year	Labor Force		Total Weighted Livestock (TWLVSTK)	Agricultural Tractors	
	Agriculture (TALAF)	Total (TTLAF)		per hectare ^a (HPTRACT)	Total (THPTRACM)
	----- (million) -----		(1,000)	(hp)	(1,000 hp)
1974	14.2174	33.3154	90077.3138	120	7080.000
1975	14.3484	34.0231	92481.1970	120	7620.000
1976	14.3706	34.8682	99211.5243	150	9360.000
1977	14.3766	35.7133	103219.6829	180	11100.000
1978	14.5080	36.5040	102630.0980	180	12840.000
1979	14.5200	37.3200	105132.5623	210	14550.000
1980	14.5376	38.1920	112907.9244	240	16356.150
1981	14.6624	39.0576	115294.0893	240	18000.000
1982	14.6561	39.9476	116957.9171	270	19650.000
1983	14.6410	40.9948	117210.9815	300	21300.000
1984	14.7420	41.9055	120595.6054	300	22950.000
1985	14.7000	42.8400	122157.0132	300	23100.000
1986	-	-	122956.7928	300	23250.000

Chile

1961	0.7488	2.5584	3778.3895	240	1006.500
1962	0.7440	2.6000	3798.5063	240	1008.000
1963	0.7371	2.6082	3731.5232	240	1009.500
1964	0.7304	2.6560	3751.5600	240	1011.000
1965	0.7225	2.7030	3776.6025	240	1012.500
1966	0.7221	2.7405	3810.4250	210	1014.000
1967	0.7120	2.7857	3955.2730	210	1015.500
1968	0.7020	2.8080	3792.2660	210	1017.000
1969	0.6992	2.8612	3793.7110	210	1018.500
1970	0.6956	2.9234	3824.0850	210	1020.000
1971	0.6840	2.9545	3686.9180	210	1021.500
1972	0.6790	3.0264	3909.6750	210	1023.000
1973	0.6831	3.1086	3860.2264	210	1024.500
1974	0.6868	3.1916	4079.6356	210	1026.000
1975	0.6901	3.3063	4194.7681	210	1029.000
1976	0.6864	3.3488	4012.4799	180	1032.210
1977	0.6890	3.4450	4044.9107	180	1032.000
1978	0.6912	3.5424	4110.8819	180	1031.850
1979	0.6867	3.5970	4205.3780	180	1031.550
1980	0.6771	3.6852	4263.3810	180	1031.400
1981	0.6780	3.7742	4381.9000	180	1031.100
1982	0.6785	3.8525	4412.6100	180	1030.950
1983	0.6669	3.9429	4426.6000	180	1030.800
1984	0.6664	4.0222	4306.5800	180	1030.500
1985	0.6655	4.1261	4102.5900	180	1030.200
1986	-	-	4206.5900	210	1137.600

Table 6. (Continued)

Year	Labor Force		Total Weighted Livestock (TWLVSTK)	Agricultural Tractors	
	Agriculture (TALAF)	Total (TTLAF)		per hectare ^a (HPTRACT)	Total (THPTRACM)
	----- (million) -----		(1,000)	(hp)	(1,000 hp)
Colombia					
1961	2.4420	4.8840	14576.7800	120	547.230
1962	2.4310	4.9980	14847.8975	120	577.530
1963	2.4150	5.1100	15138.6200	120	611.400
1964	2.4254	5.2671	15380.0500	120	603.750
1965	2.3994	5.3940	15638.5976	120	616.050
1966	2.4000	5.5488	16040.2133	120	624.000
1967	2.3760	5.7024	16740.8664	120	634.410
1968	2.3548	5.8464	17459.6066	120	646.260
1969	2.3617	6.0192	17842.3350	120	664.710
1970	2.3326	6.1846	18465.2870	150	681.390
1971	2.3100	6.3140	19133.0710	150	704.070
1972	2.2725	6.4350	19692.5740	150	721.530
1973	2.2638	6.6066	20303.1631	150	714.000
1974	2.2420	6.7260	20900.8930	150	712.590
1975	2.2172	6.8685	21576.7683	150	725.610
1976	2.1894	7.0110	22148.0244	150	738.630
1977	2.1586	7.1786	22738.7081	150	767.820
1978	2.1420	7.3440	22853.9901	150	795.000
1979	2.1320	7.5140	22677.3898	150	825.000
1980	2.0935	7.6850	22659.0798	180	852.690
1981	2.0867	7.8861	22939.8188	180	885.000
1982	2.0700	8.0868	23220.3668	180	930.000
1983	2.0586	8.2908	22887.0400	180	960.000
1984	2.0448	8.4960	21699.1564	180	991.980
1985	2.0286	8.7318	22475.5500	180	1003.500
1986	-	-	22791.3500	180	1012.710
Dominican Republic					
1961	0.6176	0.9344	1496.2560	60	53.100
1962	0.6358	0.9724	1478.6561	60	53.700
1963	0.6440	0.9905	1473.0582	60	54.300
1964	0.6480	1.0080	1465.7637	60	54.900
1965	0.6549	1.0249	1457.2652	60	55.500
1966	0.6574	1.0374	1454.7662	60	56.100
1967	0.6760	1.0800	1447.4683	60	56.700
1968	0.6806	1.0947	1438.6693	60	57.300
1969	0.6888	1.1130	1434.1703	60	57.900
1970	0.7084	1.1572	1433.5714	60	58.500
1971	0.7155	1.1745	1628.0365	60	59.100
1972	0.7222	1.1960	1701.9734	60	59.700
1973	0.7440	1.2432	1764.7745	60	60.300

Table 6. (Continued)

Year	Labor Force		Total Weighted Livestock (TWLVSTK)	Agricultural Tractors	
	Agriculture (TALAF)	Total (TTLAF)		per hectare ^a (HPTRACT)	Total (THPTRACM)
	----- (million) -----		(1,000)	(hp)	(1,000 hp)
1974	0.7497	1.2691	2038.1755	60	60.900
1975	0.7752	1.3158	2089.7765	60	61.500
1976	0.7748	1.3364	2133.3775	60	62.100
1977	0.7938	1.3770	2124.3796	60	62.700
1978	0.7975	1.3915	2059.6936	60	63.300
1979	0.8151	1.4364	2117.2086	60	63.900
1980	0.8178	1.4558	2094.7060	60	64.500
1981	0.8340	1.5000	1907.8734	60	65.100
1982	0.8357	1.5189	2037.7199	60	65.700
1983	0.8505	1.5687	2251.3458	60	66.300
1984	0.8710	1.6120	2269.2739	60	66.900
1985	0.8712	1.6302	2361.2537	60	67.500
1986	-	-	2601.8253	60	68.100
Egypt					
1961	4.3450	7.5075	4417.8364	150	385.110
1962	4.4838	7.8114	4298.8529	150	396.000
1963	4.5504	7.9488	4188.9565	150	405.000
1964	4.6020	8.1125	4264.9102	180	420.000
1965	4.6965	8.3325	4339.9838	150	435.000
1966	4.7430	8.4940	4417.3474	150	450.000
1967	4.8184	8.6541	4494.5710	180	462.000
1968	4.8773	8.8179	5112.7747	180	467.160
1969	4.9500	9.0420	5206.1783	180	508.860
1970	5.0400	9.2400	5296.6820	180	519.000
1971	5.0958	9.4050	5350.8856	180	526.980
1972	5.1504	9.5700	5436.6892	210	555.000
1973	5.1830	9.7625	5493.7928	210	601.080
1974	5.2490	9.9550	5542.3965	210	626.670
1975	5.3280	10.1750	5587.5001	240	645.000
1976	5.4288	10.4429	5613.1037	240	660.000
1977	5.5341	10.7586	5635.8074	270	674.040
1978	5.6516	11.0644	6442.1584	330	849.000
1979	5.7669	11.3702	5645.8995	420	1025.670
1980	5.8658	11.6894	5654.3122	450	1080.000
1981	5.9869	11.9738	5643.2961	480	1159.170
1982	6.0885	12.3123	5659.8070	480	1200.000
1983	6.2176	12.6208	5652.8492	510	1230.000
1984	6.3096	12.9538	5634.6528	510	1260.000
1985	6.4321	13.3061	5676.4565	510	1290.000
1986	-	-	5852.4601	510	1320.000

Table 6. (Continued)

Year	Labor Force		Total Weighted Livestock (TWLVSTK)	Agricultural Tractors	
	Agriculture (TALAF)	Total (TTLAF)		per hectare ^a (HPTRACT)	Total (THPTRACM)
	----- (million) -----		(1,000)	(hp)	(1,000 hp)
Ghana					
1961	1.8216	2.8872	607.7000	-	32.500
1962	1.8500	2.9526	660.7201	30	47.500
1963	1.8772	3.0172	707.1616	30	56.750
1964	1.9032	3.0810	820.8026	30	69.995
1965	1.9200	3.1360	869.0982	30	66.695
1966	1.9188	3.1652	884.5855	30	69.000
1967	1.9380	3.2300	944.2137	30	72.000
1968	1.9401	3.2451	999.8710	30	76.500
1969	1.9530	3.3030	1061.5000	30	79.500
1970	1.9536	3.3528	1072.5982	30	84.250
1971	1.9620	3.3930	1074.5382	30	87.150
1972	1.9809	3.4689	1140.8128	30	88.750
1973	1.9968	3.5520	1126.9448	30	93.350
1974	1.9992	3.6064	1245.9490	30	96.350
1975	2.0100	3.6800	1173.2100	30	99.400
1976	2.0400	3.7842	1140.3042	30	101.002
1977	2.0696	3.9000	1096.6356	30	102.561
1978	2.1094	4.0280	1092.5324	30	104.120
1979	2.1293	4.1302	1099.7238	30	105.679
1980	2.1708	4.2660	1130.6150	30	108.738
1981	2.2110	4.4110	1161.8050	30	110.297
1982	2.2288	4.5360	1228.2900	30	111.856
1983	2.2491	4.6529	1279.0700	30	113.415
1984	2.2932	4.8006	1332.8800	30	114.974
1985	2.3140	4.9400	1447.4900	30	116.533
1986	-	-	1549.2000	30	118.092
Ivory Coast					
1961	1.9055	2.1571	345.562	-	2.385
1962	1.9494	2.2192	356.294	-	9.040
1963	2.0360	2.3280	375.846	-	13.530
1964	2.0664	2.3780	390.948	-	13.825
1965	2.1457	2.4768	407.870	-	21.200
1966	2.2185	2.5740	421.851	-	28.250
1967	2.2842	2.6649	453.092	-	28.450
1968	2.3422	2.7440	481.473	-	32.350
1969	2.4440	2.8808	513.953	-	37.180
1970	2.4948	2.9484	530.156	30	42.610
1971	2.5764	3.0666	546.359	30	45.250
1972	2.6580	3.1800	570.563	30	48.005
1973	2.7032	3.2488	486.267	30	54.275

Table 6. (Continued)

Year	Labor Force		Total Weighted Livestock (TWLVSTK)	Agricultural Tractors	
	Agriculture (TALAF)	Total (TTLAF)		per hectare* (HPTRACT)	Total (THPTRACM)
	----- (million) -----		(1,000)	(hp)	(1,000 hp)
1974	2.7950	3.3800	595.875	30	58.775
1975	2.8832	3.5156	611.891	30	64.775
1976	2.9260	3.5840	651.911	30	69.351
1977	3.0003	3.7084	712.920	30	81.373
1978	3.0780	3.8228	766.930	30	85.896
1979	3.1521	3.9421	804.960	30	90.418
1980	3.2226	4.0672	847.770	30	91.940
1981	3.3282	4.2312	885.790	30	93.463
1982	3.3909	4.3432	954.980	30	94.985
1983	3.4500	4.4528	981.973	30	96.507
1984	3.5424	4.6080	1019.961	30	98.030
1985	3.6400	4.7600	1052.360	30	99.552
1986	-	-	1127.559	30	101.074
Malaysia					
1961	1.7922	2.8710	807.9168	30	48.000
1962	1.7978	2.9192	826.1409	30	54.000
1963	1.8109	2.9757	832.9962	30	60.000
1964	1.8518	3.0738	832.1083	30	66.000
1965	1.8720	3.1488	823.1868	30	72.000
1966	1.9107	3.2571	844.8940	30	78.000
1967	1.9482	3.3660	853.2763	30	86.100
1968	1.9656	3.4528	808.6409	30	98.400
1969	2.0116	3.5738	804.0386	30	118.500
1970	2.0383	3.6624	833.9267	30	128.220
1971	2.0720	3.7856	814.1063	30	152.910
1972	2.0862	3.8646	816.4081	30	155.010
1973	2.1177	3.9780	808.0915	30	151.740
1974	2.1360	4.0800	857.6418	30	142.830
1975	2.1648	4.1820	959.4734	30	154.080
1976	2.1798	4.2714	1003.3749	60	200.070
1977	2.1760	4.3520	1009.8978	60	214.050
1978	2.2008	4.4540	1063.1540	60	229.740
1979	2.2110	4.5560	1074.7882	60	236.640
1980	2.2356	4.6920	1124.4761	60	222.900
1981	2.2560	4.8081	1173.4178	60	240.270
1982	2.2752	4.9248	1157.3772	60	239.220
1983	2.3088	5.0912	1180.1838	60	267.270
1984	2.3254	5.2246	1188.3667	60	306.330
1985	2.3562	5.3438	1219.9076	90	342.000
1986	-	-	1223.1622	90	348.000

Table 6. (Continued)

Year	Labor Force		Total Weighted Livestock (TWLVSTK)	Agricultural Tractors	
	Agriculture (TALAF)	Total (TTLAF)		per hectare ^a (HPTRACT)	Total (THPTRACM)
	----- (million) -----		(1,000)	(hp)	(1,000 hp)
Morocco					
1961	2.1209	3.4417	5990.2041	30	240.000
1962	2.1615	3.5239	5537.4417	30	240.000
1963	2.1708	3.5912	5572.2828	30	240.000
1964	2.1783	3.6442	5873.3289	30	240.000
1965	2.1996	3.7083	6054.0663	30	240.000
1966	2.2176	3.7584	6302.0113	30	255.000
1967	2.2348	3.8332	6510.1453	30	270.000
1968	2.2499	3.8807	6662.7520	30	300.000
1969	2.2630	3.9525	7122.9540	60	330.000
1970	2.2896	4.0386	7224.4600	60	360.000
1971	2.3146	4.1076	7342.1600	60	415.140
1972	2.3352	4.2000	7029.3400	60	438.180
1973	2.3564	4.2828	7014.9800	60	483.060
1974	2.3936	4.3824	6882.9450	60	554.310
1975	2.4435	4.5250	6937.7300	90	630.000
1976	2.4738	4.6314	6795.6000	90	660.000
1977	2.5212	4.7559	6615.1300	90	690.000
1978	2.5350	4.8555	6930.0400	90	720.000
1979	2.5800	4.9800	6642.4780	90	750.000
1980	2.6035	5.1045	6672.5918	90	780.000
1981	2.6460	5.2500	6255.8540	90	810.000
1982	2.6875	5.3750	4846.0968	90	840.000
1983	2.7404	5.5471	5029.6740	120	870.000
1984	2.7798	5.6952	4740.9729	120	900.000
1985	2.8304	5.8464	5103.1300	120	930.000
1986	-	-	5611.8700	120	960.000
Pakistan					
1961	9.3060	15.3549	21743.0598	-	165.000
1962	9.8235	16.2486	22131.0771	-	180.000
1963	9.9190	16.5135	22549.0871	-	195.000
1964	10.0800	16.8000	22998.0952	-	210.000
1965	10.2350	17.0775	23497.6286	-	221.640
1966	10.3840	17.4050	24712.3683	30	291.990
1967	10.5444	17.7558	25075.3784	30	375.000
1968	10.7779	18.1293	25418.3836	30	465.000
1969	10.9440	18.4960	25779.3888	30	567.270
1970	11.1033	18.8559	26203.8990	30	630.000
1971	11.2725	19.2375	26643.6142	30	720.000
1972	11.3652	19.6119	27185.2263	60	915.390
1973	11.5182	19.9791	27757.9062	60	904.950

Table 6. (Continued)

Year	Labor Force		Total Weighted Livestock (TWLVSTK)	Agricultural Tractors	
	Agriculture (TALAF)	Total (TTLAF)		per hectare ^a (HPTRACT)	Total (THPTRACM)
	----- (million) -----		(1,000)	(hp)	(1,000 hp)
1974	11.5911	20.4120	28358.7390	60	990.000
1975	11.7279	20.8413	28988.1770	60	1071.420
1976	11.8575	21.2670	29651.8219	90	1458.000
1977	11.9646	21.8178	30350.3715	90	1845.000
1978	12.1752	22.2678	31084.3324	120	2235.000
1979	12.2776	22.8248	31859.3003	120	2622.000
1980	12.4392	23.3448	32676.7808	150	2921.190
1981	12.7296	23.9564	32780.7834	150	3300.000
1982	12.8733	24.6510	33434.7496	180	3690.000
1983	13.1180	25.2990	34118.3121	210	4080.000
1984	13.3718	25.9740	34818.7063	210	4440.000
1985	13.5630	26.7300	35527.2382	240	4698.990
1986	-	-	36271.1877	240	4920.000

Philippines

1961	6.8502	11.3484	5577.2181	30	123.000
1962	6.9312	11.6432	5968.0736	30	125.190
1963	6.9799	11.8940	5798.9132	30	156.780
1964	7.0414	12.1448	5920.9634	30	156.900
1965	7.0929	12.4209	6308.9550	30	157.050
1966	7.1552	12.6936	6603.3828	30	157.350
1967	7.1862	12.9210	6592.0423	30	157.560
1968	7.2270	13.1765	7053.7665	30	183.000
1969	7.2568	13.4608	7310.2306	30	210.000
1970	7.3143	13.7385	7440.6208	30	234.000
1971	7.3232	13.9698	7807.6299	30	261.000
1972	7.3211	14.1923	8227.6484	30	285.000
1973	7.3675	14.4824	8779.9501	30	312.000
1974	7.4043	14.7653	7723.5155	60	336.000
1975	7.4592	15.0072	6788.5046	60	363.000
1976	7.4948	15.3552	5860.3154	60	389.400
1977	7.5509	15.6646	5866.8610	60	414.000
1978	7.5674	16.0024	6247.5125	60	450.000
1979	7.6230	16.2855	6203.7586	60	480.000
1980	7.6859	16.6952	6437.9859	60	510.000
1981	7.7404	17.1021	6426.7512	60	525.000
1982	7.7865	17.4525	6502.6284	60	540.000
1983	7.8384	17.8848	6581.7041	60	555.000
1984	7.8813	18.2574	6563.1931	60	570.000
1985	7.9288	18.7143	6395.3993	90	585.000
1986	-	-	6412.2516	90	594.000

Table 6. (Continued)

Year	Labor Force		Total Weighted Livestock (TWLVSTK)	Agricultural Tractors	
	Agriculture (TALAF)	Total (TTLAF)		per hectare ^a (HPTRACT)	Total (THPTRACM)
	----- (million) -----		(1,000)	(hp)	(1,000 hp)
Portugal					
1961	1.4760	3.4290	2079.2490	90	322.440
1962	1.4580	3.4740	2080.0380	120	354.180
1963	1.4378	3.5308	2080.6558	120	386.730
1964	1.4105	3.5581	2094.0980	120	422.580
1965	1.3832	3.5945	2096.0901	150	466.050
1966	1.3286	3.5581	2105.3380	180	535.290
1967	1.2831	3.5217	2103.2954	180	572.280
1968	1.2285	3.4762	2066.2703	210	649.680
1969	1.1739	3.4307	2156.2606	240	759.420
1970	1.1250	3.3750	2142.9660	270	844.590
1971	1.1160	3.4470	2115.2715	330	961.950
1972	1.1160	3.5190	2160.3773	360	1034.250
1973	1.0980	3.5730	2177.4324	390	1141.710
1974	1.0920	3.6218	2044.7114	420	1260.720
1975	1.0904	3.6660	2010.9308	450	1333.560
1976	1.0656	3.6960	1910.0320	540	1493.520
1977	1.0573	3.7442	2026.5750	600	1717.140
1978	1.0379	3.7636	2188.1730	660	1844.520
1979	1.0185	3.7830	2206.2720	720	1981.980
1980	1.0094	3.8416	2449.4730	780	2175.540
1981	0.9900	3.8709	2480.9750	810	2219.610
1982	0.9603	3.8709	2463.8760	870	2441.880
1983	0.9500	3.9000	2466.5750	900	2482.020
1984	0.9292	3.9289	2319.1730	870	2434.380
1985	0.9078	3.9678	2401.4740	870	2357.610
1986	-	-	2341.8750	810	2266.470
South Korea					
1961	5.5808	8.6016	1124.4979	-	1.255
1962	5.5968	8.8704	1173.7105	-	1.460
1963	5.6304	9.1392	1395.7097	-	2.970
1964	5.6840	9.4360	1451.6748	-	5.645
1965	5.6826	9.7293	1385.9837	-	6.605
1966	5.6742	9.9666	1397.4248	-	8.975
1967	5.6889	10.2641	1338.4465	-	20.115
1968	5.6980	10.5336	1316.6107	-	33.165
1969	5.6700	10.8360	1265.0877	-	47.160
1970	5.6994	11.1734	1232.1386	-	61.250
1971	5.6917	11.4821	1330.3736	-	89.700
1972	5.6950	11.7920	1297.6706	-	130.290
1973	5.7288	12.1737	1444.5594	-	197.090

Table 6. (Continued)

Year	Labor Force		Total Weighted Livestock (TWLVSTK)	Agricultural Tractors	
	Agriculture (TALAF)	Total (TTLAF)		per hectare ^a (HPTRACT)	Total (THPTRACM)
	——(million)——		(1,000)	(hp)	(1,000 hp)
1974	5.7255	12.5267	1630.3347	-	311.920
1975	5.7892	12.9198	1771.2146	-	445.530
1976	5.7799	13.2830	1737.5106	-	634.095
1977	5.7512	13.5772	1571.4412	30	801.305
1978	5.7350	13.9120	1663.6246	30	1021.930
1979	5.7000	14.2500	1804.8931	30	1240.595
1980	5.6007	14.5542	2006.6986	30	1528.815
1981	5.5728	14.8995	1688.8959	60	1868.170
1982	5.5020	15.2091	1595.0256	90	2277.280
1983	5.4264	15.5211	1868.8302	90	2670.550
1984	5.3865	15.8760	2540.7641	150	2981.885
1985	5.3430	16.2345	2755.6189	180	3316.480
1986	-	-	2961.4349	240	3903.065
Sri Lanka					
1961	1.9584	3.4884	2055.8144	90	139.110
1962	1.9864	3.5360	1750.9012	120	172.475
1963	2.0330	3.6273	2204.1477	120	198.655
1964	2.0601	3.6842	2571.3465	120	210.385
1965	2.1056	3.7744	2663.1804	120	218.845
1966	2.1505	3.8755	2317.3320	150	255.065
1967	2.1762	3.9312	2180.3057	150	291.070
1968	2.2320	4.0200	2198.8790	180	330.100
1969	2.2755	4.1082	2113.7200	210	366.100
1970	2.3000	4.1750	2092.1588	210	406.265
1971	2.3552	4.2752	2107.6546	240	444.650
1972	2.3790	4.3290	2122.8059	240	451.180
1973	2.4024	4.4088	2126.8256	240	457.300
1974	2.4705	4.5225	2178.9340	240	463.805
1975	2.5071	4.6306	2252.8192	240	469.180
1976	2.5437	4.7121	2316.6325	240	476.880
1977	2.5944	4.8081	2215.6723	270	489.695
1978	2.6496	4.9248	2104.4036	300	564.817
1979	2.6864	5.0224	2201.5391	330	648.400
1980	2.7416	5.1554	2226.4237	390	730.362
1981	2.8120	5.3048	2348.8933	390	752.175
1982	2.8490	5.4208	2308.5228	420	769.427
1983	2.9016	5.5536	2341.4949	420	785.180
1984	2.9704	5.6880	2416.1265	420	804.382
1985	3.0240	5.8400	2467.6514	450	824.455
1986	-	-	2465.1068	450	843.388

Table 6. (Continued)

Year	Labor Force		Total Weighted Livestock (TWLVSTK)	Agricultural Tractors	
	Agriculture (TALAF)	Total (TTLAF)		per hectare* (HPTRACT)	Total (THPTRACM)
	——(million)——		(1,000)	(hp)	(1,000 hp)
Thailand					
1961	11.6724	14.0296	8640.1324	-	45.000
1962	11.8372	14.2691	8840.0230	-	60.000
1963	12.0196	14.5564	8897.9777	-	75.000
1964	12.1601	14.8036	9106.0546	-	90.000
1965	12.3906	15.1512	9337.5895	-	105.000
1966	12.5730	15.4440	9573.3262	-	120.000
1967	12.7840	15.7760	9828.5633	-	150.000
1968	13.0200	16.1350	10066.5096	30	180.000
1969	13.2848	16.5699	10347.2606	30	210.000
1970	13.5415	16.9547	10675.7828	30	240.000
1971	13.7520	17.3046	10073.1197	30	274.440
1972	13.9908	17.6850	9872.9116	30	328.380
1973	14.1856	18.0544	9792.6593	30	398.190
1974	14.4137	18.4611	9790.2194	30	479.790
1975	14.6781	18.8658	9651.1749	60	837.390
1976	14.8608	19.2240	10066.6931	60	870.000
1977	15.0822	19.6245	9987.7750	60	915.000
1978	15.2550	20.0250	10608.7134	90	1350.000
1979	15.5020	20.4700	10169.1331	120	1933.290
1980	15.7115	20.8236	9445.8245	120	2200.050
1981	15.8549	21.2197	10460.5569	150	2676.060
1982	16.0392	21.5649	10912.4740	180	3225.840
1983	16.1850	21.9618	11086.6012	180	3393.480
1984	16.4084	22.3520	11014.0836	180	3627.540
1985	16.5760	22.7920	10990.6871	180	3750.000
1986	-	-	11036.2093	210	3900.000
Turkey					
1961	10.7880	13.9490	20067.7154	60	1275.390
1962	10.7876	14.1550	19632.7604	60	1301.230
1963	10.7360	14.3045	19669.0239	60	1501.660
1964	10.7016	14.4768	19648.9981	60	1542.030
1965	10.7200	14.6560	20168.0758	60	1590.125
1966	10.6602	14.8458	20252.2552	60	1922.555
1967	10.6546	14.9966	20909.3033	90	2218.655
1968	10.6362	15.2190	21298.0424	90	2532.995
1969	10.6050	15.4350	21050.3414	90	2874.110
1970	10.5968	15.6446	20386.6450	120	3142.230
1971	10.5774	15.8844	19747.6445	120	3532.995

Table 6. (Continued)

Year	Labor Force		Total Weighted Livestock (TWLVSTK)	Agricultural Tractors	
	Agriculture (TALAF)	Total (TTLAF)		per hectare ^a (HPTRACT)	Total (THPTRACM)
	----- (million) -----		(1,000)	(hp)	(1,000 hp)
1972	10.5375	16.1250	19802.7677	150	4048.870
1973	10.5105	16.4395	19866.9861	180	4674.110
1974	10.5070	16.7480	20048.0076	210	6005.055
1975	10.4895	17.0910	20079.8108	270	7276.730
1976	10.4165	17.3885	20436.9166	300	8445.985
1977	10.3456	17.6384	20709.9840	360	9603.440
1978	10.2188	17.8829	21041.8096	390	11086.795
1979	10.1218	18.1662	21439.9470	420	12062.260
1980	10.0122	18.4008	22176.8659	450	13063.920
1981	9.9330	18.7110	22704.9153	480	13729.195
1982	9.8384	19.0619	22742.1966	540	14700.330
1983	9.7284	19.3600	21224.0280	570	15374.630
1984	9.6030	19.7010	20531.1368	600	16664.580
1985	9.5316	20.0265	17644.2384	630	17477.145
1986	-	-	17606.3436	660	18339.955
Zambia					
1961	1.0032	1.2837	1060.5410	30	73.050
1962	1.0234	1.3226	1051.9420	30	82.800
1963	1.0465	1.3615	1048.8435	-	60.000
1964	1.0656	1.3968	1047.6442	-	48.000
1965	1.0878	1.4356	1076.2493	-	48.000
1966	1.1058	1.4706	1097.4770	-	54.000
1967	1.1232	1.5093	1167.7041	-	61.800
1968	1.1440	1.5440	1186.9329	30	67.470
1969	1.1603	1.5785	1305.9198	30	81.000
1970	1.1718	1.6086	1308.1084	30	95.400
1971	1.2144	1.6808	1343.6704	30	102.000
1972	1.2240	1.7100	1390.0820	30	108.000
1973	1.2328	1.7388	1428.6320	30	111.000
1974	1.2672	1.8000	1440.1280	30	120.000
1975	1.2740	1.8228	1499.4095	30	123.000
1976	1.2800	1.8550	1672.9016	30	126.000
1977	1.3156	1.9188	1748.7542	30	129.000
1978	1.3197	1.9451	1781.9328	30	132.000
1979	1.3530	2.0075	1848.7008	30	135.000
1980	1.3608	2.0384	1818.1856	30	135.000
1981	1.3804	2.0938	1932.9197	30	135.000
1982	1.3980	2.1420	2055.2786	30	133.500
1983	1.4301	2.2176	1950.3266	30	132.000

Table 6. (Continued)

Year	Labor Force		Total Weighted Livestock (TWLVSTK)	Agricultural Tractors	
	Agriculture (TALAF)	Total (TTLAF)		per hectare ^a (HPTRACT)	Total (THPTRACM)
	----- (million) -----		(1,000)	(hp)	(1,000 hp)
1984	1.4430	2.2620	2163.5033	30	130.500
1985	1.4824	2.3460	2241.4900	30	131.400
1986	-	-	2288.5750	30	132.000

SOURCE: USDA-ERS 1988; FAO.

Table 7. Measures of labor quality

Year	School Enrollment Ratio		Adult Literacy	Life
	Primary (AGER1MF)	Secondary (AGER2MF)	Rate (ALR)	Expectancy (POPLIFE)
	----- (percent) -----			(year)
Argentina				
1960	100.292	23.6871	91.4	65.1
1961	100.674	25.4553	-	65.2
1962	101.055	27.2236	-	65.4
1963	101.437	28.9918	-	65.5
1964	101.819	30.7600	-	65.6
1965	102.200	32.5283	-	65.7
1966	102.582	34.2965	-	65.8
1967	102.964	36.0648	-	65.9
1968	103.345	37.8330	-	66.1
1969	103.727	39.6012	-	66.4
1970	104.108	41.3695	92.6	66.6
1971	104.490	43.1377	-	66.9
1972	104.872	44.9060	-	67.2
1973	105.253	46.6742	-	67.5
1974	105.635	48.4424	-	67.7
1975	106.017	50.2107	-	68.0
1976	106.398	51.9789	-	68.3
1977	106.780	53.7472	-	68.5
1978	107.162	55.5154	93.0	68.8
1979	107.543	57.2837	-	69.0
1980	107.925	59.0519	-	69.2
1981	108.307	60.8201	-	69.4
1982	108.688	62.5884	-	69.7
1983	109.070	64.3566	-	69.8
1984	109.451	66.1249	-	70.1
1985	109.833	67.8931	-	70.3
1986	110.215	69.6613	-	-
Brazil				
1960	93.419	9.8213	61.0	54.7
1961	93.588	10.9656	-	55.1
1962	93.757	12.1100	-	55.6
1963	93.926	13.2543	-	56.1
1964	94.096	14.3986	-	56.5
1965	94.265	15.5430	-	56.9
1966	94.434	16.6873	-	57.3
1967	94.603	17.8316	-	57.7
1968	94.772	18.9759	-	58.1
1969	94.941	20.1203	-	58.5
1970	95.110	21.2646	66.2	58.9
1971	95.279	22.4089	-	59.3

Table 7. (Continued)

Year	School Enrollment Ratio		Adult Literacy	Life
	Primary (AGER1MF)	Secondary (AGER2MF)	Rate (ALR)	Expectancy (POPLIFE)
	----- (percent) -----			(year)
1972	95.448	23.5533	-	59.7
1973	95.617	24.6976	-	60.0
1974	95.786	25.8419	-	60.4
1975	95.955	26.9863	-	60.8
1976	96.124	28.1306	76.4	61.2
1977	96.293	29.2749	-	61.6
1978	96.463	30.4192	76.1	62.0
1979	96.632	31.5636	76.0	62.3
1980	96.801	32.7079	-	62.6
1981	96.970	33.8522	-	62.9
1982	97.139	34.9966	-	63.4
1983	97.308	36.1409	-	63.6
1984	97.477	37.2852	-	64.1
1985	97.646	38.4296	-	64.5
1986	97.815	39.5739	-	-
Chile				
1960	116.750	23.2235	83.6	57.1
1961	116.569	24.8995	-	57.5
1962	116.388	26.5756	-	57.8
1963	116.208	28.2516	-	58.3
1964	116.027	29.9277	-	58.8
1965	115.846	31.6037	-	59.3
1966	115.665	33.2798	-	59.8
1967	115.484	34.9558	-	60.4
1968	115.303	36.6319	-	60.9
1969	115.122	38.3079	-	61.6
1970	114.942	39.9840	89.0	62.2
1971	114.761	41.6600	-	62.8
1972	114.580	43.3361	-	63.5
1973	114.399	45.0121	-	64.2
1974	114.218	46.6882	-	64.9
1975	114.037	48.3642	-	65.7
1976	113.856	50.0402	-	66.5
1977	113.676	51.7163	-	67.2
1978	113.495	53.3923	-	67.8
1979	113.314	55.0684	-	68.3
1980	113.133	56.7444	-	68.7
1981	112.952	58.4205	-	69.1
1982	112.771	60.0965	-	69.7
1983	112.590	61.7726	-	69.9
1984	112.410	63.4486	-	70.1

Table 7. (Continued)

Year	School Enrollment Ratio		Adult Literacy	Life
	Primary (AGER1MF)	Secondary (AGER2MF)	Rate (ALR)	Expectancy (POPLIFE)
	(percent)			(year)
1985	112.229	65.1247	-	70.4
1986	112.048	66.8007	-	-
Colombia				
1960	84.198	11.8141	63.0	53.1
1961	86.063	13.4370	-	53.4
1962	87.928	15.0599	-	53.7
1963	89.793	16.6828	-	54.3
1964	91.658	18.3057	-	55.1
1965	93.523	19.9286	-	55.9
1966	95.388	21.5515	-	56.7
1967	97.253	23.1744	-	57.5
1968	99.118	24.7973	-	58.1
1969	100.983	26.4203	-	58.5
1970	102.848	28.0432	80.8	58.9
1971	104.713	29.6661	-	59.2
1972	106.578	31.2890	-	59.6
1973	108.443	32.9119	-	60.0
1974	110.307	34.5348	-	60.4
1975	112.172	36.1577	-	60.8
1976	114.037	37.7806	-	61.2
1977	115.902	39.4035	-	61.6
1978	117.767	41.0264	-	62.0
1979	119.632	42.6493	-	62.4
1980	121.497	44.2723	81.0	62.9
1981	123.362	45.8952	-	63.3
1982	125.227	47.5181	-	64.0
1983	127.092	49.1410	-	64.1
1984	128.957	50.7639	-	64.7
1985	130.822	52.3868	-	64.9
1986	132.687	54.0097	-	-
Dominican Republic				
1960	88.810	4.6170	64.5	50.9
1961	89.925	6.5259	-	51.6
1962	91.040	8.4348	-	52.3
1963	92.155	10.3436	-	52.9
1964	93.271	12.2525	-	53.4
1965	94.386	14.1614	-	54.0
1966	95.501	16.0703	-	54.5

Table 7. (Continued)

Year	School Enrollment Ratio		Adult Literacy	Life
	Primary (AGER1MF)	Secondary (AGER2MF)	Rate (ALR)	Expectancy (POPLIFE)
	------(percent)-----			(year)
1967	96.616	17.9792	-	55.1
1968	97.732	19.8881	-	55.6
1969	98.847	21.7970	-	56.1
1970	99.962	23.7059	67.2	56.6
1971	101.078	25.6148	-	57.1
1972	102.193	27.5237	-	57.7
1973	103.308	29.4326	-	58.1
1974	104.423	31.3415	-	58.6
1975	105.539	33.2504	-	59.1
1976	106.654	35.1593	-	59.5
1977	107.769	37.0681	-	60.0
1978	108.884	38.9770	67.0	60.5
1979	110.000	40.8859	-	61.0
1980	111.115	42.7948	67.0	61.4
1981	112.230	44.7037	-	61.9
1982	113.346	46.6126	-	62.6
1983	114.461	48.5215	-	62.8
1984	115.576	50.4304	-	63.6
1985	116.691	52.3393	-	64.4
1986	117.807	54.2482	-	-
Egypt				
1960	65.582	16.3386	25.8	46.1
1961	66.280	18.1424	-	46.6
1962	66.979	19.9462	-	47.1
1963	67.678	21.7499	-	47.6
1964	68.377	23.5537	-	48.1
1965	69.075	25.3575	-	48.5
1966	69.774	27.1613	-	49.0
1967	70.473	28.9651	-	49.5
1968	71.172	30.7689	-	50.0
1969	71.870	32.5726	-	50.4
1970	72.569	34.3764	-	50.9
1971	73.268	36.1802	-	51.4
1972	73.967	37.9840	-	51.8
1973	74.666	39.7878	-	52.4
1974	75.364	41.5916	-	53.1
1975	76.063	43.3953	-	53.8
1976	76.762	45.1991	38.2	54.6
1977	77.461	47.0029	44.0	55.3
1978	78.159	48.8067	-	55.9
1979	78.858	50.6105	-	56.4

Table 7. (Continued)

Year	School Enrollment Ratio		Adult Literacy Rate (ALR)	Life Expectancy (POPLIFE)
	Primary (AGER1MF)	Secondary (AGER2MF)		
	------(percent)-----			(year)
1980	79.557	52.4143	-	56.9
1981	80.256	54.2180	44.0	57.4
1982	90.954	56.0218	-	58.1
1983	81.653	57.8256	-	58.3
1984	82.352	59.6294	-	60.4
1985	83.051	61.4332	-	60.7
1986	83.749	63.2370	-	-
Ghana				
1960	52.736	7.1205	27.0	45.0
1961	53.688	8.5602	-	45.4
1962	54.640	9.9998	-	45.8
1963	55.592	11.4394	-	46.2
1964	56.544	12.8790	-	46.6
1965	57.496	14.3187	-	47.0
1966	58.447	15.7583	-	47.4
1967	59.399	17.1979	-	47.8
1968	60.351	18.6376	-	48.2
1969	61.303	20.0772	-	48.6
1970	62.255	21.5168	30.2	49.0
1971	63.207	22.9564	-	49.4
1972	64.159	24.3961	-	49.8
1973	65.111	25.8357	-	50.1
1974	66.063	27.2753	-	50.3
1975	67.014	28.7150	-	50.5
1976	67.966	30.1546	-	50.7
1977	68.918	31.5942	-	50.9
1978	69.870	33.0338	-	51.1
1979	70.822	34.4735	-	51.3
1980	71.774	35.9131	-	51.5
1981	72.726	37.3527	-	51.7
1982	73.678	38.7923	-	52.0
1983	74.630	40.2320	-	52.5
1984	75.581	41.6716	-	52.9
1985	76.533	43.1112	-	53.2
1986	77.485	44.5509	-	-
Ivory Coast				
1960	46.539	1.8307	5.0	41.5
1961	47.883	2.6110	-	41.8

Table 7. (Continued)

Year	School Enrollment Ratio		Adult Literacy	Life
	Primary (AGER1MF)	Secondary (AGER2MF)	Rate (ALR)	Expectancy (POPLIFE)
	----- (percent) -----			(year)
1962	49.226	3.3912	-	42.2
1963	50.570	4.1715	-	42.6
1964	51.914	4.9517	-	43.1
1965	53.257	5.7320	-	43.6
1966	54.601	6.5122	-	44.1
1967	55.944	7.2925	-	44.5
1968	57.288	8.0727	-	45.0
1969	58.632	8.8530	-	45.5
1970	59.975	9.6332	20.0	45.9
1971	61.319	10.4135	-	46.4
1972	62.662	11.1937	-	46.9
1973	64.006	11.9740	-	47.3
1974	65.350	12.7542	-	47.6
1975	66.693	13.5345	-	47.8
1976	68.037	14.3147	-	48.1
1977	69.380	15.0950	-	48.4
1978	70.724	15.8752	-	48.9
1979	72.068	16.6554	-	49.4
1980	73.411	17.4357	35.0	50.0
1981	74.755	18.2159	-	50.6
1982	76.098	18.9962	-	51.5
1983	77.442	19.7764	-	51.4
1984	78.786	20.5567	-	52.4
1985	80.129	21.3369	-	52.7
1986	81.473	22.1172	-	-
Malaysia				
1960	89.946	21.0394	52.8	53.9
1961	90.164	22.4252	-	54.7
1962	90.382	23.8110	-	55.4
1963	90.599	25.1967	-	56.1
1964	90.817	26.5825	-	56.8
1965	91.035	27.9683	-	57.6
1966	91.253	29.3541	-	58.3
1967	91.471	30.7399	-	59.0
1968	91.688	32.1257	-	59.7
1969	91.906	33.5115	-	60.5
1970	92.124	34.8973	58.5	61.2
1971	92.342	36.2831	-	61.9
1972	92.560	37.6689	-	62.6
1973	92.778	39.0547	-	63.2
1974	92.995	40.4404	-	63.7

Table 7. (Continued)

Year	School Enrollment Ratio		Adult Literacy	Life
	Primary (AGER1MF)	Secondary (AGER2MF)	Rate (ALR)	Expectancy (POPLIFE)
	----- (percent) -----			(year)
1975	93.213	41.8262	-	64.1
1976	93.431	43.2120	-	64.6
1977	93.649	44.5978	-	65.0
1978	93.867	45.9836	-	65.4
1979	94.085	47.3694	-	65.7
1980	94.302	48.7552	60.0	66.1
1981	94.520	50.1410	-	66.4
1982	94.738	51.5268	-	66.9
1983	94.956	52.9126	-	67.0
1984	95.174	54.2983	-	68.6
1985	95.391	55.6841	-	67.6
1986	95.609	57.0699	-	-
Morocco				
1960	44.003	3.2395	13.8	46.7
1961	45.585	4.2891	-	47.2
1962	47.168	5.3386	-	47.7
1963	48.751	6.3882	-	48.2
1964	50.334	7.4378	-	48.7
1965	51.917	8.4873	-	49.1
1966	53.500	9.5369	-	49.6
1967	55.082	10.5864	-	50.1
1968	56.665	11.6360	-	50.6
1969	58.248	12.6856	-	51.1
1970	59.831	13.7351	21.4	51.6
1971	61.414	14.7847	-	52.1
1972	62.996	15.8342	-	52.7
1973	64.579	16.8838	-	53.2
1974	66.162	17.9334	-	53.8
1975	67.745	18.9829	-	54.3
1976	69.328	20.0325	-	54.9
1977	70.911	21.0820	-	55.5
1978	72.493	22.1316	-	56.0
1979	74.076	23.1812	-	56.5
1980	75.659	24.2307	28.0	57.0
1981	77.242	25.2803	-	57.5
1982	78.825	26.3298	-	58.3
1983	80.408	27.3794	-	57.9
1984	81.990	28.4290	-	58.9
1985	83.573	29.4785	-	59.3
1986	85.156	30.5281	-	-

Table 7. (Continued)

Year	School Enrollment Ratio		Adult Literacy	Life
	Primary (AGER1MF)	Secondary (AGER2MF)	Rate (ALR)	Expectancy (POPLIFE)
	----- (percent) -----			(year)
Pakistan				
1960	35.341	11.1875	15.4	43.1
1961	35.859	11.3831	-	43.6
1962	36.377	11.5787	-	44.1
1963	36.894	11.7743	-	44.5
1964	37.412	11.9699	-	44.7
1965	37.930	12.1655	-	45.0
1966	38.447	12.3611	-	45.2
1967	38.965	12.5567	-	45.4
1968	39.483	12.7523	-	45.6
1969	40.000	12.9479	-	45.8
1970	40.518	13.1435	20.7	46.0
1971	41.035	13.3391	-	46.2
1972	41.553	13.5346	-	46.4
1973	42.071	13.7302	-	46.7
1974	42.588	13.9258	-	47.0
1975	43.106	14.1214	-	47.3
1976	43.624	14.3170	-	47.6
1977	44.141	14.5126	-	47.9
1978	44.659	14.7082	-	48.2
1979	45.176	14.9038	24.0	48.6
1980	45.694	15.0994	-	49.0
1981	46.212	15.2950	-	49.4
1982	46.729	15.4906	-	50.0
1983	47.247	15.6862	-	50.2
1984	47.765	15.8818	-	55.6
1985	48.282	16.0774	-	50.9
1986	48.800	16.2730	-	-
Philippines				
1960	103.053	30.7486	71.9	52.8
1961	103.339	32.3380	-	53.5
1962	103.626	33.9275	-	54.2
1963	103.912	35.5169	-	54.7
1964	104.198	37.1064	-	55.0
1965	104.484	38.6958	-	55.3
1966	104.770	40.2853	-	55.7
1967	105.057	41.8747	-	56.0
1968	105.343	43.4641	-	56.3
1969	105.629	45.0536	-	56.7
1970	105.915	46.6430	82.6	57.0
1971	106.201	48.2325	-	57.4

Table 7. (Continued)

Year	School Enrollment Ratio		Adult Literacy	Life
	Primary (AGER1MF)	Secondary (AGER2MF)	Rate (ALR)	Expectancy (POPLIFE)
	------(percent)-----			(year)
1972	106.488	49.8219	-	57.7
1973	106.774	51.4114	-	58.1
1974	107.060	53.0008	-	58.5
1975	107.346	54.5903	-	58.9
1976	107.632	56.1797	-	59.3
1977	107.918	57.7692	-	59.7
1978	108.205	59.3586	-	60.1
1979	108.491	60.9481	75.0	60.5
1980	108.777	62.5375	-	60.9
1981	109.063	64.1270	-	61.3
1982	109.349	65.7164	-	61.9
1983	109.635	67.3058	-	62.3
1984	109.922	68.8953	-	62.7
1985	110.208	70.4847	-	62.9
1986	110.494	72.0742	-	-
Portugal				
1960	77.742	53.2736	62.9	63.3
1961	79.811	52.9685	-	63.6
1962	81.880	52.6634	-	64.0
1963	83.950	52.3583	-	64.4
1964	86.019	52.0531	-	64.8
1965	88.088	51.7480	-	65.2
1966	90.157	51.4429	-	65.5
1967	92.227	51.1378	-	65.9
1968	94.296	50.8327	-	66.3
1969	96.365	50.5276	-	66.7
1970	98.435	50.2224	71.0	67.1
1971	100.504	49.9173	-	67.5
1972	102.573	49.6122	-	67.8
1973	104.643	49.3071	-	68.2
1974	106.712	49.0020	-	68.4
1975	108.781	48.6969	-	68.7
1976	110.850	48.3917	-	69.0
1977	112.920	48.0866	-	69.3
1978	114.989	47.7815	-	69.6
1979	117.058	47.4764	78.0	69.8
1980	119.128	47.1713	-	70.1
1981	121.197	46.8661	-	70.4
1982	123.266	46.5610	-	70.8
1983	125.335	46.2559	-	67.4
1984	127.405	45.9508	-	73.6

Table 7. (Continued)

Year	School Enrollment Ratio		Adult Literacy Rate (ALR)	Life Expectancy (POPLIFE)
	Primary (AGER1MF)	Secondary (AGER2MF)		
	------(percent)-----			(year)
1985	129.474	45.6457	-	73.8
1986	131.543	45.3406	-	-
South Korea				
1960	101.926	19.4565	70.6	53.9
1961	102.026	22.3115	-	54.4
1962	102.126	25.1665	-	54.9
1963	102.226	28.0215	-	55.5
1964	102.326	30.8765	-	55.9
1965	102.426	33.7315	-	56.4
1966	102.526	36.5865	-	56.9
1967	102.626	39.4414	-	57.4
1968	102.726	42.2964	-	58.0
1969	102.826	45.1514	-	58.8
1970	102.926	48.0064	37.6	59.5
1971	103.026	50.8614	-	60.3
1972	103.126	53.7164	-	61.1
1973	103.226	56.5714	-	61.8
1974	103.326	59.4264	-	62.7
1975	103.427	62.2814	-	63.5
1976	103.527	65.1363	-	64.3
1977	103.627	67.9913	-	65.1
1978	103.727	70.8463	93.0	65.7
1979	103.827	73.7013	-	66.2
1980	103.927	76.5563	-	66.6
1981	104.027	79.4113	-	67.1
1982	104.127	82.2663	-	67.7
1983	104.227	85.1213	-	67.8
1984	104.327	87.9763	-	68.3
1985	104.427	90.8313	-	68.5
1986	105.527	93.6862	-	-
Sri Lanka				
1960	87.187	28.0626	75.0	62.3
1961	87.627	29.3270	-	62.9
1962	88.067	30.5913	-	63.5
1963	88.507	31.8557	-	63.6
1964	88.947	33.1200	-	63.8
1965	89.386	34.3844	-	63.9
1966	89.826	35.6487	-	64.1

Table 7. (Continued)

Year	School Enrollment Ratio		Adult Literacy	Life
	Primary (AGER1MF)	Secondary (AGER2MF)	Rate (ALR)	Expectancy (POPLIFE)
	------(percent)-----			(year)
1967	90.266	36.9131	-	64.2
1968	90.706	38.1774	-	64.0
1969	91.146	39.4418	-	63.7
1970	91.586	40.7062	77.6	63.5
1971	92.026	41.9705	-	63.2
1972	92.466	43.2349	-	63.0
1973	92.906	44.4992	-	63.7
1974	93.346	45.7636	-	64.4
1975	93.786	47.0279	-	65.1
1976	94.226	48.2923	-	65.8
1977	94.666	49.5566	-	66.5
1978	95.106	50.8210	-	67.0
1979	95.546	52.0854	85.0	67.6
1980	95.986	53.3497	-	68.1
1981	96.425	54.6141	-	68.7
1982	96.865	55.8784	-	69.2
1983	97.305	57.1428	-	69.4
1984	97.745	58.4071	-	69.6
1985	98.185	59.6715	-	69.8
1986	98.625	60.9359	-	-
Thailand				
1960	76.108	11.9990	67.7	52.3
1961	76.960	12.8159	-	53.0
1962	77.813	13.6329	-	53.6
1963	78.666	14.4498	-	54.2
1964	79.518	15.2668	-	54.8
1965	80.371	16.0838	-	55.3
1966	81.223	16.9007	-	55.9
1967	82.076	17.7177	-	56.4
1968	82.928	18.5347	-	57.0
1969	83.781	19.3516	-	57.6
1970	84.634	20.1686	78.6	58.2
1971	85.486	20.9856	-	58.7
1972	86.339	21.8025	-	59.3
1973	87.191	22.6195	-	59.8
1974	88.044	23.4365	-	60.1
1975	88.896	24.2534	-	60.4
1976	89.749	25.0704	-	60.7
1977	90.602	25.8874	-	61.0
1978	91.454	26.7043	-	61.4
1979	92.307	27.5213	-	61.7

Table 7. (Continued)

Year	School Enrollment Ratio		Adult Literacy Rate (ALR)	Life Expectancy (POPLIFE)
	Primary (AGER1MF)	Secondary (AGER2MF)		
	------(percent)-----			(year)
1980	93.159	28.3383	86.0	62.0
1981	94.012	29.1552	-	62.4
1982	94.864	29.9722	-	62.9
1983	95.717	30.7892	-	63.1
1984	96.570	31.6061	-	63.7
1985	97.422	32.4231	-	64.0
1986	98.275	33.2401	-	-
Turkey				
1960	88.496	13.2809	38.0	50.5
1961	89.476	14.4211	-	51.0
1962	90.455	15.5613	-	51.5
1963	91.435	16.7015	-	52.0
1964	92.414	17.8417	-	52.5
1965	93.393	18.9819	46.0	53.1
1966	94.373	20.1222	-	53.6
1967	95.352	21.2624	-	54.1
1968	96.332	22.4026	-	54.7
1969	97.311	23.5428	-	55.3
1970	98.291	24.6830	51.3	55.9
1971	99.270	25.8233	-	56.5
1972	100.249	26.9635	-	57.1
1973	101.229	28.1037	-	57.8
1974	102.208	29.2439	-	58.4
1975	103.188	30.3841	60.2	59.0
1976	104.167	31.5243	-	59.6
1977	105.147	32.6646	-	60.2
1978	106.126	33.8048	-	60.7
1979	107.105	34.9450	60.0	61.2
1980	108.085	36.0852	-	61.7
1981	109.064	37.2254	-	62.2
1982	110.044	38.3657	-	63.0
1983	111.023	39.5059	-	63.2
1984	112.003	40.6461	-	63.8
1985	112.982	41.7863	-	64.1
1986	113.961	42.9265	-	-
Zambia				
1960	49.493	3.9951	28.5	41.7
1961	51.916	4.6398	-	42.1

Table 7. (Continued)

Year	School Enrollment Ratio		Adult Literacy	Life
	Primary (AGER1MF)	Secondary (AGER2MF)	Rate (ALR)	Expectancy (POPLIFE)
	------(percent)-----			(year)
1962	54.339	5.2844	-	42.6
1963	56.763	5.9290	-	43.0
1964	59.186	6.5737	-	43.5
1965	61.609	7.2183	-	44.0
1966	64.032	7.8629	-	44.5
1967	66.455	8.5076	-	45.0
1968	68.878	9.1522	-	45.5
1969	71.301	9.7968	-	45.9
1970	73.724	10.4414	47.3	46.3
1971	76.147	11.0861	-	46.7
1972	78.570	11.7307	-	47.1
1973	80.994	12.3753	-	47.5
1974	83.417	13.0200	-	47.9
1975	85.840	13.6646	-	48.3
1976	88.263	14.3092	-	48.7
1977	90.686	14.9539	-	49.1
1978	93.109	15.5985	-	49.4
1979	95.532	16.2431	-	49.7
1980	97.955	16.8877	44.0	49.9
1981	100.378	17.5324	-	50.2
1982	102.801	18.1770	-	50.6
1983	105.225	18.8216	-	50.8
1984	107.648	19.4663	-	51.6
1985	110.071	20.1109	-	51.9
1986	112.494	20.7555	-	-

SOURCE: World Bank 1987.

Table 8. Land quality

Country	Weighted			Maximum Production of Dry Matter Irrigated Land (WMPDMI)	International Land Quality Index Agricultural Land (LQIND)
	Potential Production of Dry Matter (WPDM)	Factor for Water Deficiency (WFWD)	Develop Cost Classes (WDCC)		
Argentina	61.40	0.393	3.00	718.27	55
Brazil	20.02	0.221	1.31	1,556.73	90
Chile	61.80	0.240	3.00	101.80	50
Colombia	78.34	0.650	3.28	2,389.98	72
Dominican Republic	80.00	0.700	3.00	1,276.00	104
Egypt	82.20	0.000	0.30	31.80	68
Ghana	80.80	0.360	2.25	1,384.75	90
Ivory Coast	76.30	0.585	2.85	1,962.95	112
Malaysia	78.00	0.900	5.00	1,923.00	193
Morocco	74.00	0.160	2.40	210.60	53
Pakistan	74.66	0.094	3.38	798.34	99
Philippines	74.00	0.800	5.00	2,000.00	178
Portugal	58.20	0.490	3.50	133.10	125
South Korea	40.00	0.900	3.00	206.00	182
Sri Lanka	78.00	0.600	3.00	1,872.00	179
Thailand	75.40	0.780	3.25	1,164.85	164
Turkey	55.14	0.220	4.00	95.01	89
Zambia	88.00	0.660	3.35	2,629.15	47

SOURCE: (WPDM), (WFWD), (WMPDMI), and (WDCC) calculated from data collected from Linneman et al. 1979.

Table 9. Research stock and infrastructure

Year	Research		GDP for Transportation and Communication (AGDPTC)	Road Density (ROADDEN)
	Personnel (APERSON)	Expenditure (AEXPEND)		
	(scientist man-years)	(constant 1980 million U.S. dollars)	(billion pesos)	(km/km ²)
Argentina				
1960	-	-	0.80	-
1961	344	49.498	0.88	-
1962	420	49.306	1.11	-
1963	503	49.395	1.50	-
1964	537	50.552	1.98	-
1965	670	51.654	2.65	-
1966	703	52.756	3.69	-
1967	731	54.021	4.81	-
1968	768	58.243	5.85	-
1969	782	61.476	6.96	-
1970	795	66.688	8.60	-
1971	840	55.978	11.60	-
1972	820	61.600	18.80	-
1973	840	75.151	29.80	-
1974	880	84.328	41.80	-
1975	953	63.603	121.80	-
1976	847	61.973	640.70	-
1977	890	67.092	1,742.70	-
1978	880	75.063	4,336.40	0.07
1979	919	77.000	10,990.20	-
1980	1,065	86.569	20,383.90	0.08
1981	1,045	73.263	50,305.73	0.08
1982	1,024	53.153	123,298.93	0.08
1983	1,005	55.588	481,608.30	0.08
1984	1,062	43.176	3,676,924.54	0.08
1985	1,119	63.682	27,222,472.84	-
1986	1,156	69.340	49,603,955.02	-
			(billion cruzeiros)	
Brazil				
1960	-	-	0.20	-
1961	201	16.927	0.34	-
1962	400	22.569	0.52	-
1963	533	28.888	0.93	-
1964	711	29.899	1.69	-
1965	800	41.527	2.30	-

Table 9. (Continued)

Year	Research		GDP for Transportation and Communication (AGDPTC)	Road Density (ROADDEN)
	Personnel (APERSON)	Expenditure (AEXPEND)		
	(scientist man-years)	(constant 1980 million U.S. dollars)	(billion cruzeiros)	(km/km ²)
1966	983	47.687	2.94	-
1967	1,041	51.106	4.20	-
1968	1,350	60.008	5.30	-
1969	1,540	63.485	7.13	-
1970	1,650	66.358	9.60	-
1971	1,920	70.440	12.50	-
1972	2,051	85.167	16.90	-
1973	2,163	90.657	22.70	-
1974	2,276	114.620	32.70	-
1975	2,442	150.001	48.40	-
1976	2,529	216.274	74.20	-
1977	2,496	271.311	110.70	-
1978	2,554	299.822	160.80	0.16
1979	2,727	361.228	266.90	0.16
1980	2,935	389.740	562.30	0.16
1981	3,426	345.145	1,155.04	0.16
1982	3,714	300.549	2,278.76	0.17
1983	4,175	346.303	5,598.42	0.17
1984	4,018	364.071	18,070.45	0.17
1985	3,861	381.839	64,798.07	-
1986	4,157	399.607	171,355.94	-
			(million pesos)	
Chile				
1960	-	-	0.20	-
1961	128	4.968	0.24	-
1962	135	8.243	0.28	-
1963	121	11.518	0.38	-
1964	135	12.866	0.58	-
1965	145	13.898	0.90	-
1966	155	14.931	1.20	-
1967	175	16.910	1.59	-
1968	186	17.796	2.32	-
1969	194	18.543	3.63	-
1970	207	19.568	5.10	-
1971	217	32.769	6.50	-
1972	217	30.860	13.70	-
1973	230	22.539	70.50	-

Table 9. (Continued)

Year	Research		GDP for Transportation and Communication (AGDPTC)	Road Density (ROADDEN)
	Personnel (APERSON)	Expenditure (AEXPEND)		
	(scientist man-years)	(constant 1980 million U.S. dollars)	(million pesos)	(km/km ²)
1974	230	23.874	528.60	-
1975	236	25.693	2,023.40	-
1976	247	28.596	6,362.60	-
1977	253	28.653	15,376.90	-
1978	271	24.913	26,706.90	0.10
1979	288	23.562	39,923.30	0.10
1980	264	25.182	51,901.70	0.11
1981	268	29.581	63,742.00	0.10
1982	264	25.282	70,791.85	0.12
1983	274	24.758	83,434.48	0.12
1984	276	27.952	105,741.64	0.10
1985	306	30.798	127,986.85	-
1986	313	31.499	150,348.23	-
Columbia				
1960	-	-	1,647.80	-
1961	193	28.285	1,869.00	-
1962	209	29.146	2,333.60	-
1963	227	30.008	3,031.00	-
1964	252	30.869	3,390.00	-
1965	271	31.731	3,596.80	-
1966	290	32.592	4,457.70	-
1967	326	33.454	5,049.70	-
1968	359	34.315	6,013.30	-
1969	388	35.176	7,310.70	-
1970	413	46.793	8,881.10	-
1971	433	45.668	10,336.30	-
1972	462	43.648	11,666.90	-
1973	502	40.893	13,883.10	-
1974	559	35.225	20,551.90	-
1975	497	37.588	23,987.40	-
1976	434	33.585	32,472.80	-
1977	405	32.673	45,072.80	-
1978	376	38.047	57,471.30	0.050
1979	366	37.797	79,759.40	0.050
1980	424	36.743	108,423.90	0.065
1981	431	41.307	133,269.60	-
1982	428	37.493	170,799.25	-
1983	424	53.417	207,902.16	-

Table 9. (Continued)

Year	Research		GDP for Transportation and Communication (AGDPTC)	Road Density (ROADDEN)
	Personnel (APERSON)	Expenditure (AEXPEND)		
	(scientist man-years)	(constant 1980 million U.S. dollars)	(million pesos)	(km/km ²)
1984	456	44.735	255,501.39	-
1985	505	62.829	359,595.25	-
1986	514	62.359	472,514.04	-
Dominican Republic				
1960	-	-	33.20	-
1961	9	0.755	33.10	-
1962	10	0.820	44.40	-
1963	11	0.872	52.50	-
1964	13	0.914	65.80	-
1965	14	0.975	49.90	-
1966	17	1.043	68.40	-
1967	18	1.097	72.00	-
1968	22	1.179	86.50	-
1969	22	1.385	102.80	-
1970	23	1.483	114.80	-
1971	23	1.798	125.70	-
1972	25	1.989	144.80	-
1973	26	2.119	168.50	-
1974	29	2.370	196.70	-
1975	46	2.584	217.80	-
1976	62	2.797	238.40	-
1977	60	5.566	282.90	-
1978	64	5.503	322.30	-
1979	67	3.944	355.00	0.34
1980	106	3.474	362.30	0.34
1981	116	3.155	470.77	-
1982	123	3.961	508.60	-
1983	136	4.766	547.81	-
1984	143	4.727	664.92	-
1985	145	4.923	887.47	-
1986	140	5.119	978.34	-

Table 9. (Continued)

Year	Research		GDP for Transportation and Communication (AGDPTC)	Road Density (ROADDEN)
	Personnel (APERSON)	Expenditure (AEXPEND)		
	(scientist man-years)	(constant 1980 million U.S. dollars)	(million pounds)	(km/km ²)
Egypt				
1960	-	-	97.60	-
1961	52	12.112	109.60	-
1962	226	12.758	124.80	-
1963	569	13.768	144.40	-
1964	741	17.518	166.10	-
1965	809	19.225	186.30	-
1966	877	20.933	200.70	-
1967	1,257	28.769	160.20	-
1968	1,431	28.033	116.00	-
1969	1,533	27.268	123.60	-
1970	1,780	26.462	137.30	-
1971	1,853	25.656	145.70	-
1972	1,919	24.975	151.00	-
1973	1,986	24.352	158.60	-
1974	2,070	25.419	179.00	-
1975	2,256	26.421	260.00	-
1976	2,419	27.356	401.00	-
1977	2,565	28.193	491.00	-
1978	2,693	29.228	689.00	0.03
1979	2,821	30.427	992.00	-
1980	3,002	31.821	1,311.00	-
1981	3,237	33.217	1,818.08	-
1982	3,556	39.964	2,304.99	0.03
1983	4,181	39.277	2,949.53	0.03
1984	4,591	38.331	3,793.44	-
1985	5,000	38.499	4,959.02	-
1986	5,572	39.474	6,338.22	-
Ghana				
			(million cedis)	
1960	-	-	39.10	-
1961	73	3.950	44.48	-
1962	80	4.513	50.60	-
1963	87	4.854	51.00	-
1964	92	5.118	58.02	-
1965	100	5.537	66.00	-
1966	103	5.936	61.50	-

Table 9. (Continued)

Year	Research		GDP for Transportation and Communication (AGDPTC)	Road Density (ROADDEN)
	Personnel (APERSON)	Expenditure (AEXPEND)		
	(scientist man-years)	(constant 1980 million U.S. dollars)	(million cedis)	(km/km ²)
1967	106	6.335	60.00	-
1968	108	6.666	62.60	-
1969	112	6.945	79.00	-
1970	115	7.327	96.90	-
1971	114	6.609	112.10	-
1972	112	5.749	124.10	-
1973	109	4.890	126.80	-
1974	105	4.453	163.40	-
1975	116	4.577	206.00	-
1976	129	7.406	258.90	-
1977	130	5.102	330.60	-
1978	127	3.652	552.60	0.14
1979	123	4.691	758.40	0.14
1980	120	3.639	913.40	0.14
1981	128	3.442	1,602.40	0.14
1982	134	3.213	2,810.93	-
1983	143	3.048	5,408.09	-
1984	147	4.109	9,284.69	-
1985	151	4.025	11,115.86	-
1986	154	3.941	17,834.69	-
			(billion CFA francs)	
Ivory Coast				
1960	-	-	9.90	-
1961	53	7.052	11.30	-
1962	60	8.462	12.00	-
1963	67	9.332	15.00	-
1964	71	9.934	20.00	-
1965	80	11.073	21.00	-
1966	83	11.730	22.10	-
1967	85	12.271	23.90	-
1968	104	13.045	26.50	-
1969	110	15.642	30.80	-
1970	141	17.205	31.90	-
1971	160	18.768	37.60	-
1972	179	23.432	42.20	-
1973	180	23.988	53.10	-
1974	180	24.527	63.60	-

Table 9. (Continued)

Year	Research		GDP for Transportation and Communication (AGDPTC)	Road Density (ROADDEN)
	Personnel (APERSON)	Expenditure (AEXPEND)		
	(scientist man-years)	(constant 1980 million U.S. dollars)	(billion CFA francs)	(km/km ²)
1975	181	25.049	72.20	-
1976	182	25.553	86.00	-
1977	183	26.026	97.70	-
1978	184	26.560	134.80	-
1979	185	27.137	152.30	-
1980	186	27.761	176.00	-
1981	187	28.436	189.00	-
1982	193	29.387	193.18	0.14
1983	203	30.584	199.58	0.17
1984	205	26.697	169.76	0.17
1985	216	26.549	170.96	-
1986	237	33.351	186.81	-
			(million ringgits)	
Malaysia				
1960	-	-	292.00	-
1961	118	4.655	343.07	-
1962	124	5.924	366.64	-
1963	132	14.878	384.97	-
1964	142	19.385	416.39	-
1965	150	22.185	456.99	-
1966	158	24.446	470.08	-
1967	171	26.361	496.27	-
1968	184	27.976	532.93	-
1969	195	29.591	542.10	-
1970	206	32.107	581.00	-
1971	223	35.750	638.00	-
1972	271	41.787	755.00	-
1973	288	59.944	941.00	-
1974	367	71.271	1,123.00	-
1975	420	86.056	1,299.00	-
1976	463	61.129	1,537.00	-
1977	498	72.656	1,782.00	-
1978	526	77.259	2,043.00	16.31
1979	569	71.916	2,432.00	16.72
1980	633	90.473	3,005.00	17.40
1981	741	97.241	3,444.95	18.02
1982	829	102.490	4,063.98	18.75

Table 9. (Continued)

Year	Research		GDP for Transportation and Communication (AGDPTC)	Road Density (ROADDEN)
	Personnel (APERSON)	Expenditure (AEXPEND)		
	(scientist man-years)	(constant 1980 million U.S. dollars)	(million ringgits)	(km/km ²)
1983	862	110.776	4,645.04	20.60
1984	932	108.538	5,492.18	22.00
1985	1,000	113.315	6,403.95	-
1986	1,065	118.093	7,453.53	-
			(million dirhams)	
Morocco				
1960	-	-	0.27	-
1961	78	1.033	0.30	-
1962	83	2.110	0.33	-
1963	127	3.186	0.36	-
1964	121	4.263	0.40	-
1965	114	5.339	0.45	-
1966	108	6.416	0.50	-
1967	103	7.492	0.54	-
1968	110	8.569	0.58	-
1969	116	9.645	0.71	-
1970	124	10.722	0.78	-
1971	130	11.798	0.83	-
1972	123	12.875	0.90	-
1973	101	13.951	1.00	-
1974	98	16.881	1.34	-
1975	103	17.278	1.06	-
1976	137	17.646	1.65	-
1977	152	18.071	1.87	-
1978	189	18.557	2.76	-
1979	199	19.016	2.48	0.09
1980	264	19.475	2.81	0.09
1981	242	20.013	3.07	-
1982	212	21.955	3.60	-
1983	230	23.896	4.73	0.08
1984	212	31.724	4.76	-
1985	191	26.869	5.28	-
1986	178	27.946	5.92	-

Table 9. (Continued)

Year	Research		GDP for Transportation and Communication (AGDPTC)	Road Density (ROADDEN)
	Personnel (APERSON)	Expenditure (AEXPEND)		
	(scientist man-years)	(constant 1980 million U.S. dollars)	(million rupees)	(km/km ²)
Pakistan				
1960	-	-	946.00	-
1961	826	9.936	1,089.80	-
1962	928	11.412	1,093.91	-
1963	1,029	12.710	1,170.94	-
1964	1,131	13.317	1,273.66	-
1965	1,232	13.865	1,824.00	-
1966	1,334	14.414	1,979.41	-
1967	1,403	15.136	2,279.74	-
1968	1,533	13.165	2,474.00	-
1969	1,648	10.423	2,628.37	-
1970	1,753	9.222	2,943.00	-
1971	1,848	11.390	3,014.00	-
1972	1,934	12.072	3,250.00	-
1973	2,008	11.851	4,261.00	-
1974	2,107	21.137	5,587.00	-
1975	2,227	35.394	7,404.00	-
1976	2,378	39.272	8,338.00	-
1977	2,571	36.498	9,252.00	-
1978	2,834	41.489	11,260.00	0.047
1979	2,727	46.699	13,151.00	0.047
1980	2,608	48.525	15,451.00	0.109
1981	2,513	43.633	19,035.00	0.049
1982	2,819	45.848	22,024.68	0.116
1983	3,013	48.063	25,148.13	0.119
1984	3,431	50.279	29,506.61	0.125
1985	4,086	52.494	33,688.52	-
1986	5,057	54.709	38,024.88	-
			(million pesos)	
Philippines				
1960	-	-	642.00	-
1961	119	15.070	681.09	-
1962	165	15.615	738.79	-
1963	219	16.472	800.04	-
1964	294	18.253	862.08	-
1965	334	19.648	937.00	-
1966	367	21.044	1,046.89	-

Table 9. (Continued)

Year	Research		GDP for Transportation and Communication (AGDPTC)	Road Density (ROADDEN)
	Personnel (APERSON)	Expenditure (AEXPEND)		
	(scientist man-years)	(constant 1980 million U.S. dollars)	(million pesos)	(km/km ²)
1967	393	23.595	1,163.90	-
1968	419	27.836	1,270.95	-
1969	464	29.790	1,343.33	-
1970	538	36.318	1,783.00	-
1971	817	35.297	2,172.00	-
1972	921	40.464	2,418.00	-
1973	985	52.248	2,913.00	-
1974	1,128	46.731	3,664.00	-
1975	1,215	35.284	4,771.00	-
1976	1,282	42.584	6,072.00	-
1977	1,390	38.051	8,500.00	-
1978	1,416	38.671	9,894.00	1.41
1979	1,440	29.374	12,377.00	0.49
1980	1,465	28.704	16,444.00	0.51
1981	1,492	41.061	19,618.00	0.51
1982	1,729	32.056	22,363.19	0.51
1983	1,890	24.624	26,326.68	-
1984	2,052	22.561	36,145.62	0.52
1985	2,438	23.168	42,727.27	-
1986	2,898	35.976	46,454.28	-
			(million escudos)	
Portugal				
1960	-	-	3,600.00	-
1961	293	5.802	4,000.00	-
1962	299	5.623	4,100.00	-
1963	306	8.943	4,700.00	-
1964	314	10.498	4,900.00	-
1965	321	11.693	5,200.00	-
1966	329	12.683	6,000.00	-
1967	336	13.506	6,700.00	-
1968	342	14.329	7,700.00	-
1969	350	15.655	9,200.00	-
1970	358	17.665	10,500.00	-
1971	366	21.384	11,600.00	-
1972	376	16.678	13,300.00	-
1973	370	18.169	15,800.00	-
1974	363	19.394	19,800.00	-

Table 9. (Continued)

Year	Research		GDP for Transportation and Communication (AGDPTC)	Road Density (ROADDEN)
	Personnel (APERSON)	Expenditure (AEXPEND)		
	(scientist man-years)	(constant 1980 million U.S. dollars)	(million escudos)	(km/km ²)
1975	357	20.618	23,700.00	-
1976	351	22.643	19,387.50	-
1977	366	23.366	20,559.56	-
1978	379	24.089	21,731.62	0.57
1979	392	23.880	22,903.68	0.58
1980	404	23.669	24,075.74	0.58
1981	420	23.454	25,247.79	-
1982	438	23.239	26,419.85	-
1983	445	23.035	27,591.91	-
1984	452	22.837	28,763.97	-
1985	460	26.884	29,936.03	-
1986	462	27.596	31,108.09	-
			(billion won)	
South Korea				
1960	-	-	11.30	-
1961	460	2.335	14.15	-
1962	499	4.456	17.22	-
1963	521	8.650	19.97	-
1964	578	11.804	24.14	-
1965	622	12.658	32.69	-
1966	666	13.512	50.80	-
1967	747	21.265	71.09	-
1968	786	23.075	98.85	-
1969	819	24.422	119.91	-
1970	864	26.694	182.30	-
1971	757	31.102	224.20	-
1972	831	29.510	270.10	-
1973	969	22.794	365.10	-
1974	981	22.920	466.00	-
1975	992	24.327	606.70	-
1976	998	26.491	787.90	-
1977	911	23.181	1,017.20	-
1978	1,029	27.118	1,388.90	0.46
1979	1,027	29.136	1,705.10	0.47
1980	1,296	30.663	2,146.30	0.47
1981	1,334	31.015	2,980.80	0.51
1982	1,361	39.347	3,345.68	0.54

Table 9. (Continued)

Year	Research		GDP for Transportation and Communication (AGDPTC)	Road Density (ROADDEN)
	Personnel (APERSON)	Expenditure (AEXPEND)		
	(scientist man-years)	(constant 1980 million U.S. dollars)	(billion won)	(km/km ²)
1983	1,373	54.346	3,893.15	0.55
1984	1,355	53.897	4,330.80	0.51
1985	1,394	71.217	4,805.15	-
1986	1,433	84.064	5,476.11	-
			(million rupees)	
Sri Lanka				
1960	-	-	641.00	-
1961	40	6.544	632.26	-
1962	45	7.207	692.32	-
1963	51	7.870	695.60	-
1964	61	8.533	770.95	-
1965	67	9.196	847.00	-
1966	73	9.858	904.85	-
1967	90	11.325	907.03	-
1968	104	12.454	1,024.91	-
1969	114	13.246	1,156.98	-
1970	124	14.713	1,258.00	-
1971	147	13.985	1,270.00	-
1972	148	13.451	1,405.00	-
1973	148	12.917	1,596.00	-
1974	149	11.563	1,853.00	-
1975	182	12.190	2,079.00	-
1976	193	13.133	2,286.00	-
1977	247	17.169	2,723.00	-
1978	245	18.865	2,994.00	0.48
1979	243	20.033	4,744.00	-
1980	241	19.495	5,293.00	-
1981	291	20.517	7,307.00	-
1982	310	21.379	8,780.97	-
1983	391	22.562	10,139.93	-
1984	503	21.788	12,377.46	-
1985	679	22.451	13,649.11	-
1986	958	23.114	15,393.81	-

Table 9. (Continued)

Year	Research		GDP for Transportation and Communication (AGDPTC)	Road Density (ROADDEN)
	Personnel (APERSON)	Expenditure (AEXPEND)		
	(scientist man-years)	(constant 1980 million U.S. dollars)	(million baht)	(km/km ²)
Thailand				
1960	-	-	4,000.00	-
1961	228	11.775	3,800.00	-
1962	256	17.617	4,100.00	-
1963	287	25.272	4,300.00	-
1964	307	34.697	4,800.00	-
1965	350	45.498	6,000.00	-
1966	392	56.857	6,100.00	-
1967	418	67.550	6,800.00	-
1968	475	72.858	7,200.00	-
1969	492	76.914	7,500.00	-
1970	507	83.473	8,600.00	-
1971	522	83.165	9,000.00	-
1972	536	66.545	10,500.00	-
1973	554	50.717	13,200.00	-
1974	574	38.115	16,000.00	-
1975	596	56.165	18,800.00	-
1976	1,280	55.158	21,800.00	-
1977	1,320	62.226	24,700.00	-
1978	1,341	59.340	29,600.00	0.120
1979	1,429	52.523	37,800.00	0.124
1980	1,532	63.845	45,300.00	0.131
1981	1,668	71.764	57,100.00	0.132
1982	1,846	79.013	61,519.69	0.140
1983	2,074	84.935	68,161.20	0.144
1984	2,366	98.496	74,873.27	0.148
1985	2,739	116.834	80,681.09	-
1986	3,219	141.684	86,183.32	-
			(million liras)	
Turkey				
1960	-	-	3,200.00	-
1961	149	15.174	3,555.56	-
1962	200	18.357	4,029.63	-
1963	266	21.539	4,503.70	-
1964	267	24.722	4,977.78	-
1965	397	27.904	5,900.00	-
1966	411	31.087	6,276.60	-

Table 9. (Continued)

Year	Research		GDP for Transportation and Communication (AGDPTC)	Road Density (ROADDEN)
	Personnel (APERSON)	Expenditure (AEXPEND)		
	(scientist man-years)	(constant 1980 million U.S. dollars)	(million liras)	(km/km ²)
1967	424	18.758	7,280.85	-
1968	440	28.537	8,661.70	-
1969	460	38.316	9,414.89	-
1970	479	48.095	11,700.00	-
1971	485	46.473	14,900.00	-
1972	503	49.449	18,000.00	-
1973	520	52.425	25,300.00	-
1974	540	63.951	35,500.00	-
1975	651	68.275	43,300.00	-
1976	731	69.069	54,800.00	-
1977	796	114.513	72,200.00	-
1978	850	84.491	110,100.00	0.30
1979	904	67.298	223,800.00	0.29
1980	993	45.934	409,200.00	0.30
1981	1,133	52.617	623,300.00	0.30
1982	1,424	82.007	822,523.08	0.38
1983	1,549	85.189	1,105,857.04	0.39
1984	1,642	88.372	1,755,789.03	-
1985	1,800	91.554	2,539,555.84	-
1986	1,876	94.737	3,664,919.93	-
			(million kwacha)	
Zambia				
1960	-	-	24.60	-
1961	13	2.683	23.41	-
1962	17	2.734	23.53	-
1963	21	2.786	23.41	-
1964	27	2.837	24.60	-
1965	29	2.888	34.20	-
1966	32	2.940	36.31	-
1967	43	2.497	52.14	-
1968	46	2.439	48.66	-
1969	49	2.377	54.89	-
1970	53	2.323	48.80	-
1971	72	3.796	62.30	-
1972	79	3.536	63.50	-
1973	66	3.201	64.90	-
1974	85	3.167	76.30	-

Table 9. (Continued)

Year	Research		GDP for Transportation and Communication (AGDPTC)	Road Density (ROADDEN)
	Personnel (APERSON)	Expenditure (AEXPEND)		
	(scientist man-years)	(constant 1980 million U.S. dollars)	(million kwacha)	(km/km ²)
1975	76	4.309	88.50	-
1976	85	4.273	118.50	-
1977	61	4.216	134.40	-
1978	62	4.179	142.10	0.05
1979	56	3.851	162.80	0.05
1980	78	4.483	193.00	-
1981	81	3.558	196.00	0.05
1982	90	6.110	234.85	-
1983	116	1.974	254.22	-
1984	123	3.081	306.41	-
1985	138	2.249	419.55	-
1986	153	3.967	665.24	-

SOURCES: Pardey and Roseboom 1989; Boyce and Evenson 1983; U.N. annual statistics; World Bank 1976, 1984, 1987; IRF 1982, 1984.

Table 7. (Continued)

Year	School Enrollment Ratio		Adult Literacy	Life
	Primary (AGER1MF)	Secondary (AGER2MF)	Rate (ALR)	Expectancy (POPLIFE)
	(percent)			(year)
1985	112.229	65.1247	-	70.4
1986	112.048	66.8007	-	-
Colombia				
1960	84.198	11.8141	63.0	53.1
1961	86.063	13.4370	-	53.4
1962	87.928	15.0599	-	53.7
1963	89.793	16.6828	-	54.3
1964	91.658	18.3057	-	55.1
1965	93.523	19.9286	-	55.9
1966	95.388	21.5515	-	56.7
1967	97.253	23.1744	-	57.5
1968	99.118	24.7973	-	58.1
1969	100.983	26.4203	-	58.5
1970	102.848	28.0432	80.8	58.9
1971	104.713	29.6661	-	59.2
1972	106.578	31.2890	-	59.6
1973	108.443	32.9119	-	60.0
1974	110.307	34.5348	-	60.4
1975	112.172	36.1577	-	60.8
1976	114.037	37.7806	-	61.2
1977	115.902	39.4035	-	61.6
1978	117.767	41.0264	-	62.0
1979	119.632	42.6493	-	62.4
1980	121.497	44.2723	81.0	62.9
1981	123.362	45.8952	-	63.3
1982	125.227	47.5181	-	64.0
1983	127.092	49.1410	-	64.1
1984	128.957	50.7639	-	64.7
1985	130.822	52.3868	-	64.9
1986	132.687	54.0097	-	-
Dominican Republic				
1960	88.810	4.6170	64.5	50.9
1961	89.925	6.5259	-	51.6
1962	91.040	8.4348	-	52.3
1963	92.155	10.3436	-	52.9
1964	93.271	12.2525	-	53.4
1965	94.386	14.1614	-	54.0
1966	95.501	16.0703	-	54.5

Table 7. (Continued)

Year	School Enrollment Ratio		Adult Literacy	Life
	Primary (AGER1MF)	Secondary (AGER2MF)	Rate (ALR)	Expectancy (POPLIFE)
	------(percent)-----			(year)
1967	96.616	17.9792	-	55.1
1968	97.732	19.8881	-	55.6
1969	98.847	21.7970	-	56.1
1970	99.962	23.7059	67.2	56.6
1971	101.078	25.6148	-	57.1
1972	102.193	27.5237	-	57.7
1973	103.308	29.4326	-	58.1
1974	104.423	31.3415	-	58.6
1975	105.539	33.2504	-	59.1
1976	106.654	35.1593	-	59.5
1977	107.769	37.0681	-	60.0
1978	108.884	38.9770	67.0	60.5
1979	110.000	40.8859	-	61.0
1980	111.115	42.7948	67.0	61.4
1981	112.230	44.7037	-	61.9
1982	113.346	46.6126	-	62.6
1983	114.461	48.5215	-	62.8
1984	115.576	50.4304	-	63.6
1985	116.691	52.3393	-	64.4
1986	117.807	54.2482	-	-
Egypt				
1960	65.582	16.3386	25.8	46.1
1961	66.280	18.1424	-	46.6
1962	66.979	19.9462	-	47.1
1963	67.678	21.7499	-	47.6
1964	68.377	23.5537	-	48.1
1965	69.075	25.3575	-	48.5
1966	69.774	27.1613	-	49.0
1967	70.473	28.9651	-	49.5
1968	71.172	30.7689	-	50.0
1969	71.870	32.5726	-	50.4
1970	72.569	34.3764	-	50.9
1971	73.268	36.1802	-	51.4
1972	73.967	37.9840	-	51.8
1973	74.666	39.7878	-	52.4
1974	75.364	41.5916	-	53.1
1975	76.063	43.3953	-	53.8
1976	76.762	45.1991	38.2	54.6
1977	77.461	47.0029	44.0	55.3
1978	78.159	48.8067	-	55.9
1979	78.858	50.6105	-	56.4

Table 7. (Continued)

Year	School Enrollment Ratio		Adult Literacy Rate (ALR)	Life Expectancy (POPLIFE)
	Primary (AGER1MF)	Secondary (AGER2MF)		
	------(percent)-----			(year)
1980	79.557	52.4143	-	56.9
1981	80.256	54.2180	44.0	57.4
1982	90.954	56.0218	-	58.1
1983	81.653	57.8256	-	58.3
1984	82.352	59.6294	-	60.4
1985	83.051	61.4332	-	60.7
1986	83.749	63.2370	-	-
Ghana				
1960	52.736	7.1205	27.0	45.0
1961	53.688	8.5602	-	45.4
1962	54.640	9.9998	-	45.8
1963	55.592	11.4394	-	46.2
1964	56.544	12.8790	-	46.6
1965	57.496	14.3187	-	47.0
1966	58.447	15.7583	-	47.4
1967	59.399	17.1979	-	47.8
1968	60.351	18.6376	-	48.2
1969	61.303	20.0772	-	48.6
1970	62.255	21.5168	30.2	49.0
1971	63.207	22.9564	-	49.4
1972	64.159	24.3961	-	49.8
1973	65.111	25.8357	-	50.1
1974	66.063	27.2753	-	50.3
1975	67.014	28.7150	-	50.5
1976	67.966	30.1546	-	50.7
1977	68.918	31.5942	-	50.9
1978	69.870	33.0338	-	51.1
1979	70.822	34.4735	-	51.3
1980	71.774	35.9131	-	51.5
1981	72.726	37.3527	-	51.7
1982	73.678	38.7923	-	52.0
1983	74.630	40.2320	-	52.5
1984	75.581	41.6716	-	52.9
1985	76.533	43.1112	-	53.2
1986	77.485	44.5509	-	-
Ivory Coast				
1960	46.539	1.8307	5.0	41.5
1961	47.883	2.6110	-	41.8

Table 7. (Continued)

Year	School Enrollment Ratio		Adult Literacy	Life
	Primary (AGER1MF)	Secondary (AGER2MF)	Rate (ALR)	Expectancy (POPLIFE)
	----- (percent) -----			(year)
1962	49.226	3.3912	-	42.2
1963	50.570	4.1715	-	42.6
1964	51.914	4.9517	-	43.1
1965	53.257	5.7320	-	43.6
1966	54.601	6.5122	-	44.1
1967	55.944	7.2925	-	44.5
1968	57.288	8.0727	-	45.0
1969	58.632	8.8530	-	45.5
1970	59.975	9.6332	20.0	45.9
1971	61.319	10.4135	-	46.4
1972	62.662	11.1937	-	46.9
1973	64.006	11.9740	-	47.3
1974	65.350	12.7542	-	47.6
1975	66.693	13.5345	-	47.8
1976	68.037	14.3147	-	48.1
1977	69.380	15.0950	-	48.4
1978	70.724	15.8752	-	48.9
1979	72.068	16.6554	-	49.4
1980	73.411	17.4357	35.0	50.0
1981	74.755	18.2159	-	50.6
1982	76.098	18.9962	-	51.5
1983	77.442	19.7764	-	51.4
1984	78.786	20.5567	-	52.4
1985	80.129	21.3369	-	52.7
1986	81.473	22.1172	-	-
Malaysia				
1960	89.946	21.0394	52.8	53.9
1961	90.164	22.4252	-	54.7
1962	90.382	23.8110	-	55.4
1963	90.599	25.1967	-	56.1
1964	90.817	26.5825	-	56.8
1965	91.035	27.9683	-	57.6
1966	91.253	29.3541	-	58.3
1967	91.471	30.7399	-	59.0
1968	91.688	32.1257	-	59.7
1969	91.906	33.5115	-	60.5
1970	92.124	34.8973	58.5	61.2
1971	92.342	36.2831	-	61.9
1972	92.560	37.6689	-	62.6
1973	92.778	39.0547	-	63.2
1974	92.995	40.4404	-	63.7

Table 7. (Continued)

Year	School Enrollment Ratio		Adult Literacy	Life
	Primary (AGER1MF)	Secondary (AGER2MF)	Rate (ALR)	Expectancy (POPLIFE)
	----- (percent) -----			(year)
1975	93.213	41.8262	-	64.1
1976	93.431	43.2120	-	64.6
1977	93.649	44.5978	-	65.0
1978	93.867	45.9836	-	65.4
1979	94.085	47.3694	-	65.7
1980	94.302	48.7552	60.0	66.1
1981	94.520	50.1410	-	66.4
1982	94.738	51.5268	-	66.9
1983	94.956	52.9126	-	67.0
1984	95.174	54.2983	-	68.6
1985	95.391	55.6841	-	67.6
1986	95.609	57.0699	-	-
Morocco				
1960	44.003	3.2395	13.8	46.7
1961	45.585	4.2891	-	47.2
1962	47.168	5.3386	-	47.7
1963	48.751	6.3882	-	48.2
1964	50.334	7.4378	-	48.7
1965	51.917	8.4873	-	49.1
1966	53.500	9.5369	-	49.6
1967	55.082	10.5864	-	50.1
1968	56.665	11.6360	-	50.6
1969	58.248	12.6856	-	51.1
1970	59.831	13.7351	21.4	51.6
1971	61.414	14.7847	-	52.1
1972	62.996	15.8342	-	52.7
1973	64.579	16.8838	-	53.2
1974	66.162	17.9334	-	53.8
1975	67.745	18.9829	-	54.3
1976	69.328	20.0325	-	54.9
1977	70.911	21.0820	-	55.5
1978	72.493	22.1316	-	56.0
1979	74.076	23.1812	-	56.5
1980	75.659	24.2307	28.0	57.0
1981	77.242	25.2803	-	57.5
1982	78.825	26.3298	-	58.3
1983	80.408	27.3794	-	57.9
1984	81.990	28.4290	-	58.9
1985	83.573	29.4785	-	59.3
1986	85.156	30.5281	-	-

Table 7. (Continued)

Year	School Enrollment Ratio		Adult Literacy Rate (ALR)	Life Expectancy (POPLIFE)
	Primary (AGER1MF)	Secondary (AGER2MF)		
	------(percent)-----			(year)
Pakistan				
1960	35.341	11.1875	15.4	43.1
1961	35.859	11.3831	-	43.6
1962	36.377	11.5787	-	44.1
1963	36.894	11.7743	-	44.5
1964	37.412	11.9699	-	44.7
1965	37.930	12.1655	-	45.0
1966	38.447	12.3611	-	45.2
1967	38.965	12.5567	-	45.4
1968	39.483	12.7523	-	45.6
1969	40.000	12.9479	-	45.8
1970	40.518	13.1435	20.7	46.0
1971	41.035	13.3391	-	46.2
1972	41.553	13.5346	-	46.4
1973	42.071	13.7302	-	46.7
1974	42.588	13.9258	-	47.0
1975	43.106	14.1214	-	47.3
1976	43.624	14.3170	-	47.6
1977	44.141	14.5126	-	47.9
1978	44.659	14.7082	-	48.2
1979	45.176	14.9038	24.0	48.6
1980	45.694	15.0994	-	49.0
1981	46.212	15.2950	-	49.4
1982	46.729	15.4906	-	50.0
1983	47.247	15.6862	-	50.2
1984	47.765	15.8818	-	55.6
1985	48.282	16.0774	-	50.9
1986	48.800	16.2730	-	-
Philippines				
1960	103.053	30.7486	71.9	52.8
1961	103.339	32.3380	-	53.5
1962	103.626	33.9275	-	54.2
1963	103.912	35.5169	-	54.7
1964	104.198	37.1064	-	55.0
1965	104.484	38.6958	-	55.3
1966	104.770	40.2853	-	55.7
1967	105.057	41.8747	-	56.0
1968	105.343	43.4641	-	56.3
1969	105.629	45.0536	-	56.7
1970	105.915	46.6430	82.6	57.0
1971	106.201	48.2325	-	57.4

Table 7. (Continued)

Year	School Enrollment Ratio		Adult Literacy	Life
	Primary (AGER1MF)	Secondary (AGER2MF)	Rate (ALR)	Expectancy (POPLIFE)
	------(percent)-----			(year)
1972	106.488	49.8219	-	57.7
1973	106.774	51.4114	-	58.1
1974	107.060	53.0008	-	58.5
1975	107.346	54.5903	-	58.9
1976	107.632	56.1797	-	59.3
1977	107.918	57.7692	-	59.7
1978	108.205	59.3586	-	60.1
1979	108.491	60.9481	75.0	60.5
1980	108.777	62.5375	-	60.9
1981	109.063	64.1270	-	61.3
1982	109.349	65.7164	-	61.9
1983	109.635	67.3058	-	62.3
1984	109.922	68.8953	-	62.7
1985	110.208	70.4847	-	62.9
1986	110.494	72.0742	-	-
Portugal				
1960	77.742	53.2736	62.9	63.3
1961	79.811	52.9685	-	63.6
1962	81.880	52.6634	-	64.0
1963	83.950	52.3583	-	64.4
1964	86.019	52.0531	-	64.8
1965	88.088	51.7480	-	65.2
1966	90.157	51.4429	-	65.5
1967	92.227	51.1378	-	65.9
1968	94.296	50.8327	-	66.3
1969	96.365	50.5276	-	66.7
1970	98.435	50.2224	71.0	67.1
1971	100.504	49.9173	-	67.5
1972	102.573	49.6122	-	67.8
1973	104.643	49.3071	-	68.2
1974	106.712	49.0020	-	68.4
1975	108.781	48.6969	-	68.7
1976	110.850	48.3917	-	69.0
1977	112.920	48.0866	-	69.3
1978	114.989	47.7815	-	69.6
1979	117.058	47.4764	78.0	69.8
1980	119.128	47.1713	-	70.1
1981	121.197	46.8661	-	70.4
1982	123.266	46.5610	-	70.8
1983	125.335	46.2559	-	67.4
1984	127.405	45.9508	-	73.6

Table 7. (Continued)

Year	School Enrollment Ratio		Adult Literacy Rate (ALR)	Life Expectancy (POPLIFE)
	Primary (AGER1MF)	Secondary (AGER2MF)		
	----- (percent) -----			(year)
1985	129.474	45.6457	-	73.8
1986	131.543	45.3406	-	-
South Korea				
1960	101.926	19.4565	70.6	53.9
1961	102.026	22.3115	-	54.4
1962	102.126	25.1665	-	54.9
1963	102.226	28.0215	-	55.5
1964	102.326	30.8765	-	55.9
1965	102.426	33.7315	-	56.4
1966	102.526	36.5865	-	56.9
1967	102.626	39.4414	-	57.4
1968	102.726	42.2964	-	58.0
1969	102.826	45.1514	-	58.8
1970	102.926	48.0064	37.6	59.5
1971	103.026	50.8614	-	60.3
1972	103.126	53.7164	-	61.1
1973	103.226	56.5714	-	61.8
1974	103.326	59.4264	-	62.7
1975	103.427	62.2814	-	63.5
1976	103.527	65.1363	-	64.3
1977	103.627	67.9913	-	65.1
1978	103.727	70.8463	93.0	65.7
1979	103.827	73.7013	-	66.2
1980	103.927	76.5563	-	66.6
1981	104.027	79.4113	-	67.1
1982	104.127	82.2663	-	67.7
1983	104.227	85.1213	-	67.8
1984	104.327	87.9763	-	68.3
1985	104.427	90.8313	-	68.5
1986	105.527	93.6862	-	-
Sri Lanka				
1960	87.187	28.0626	75.0	62.3
1961	87.627	29.3270	-	62.9
1962	88.067	30.5913	-	63.5
1963	88.507	31.8557	-	63.6
1964	88.947	33.1200	-	63.8
1965	89.386	34.3844	-	63.9
1966	89.826	35.6487	-	64.1

Table 7. (Continued)

Year	School Enrollment Ratio		Adult Literacy	Life
	Primary (AGER1MF)	Secondary (AGER2MF)	Rate (ALR)	Expectancy (POPLIFE)
	------(percent)-----			(year)
1967	90.266	36.9131	-	64.2
1968	90.706	38.1774	-	64.0
1969	91.146	39.4418	-	63.7
1970	91.586	40.7062	77.6	63.5
1971	92.026	41.9705	-	63.2
1972	92.466	43.2349	-	63.0
1973	92.906	44.4992	-	63.7
1974	93.346	45.7636	-	64.4
1975	93.786	47.0279	-	65.1
1976	94.226	48.2923	-	65.8
1977	94.666	49.5566	-	66.5
1978	95.106	50.8210	-	67.0
1979	95.546	52.0854	85.0	67.6
1980	95.986	53.3497	-	68.1
1981	96.425	54.6141	-	68.7
1982	96.865	55.8784	-	69.2
1983	97.305	57.1428	-	69.4
1984	97.745	58.4071	-	69.6
1985	98.185	59.6715	-	69.8
1986	98.625	60.9359	-	-
Thailand				
1960	76.108	11.9990	67.7	52.3
1961	76.960	12.8159	-	53.0
1962	77.813	13.6329	-	53.6
1963	78.666	14.4498	-	54.2
1964	79.518	15.2668	-	54.8
1965	80.371	16.0838	-	55.3
1966	81.223	16.9007	-	55.9
1967	82.076	17.7177	-	56.4
1968	82.928	18.5347	-	57.0
1969	83.781	19.3516	-	57.6
1970	84.634	20.1686	78.6	58.2
1971	85.486	20.9856	-	58.7
1972	86.339	21.8025	-	59.3
1973	87.191	22.6195	-	59.8
1974	88.044	23.4365	-	60.1
1975	88.896	24.2534	-	60.4
1976	89.749	25.0704	-	60.7
1977	90.602	25.8874	-	61.0
1978	91.454	26.7043	-	61.4
1979	92.307	27.5213	-	61.7

Table 7. (Continued)

Year	School Enrollment Ratio		Adult Literacy Rate (ALR)	Life Expectancy (POPLIFE)
	Primary (AGER1MF)	Secondary (AGER2MF)		
	------(percent)-----			(year)
1980	93.159	28.3383	86.0	62.0
1981	94.012	29.1552	-	62.4
1982	94.864	29.9722	-	62.9
1983	95.717	30.7892	-	63.1
1984	96.570	31.6061	-	63.7
1985	97.422	32.4231	-	64.0
1986	98.275	33.2401	-	-
Turkey				
1960	88.496	13.2809	38.0	50.5
1961	89.476	14.4211	-	51.0
1962	90.455	15.5613	-	51.5
1963	91.435	16.7015	-	52.0
1964	92.414	17.8417	-	52.5
1965	93.393	18.9819	46.0	53.1
1966	94.373	20.1222	-	53.6
1967	95.352	21.2624	-	54.1
1968	96.332	22.4026	-	54.7
1969	97.311	23.5428	-	55.3
1970	98.291	24.6830	51.3	55.9
1971	99.270	25.8233	-	56.5
1972	100.249	26.9635	-	57.1
1973	101.229	28.1037	-	57.8
1974	102.208	29.2439	-	58.4
1975	103.188	30.3841	60.2	59.0
1976	104.167	31.5243	-	59.6
1977	105.147	32.6646	-	60.2
1978	106.126	33.8048	-	60.7
1979	107.105	34.9450	60.0	61.2
1980	108.085	36.0852	-	61.7
1981	109.064	37.2254	-	62.2
1982	110.044	38.3657	-	63.0
1983	111.023	39.5059	-	63.2
1984	112.003	40.6461	-	63.8
1985	112.982	41.7863	-	64.1
1986	113.961	42.9265	-	-
Zambia				
1960	49.493	3.9951	28.5	41.7
1961	51.916	4.6398	-	42.1

Table 7. (Continued)

Year	School Enrollment Ratio		Adult Literacy	Life
	Primary (AGER1MF)	Secondary (AGER2MF)	Rate (ALR)	Expectancy (POPLIFE)
	------(percent)-----			(year)
1962	54.339	5.2844	-	42.6
1963	56.763	5.9290	-	43.0
1964	59.186	6.5737	-	43.5
1965	61.609	7.2183	-	44.0
1966	64.032	7.8629	-	44.5
1967	66.455	8.5076	-	45.0
1968	68.878	9.1522	-	45.5
1969	71.301	9.7968	-	45.9
1970	73.724	10.4414	47.3	46.3
1971	76.147	11.0861	-	46.7
1972	78.570	11.7307	-	47.1
1973	80.994	12.3753	-	47.5
1974	83.417	13.0200	-	47.9
1975	85.840	13.6646	-	48.3
1976	88.263	14.3092	-	48.7
1977	90.686	14.9539	-	49.1
1978	93.109	15.5985	-	49.4
1979	95.532	16.2431	-	49.7
1980	97.955	16.8877	44.0	49.9
1981	100.378	17.5324	-	50.2
1982	102.801	18.1770	-	50.6
1983	105.225	18.8216	-	50.8
1984	107.648	19.4663	-	51.6
1985	110.071	20.1109	-	51.9
1986	112.494	20.7555	-	-

SOURCE: World Bank 1987.

Table 8. Land quality

Country	Weighted			Maximum Production of Dry Matter Irrigated Land (WMPDMI)	International Land Quality Index Agricultural Land (LQIND)
	Potential Production of Dry Matter (WPDM)	Factor for Water Deficiency (WFWD)	Develop Cost Classes (WDCC)		
Argentina	61.40	0.393	3.00	718.27	55
Brazil	20.02	0.221	1.31	1,556.73	90
Chile	61.80	0.240	3.00	101.80	50
Colombia	78.34	0.650	3.28	2,389.98	72
Dominican Republic	80.00	0.700	3.00	1,276.00	104
Egypt	82.20	0.000	0.30	31.80	68
Ghana	80.80	0.360	2.25	1,384.75	90
Ivory Coast	76.30	0.585	2.85	1,962.95	112
Malaysia	78.00	0.900	5.00	1,923.00	193
Morocco	74.00	0.160	2.40	210.60	53
Pakistan	74.66	0.094	3.38	798.34	99
Philippines	74.00	0.800	5.00	2,000.00	178
Portugal	58.20	0.490	3.50	133.10	125
South Korea	40.00	0.900	3.00	206.00	182
Sri Lanka	78.00	0.600	3.00	1,872.00	179
Thailand	75.40	0.780	3.25	1,164.85	164
Turkey	55.14	0.220	4.00	95.01	89
Zambia	88.00	0.660	3.35	2,629.15	47

SOURCE: (WPDM), (WFWD), (WMPDMI), and (WDCC) calculated from data collected from Linneman et al. 1979.

Table 9. Research stock and infrastructure

Year	Research		GDP for Transportation and Communication (AGDPTC)	Road Density (ROADDEN)
	Personnel (APERSON)	Expenditure (AEXPEND)		
	(scientist man-years)	(constant 1980 million U.S. dollars)	(billion pesos)	(km/km ²)
Argentina				
1960	-	-	0.80	-
1961	344	49.498	0.88	-
1962	420	49.306	1.11	-
1963	503	49.395	1.50	-
1964	537	50.552	1.98	-
1965	670	51.654	2.65	-
1966	703	52.756	3.69	-
1967	731	54.021	4.81	-
1968	768	58.243	5.85	-
1969	782	61.476	6.96	-
1970	795	66.688	8.60	-
1971	840	55.978	11.60	-
1972	820	61.600	18.80	-
1973	840	75.151	29.80	-
1974	880	84.328	41.80	-
1975	953	63.603	121.80	-
1976	847	61.973	640.70	-
1977	890	67.092	1,742.70	-
1978	880	75.063	4,336.40	0.07
1979	919	77.000	10,990.20	-
1980	1,065	86.569	20,383.90	0.08
1981	1,045	73.263	50,305.73	0.08
1982	1,024	53.153	123,298.93	0.08
1983	1,005	55.588	481,608.30	0.08
1984	1,062	43.176	3,676,924.54	0.08
1985	1,119	63.682	27,222,472.84	-
1986	1,156	69.340	49,603,955.02	-
			(billion cruzeiros)	
Brazil				
1960	-	-	0.20	-
1961	201	16.927	0.34	-
1962	400	22.569	0.52	-
1963	533	28.888	0.93	-
1964	711	29.899	1.69	-
1965	800	41.527	2.30	-

Table 9. (Continued)

Year	Research		GDP for Transportation and Communication (AGDPTC)	Road Density (ROADDEN)
	Personnel (APERSON)	Expenditure (AEXPEND)		
	(scientist man-years)	(constant 1980 million U.S. dollars)	(billion cruzeiros)	(km/km ²)
1966	983	47.687	2.94	-
1967	1,041	51.106	4.20	-
1968	1,350	60.008	5.30	-
1969	1,540	63.485	7.13	-
1970	1,650	66.358	9.60	-
1971	1,920	70.440	12.50	-
1972	2,051	85.167	16.90	-
1973	2,163	90.657	22.70	-
1974	2,276	114.620	32.70	-
1975	2,442	150.001	48.40	-
1976	2,529	216.274	74.20	-
1977	2,496	271.311	110.70	-
1978	2,554	299.822	160.80	0.16
1979	2,727	361.228	266.90	0.16
1980	2,935	389.740	562.30	0.16
1981	3,426	345.145	1,155.04	0.16
1982	3,714	300.549	2,278.76	0.17
1983	4,175	346.303	5,598.42	0.17
1984	4,018	364.071	18,070.45	0.17
1985	3,861	381.839	64,798.07	-
1986	4,157	399.607	171,355.94	-
			(million pesos)	
Chile				
1960	-	-	0.20	-
1961	128	4.968	0.24	-
1962	135	8.243	0.28	-
1963	121	11.518	0.38	-
1964	135	12.866	0.58	-
1965	145	13.898	0.90	-
1966	155	14.931	1.20	-
1967	175	16.910	1.59	-
1968	186	17.796	2.32	-
1969	194	18.543	3.63	-
1970	207	19.568	5.10	-
1971	217	32.769	6.50	-
1972	217	30.860	13.70	-
1973	230	22.539	70.50	-

Table 9. (Continued)

Year	Research		GDP for Transportation and Communication (AGDPTC)	Road Density (ROADDEN)
	Personnel (APERSON)	Expenditure (AEXPEND)		
	(scientist man-years)	(constant 1980 million U.S. dollars)	(million pesos)	(km/km ²)
1974	230	23.874	528.60	-
1975	236	25.693	2,023.40	-
1976	247	28.596	6,362.60	-
1977	253	28.653	15,376.90	-
1978	271	24.913	26,706.90	0.10
1979	288	23.562	39,923.30	0.10
1980	264	25.182	51,901.70	0.11
1981	268	29.581	63,742.00	0.10
1982	264	25.282	70,791.85	0.12
1983	274	24.758	83,434.48	0.12
1984	276	27.952	105,741.64	0.10
1985	306	30.798	127,986.85	-
1986	313	31.499	150,348.23	-
Columbia				
1960	-	-	1,647.80	-
1961	193	28.285	1,869.00	-
1962	209	29.146	2,333.60	-
1963	227	30.008	3,031.00	-
1964	252	30.869	3,390.00	-
1965	271	31.731	3,596.80	-
1966	290	32.592	4,457.70	-
1967	326	33.454	5,049.70	-
1968	359	34.315	6,013.30	-
1969	388	35.176	7,310.70	-
1970	413	46.793	8,881.10	-
1971	433	45.668	10,336.30	-
1972	462	43.648	11,666.90	-
1973	502	40.893	13,883.10	-
1974	559	35.225	20,551.90	-
1975	497	37.588	23,987.40	-
1976	434	33.585	32,472.80	-
1977	405	32.673	45,072.80	-
1978	376	38.047	57,471.30	0.050
1979	366	37.797	79,759.40	0.050
1980	424	36.743	108,423.90	0.065
1981	431	41.307	133,269.60	-
1982	428	37.493	170,799.25	-
1983	424	53.417	207,902.16	-

Table 9. (Continued)

Year	Research		GDP for Transportation and Communication (AGDPTC)	Road Density (ROADDEN)
	Personnel (APERSON)	Expenditure (AEXPEND)		
	(scientist man-years)	(constant 1980 million U.S. dollars)	(million pesos)	(km/km ²)
1984	456	44.735	255,501.39	-
1985	505	62.829	359,595.25	-
1986	514	62.359	472,514.04	-
Dominican Republic				
1960	-	-	33.20	-
1961	9	0.755	33.10	-
1962	10	0.820	44.40	-
1963	11	0.872	52.50	-
1964	13	0.914	65.80	-
1965	14	0.975	49.90	-
1966	17	1.043	68.40	-
1967	18	1.097	72.00	-
1968	22	1.179	86.50	-
1969	22	1.385	102.80	-
1970	23	1.483	114.80	-
1971	23	1.798	125.70	-
1972	25	1.989	144.80	-
1973	26	2.119	168.50	-
1974	29	2.370	196.70	-
1975	46	2.584	217.80	-
1976	62	2.797	238.40	-
1977	60	5.566	282.90	-
1978	64	5.503	322.30	-
1979	67	3.944	355.00	0.34
1980	106	3.474	362.30	0.34
1981	116	3.155	470.77	-
1982	123	3.961	508.60	-
1983	136	4.766	547.81	-
1984	143	4.727	664.92	-
1985	145	4.923	887.47	-
1986	140	5.119	978.34	-

Table 9. (Continued)

Year	Research		GDP for Transportation and Communication (AGDPTC)	Road Density (ROADDEN)
	Personnel (APERSON)	Expenditure (AEXPEND)		
	(scientist man-years)	(constant 1980 million U.S. dollars)	(million pounds)	(km/km ²)
Egypt				
1960	-	-	97.60	-
1961	52	12.112	109.60	-
1962	226	12.758	124.80	-
1963	569	13.768	144.40	-
1964	741	17.518	166.10	-
1965	809	19.225	186.30	-
1966	877	20.933	200.70	-
1967	1,257	28.769	160.20	-
1968	1,431	28.033	116.00	-
1969	1,533	27.268	123.60	-
1970	1,780	26.462	137.30	-
1971	1,853	25.656	145.70	-
1972	1,919	24.975	151.00	-
1973	1,986	24.352	158.60	-
1974	2,070	25.419	179.00	-
1975	2,256	26.421	260.00	-
1976	2,419	27.356	401.00	-
1977	2,565	28.193	491.00	-
1978	2,693	29.228	689.00	0.03
1979	2,821	30.427	992.00	-
1980	3,002	31.821	1,311.00	-
1981	3,237	33.217	1,818.08	-
1982	3,556	39.964	2,304.99	0.03
1983	4,181	39.277	2,949.53	0.03
1984	4,591	38.331	3,793.44	-
1985	5,000	38.499	4,959.02	-
1986	5,572	39.474	6,338.22	-
Ghana				
			(million cedis)	
1960	-	-	39.10	-
1961	73	3.950	44.48	-
1962	80	4.513	50.60	-
1963	87	4.854	51.00	-
1964	92	5.118	58.02	-
1965	100	5.537	66.00	-
1966	103	5.936	61.50	-

Table 9. (Continued)

Year	Research		GDP for Transportation and Communication (AGDPTC)	Road Density (ROADDEN)
	Personnel (APERSON)	Expenditure (AEXPEND)		
	(scientist man-years)	(constant 1980 million U.S. dollars)	(million cedis)	(km/km ²)
1967	106	6.335	60.00	-
1968	108	6.666	62.60	-
1969	112	6.945	79.00	-
1970	115	7.327	96.90	-
1971	114	6.609	112.10	-
1972	112	5.749	124.10	-
1973	109	4.890	126.80	-
1974	105	4.453	163.40	-
1975	116	4.577	206.00	-
1976	129	7.406	258.90	-
1977	130	5.102	330.60	-
1978	127	3.652	552.60	0.14
1979	123	4.691	758.40	0.14
1980	120	3.639	913.40	0.14
1981	128	3.442	1,602.40	0.14
1982	134	3.213	2,810.93	-
1983	143	3.048	5,408.09	-
1984	147	4.109	9,284.69	-
1985	151	4.025	11,115.86	-
1986	154	3.941	17,834.69	-
			(billion CFA francs)	
Ivory Coast				
1960	-	-	9.90	-
1961	53	7.052	11.30	-
1962	60	8.462	12.00	-
1963	67	9.332	15.00	-
1964	71	9.934	20.00	-
1965	80	11.073	21.00	-
1966	83	11.730	22.10	-
1967	85	12.271	23.90	-
1968	104	13.045	26.50	-
1969	110	15.642	30.80	-
1970	141	17.205	31.90	-
1971	160	18.768	37.60	-
1972	179	23.432	42.20	-
1973	180	23.988	53.10	-
1974	180	24.527	63.60	-

Table 9. (Continued)

Year	Research		GDP for Transportation and Communication (AGDPTC)	Road Density (ROADDEN)
	Personnel (APERSON)	Expenditure (AEXPEND)		
	(scientist man-years)	(constant 1980 million U.S. dollars)	(billion CFA francs)	(km/km ²)
1975	181	25.049	72.20	-
1976	182	25.553	86.00	-
1977	183	26.026	97.70	-
1978	184	26.560	134.80	-
1979	185	27.137	152.30	-
1980	186	27.761	176.00	-
1981	187	28.436	189.00	-
1982	193	29.387	193.18	0.14
1983	203	30.584	199.58	0.17
1984	205	26.697	169.76	0.17
1985	216	26.549	170.96	-
1986	237	33.351	186.81	-
			(million ringgits)	
Malaysia				
1960	-	-	292.00	-
1961	118	4.655	343.07	-
1962	124	5.924	366.64	-
1963	132	14.878	384.97	-
1964	142	19.385	416.39	-
1965	150	22.185	456.99	-
1966	158	24.446	470.08	-
1967	171	26.361	496.27	-
1968	184	27.976	532.93	-
1969	195	29.591	542.10	-
1970	206	32.107	581.00	-
1971	223	35.750	638.00	-
1972	271	41.787	755.00	-
1973	288	59.944	941.00	-
1974	367	71.271	1,123.00	-
1975	420	86.056	1,299.00	-
1976	463	61.129	1,537.00	-
1977	498	72.656	1,782.00	-
1978	526	77.259	2,043.00	16.31
1979	569	71.916	2,432.00	16.72
1980	633	90.473	3,005.00	17.40
1981	741	97.241	3,444.95	18.02
1982	829	102.490	4,063.98	18.75

Table 9. (Continued)

Year	Research		GDP for Transportation and Communication (AGDPTC)	Road Density (ROADDEN)
	Personnel (APERSON)	Expenditure (AEXPEND)		
	(scientist man-years)	(constant 1980 million U.S. dollars)	(million ringgits)	(km/km ²)
1983	862	110.776	4,645.04	20.60
1984	932	108.538	5,492.18	22.00
1985	1,000	113.315	6,403.95	-
1986	1,065	118.093	7,453.53	-
			(million dirhams)	
Morocco				
1960	-	-	0.27	-
1961	78	1.033	0.30	-
1962	83	2.110	0.33	-
1963	127	3.186	0.36	-
1964	121	4.263	0.40	-
1965	114	5.339	0.45	-
1966	108	6.416	0.50	-
1967	103	7.492	0.54	-
1968	110	8.569	0.58	-
1969	116	9.645	0.71	-
1970	124	10.722	0.78	-
1971	130	11.798	0.83	-
1972	123	12.875	0.90	-
1973	101	13.951	1.00	-
1974	98	16.881	1.34	-
1975	103	17.278	1.06	-
1976	137	17.646	1.65	-
1977	152	18.071	1.87	-
1978	189	18.557	2.76	-
1979	199	19.016	2.48	0.09
1980	264	19.475	2.81	0.09
1981	242	20.013	3.07	-
1982	212	21.955	3.60	-
1983	230	23.896	4.73	0.08
1984	212	31.724	4.76	-
1985	191	26.869	5.28	-
1986	178	27.946	5.92	-

Table 9. (Continued)

Year	Research		GDP for Transportation and Communication (AGDPTC)	Road Density (ROADDEN)
	Personnel (APERSON)	Expenditure (AEXPEND)		
	(scientist man-years)	(constant 1980 million U.S. dollars)	(million rupees)	(km/km ²)
Pakistan				
1960	-	-	946.00	-
1961	826	9.936	1,089.80	-
1962	928	11.412	1,093.91	-
1963	1,029	12.710	1,170.94	-
1964	1,131	13.317	1,273.66	-
1965	1,232	13.865	1,824.00	-
1966	1,334	14.414	1,979.41	-
1967	1,403	15.136	2,279.74	-
1968	1,533	13.165	2,474.00	-
1969	1,648	10.423	2,628.37	-
1970	1,753	9.222	2,943.00	-
1971	1,848	11.390	3,014.00	-
1972	1,934	12.072	3,250.00	-
1973	2,008	11.851	4,261.00	-
1974	2,107	21.137	5,587.00	-
1975	2,227	35.394	7,404.00	-
1976	2,378	39.272	8,338.00	-
1977	2,571	36.498	9,252.00	-
1978	2,834	41.489	11,260.00	0.047
1979	2,727	46.699	13,151.00	0.047
1980	2,608	48.525	15,451.00	0.109
1981	2,513	43.633	19,035.00	0.049
1982	2,819	45.848	22,024.68	0.116
1983	3,013	48.063	25,148.13	0.119
1984	3,431	50.279	29,506.61	0.125
1985	4,086	52.494	33,688.52	-
1986	5,057	54.709	38,024.88	-
			(million pesos)	
Philippines				
1960	-	-	642.00	-
1961	119	15.070	681.09	-
1962	165	15.615	738.79	-
1963	219	16.472	800.04	-
1964	294	18.253	862.08	-
1965	334	19.648	937.00	-
1966	367	21.044	1,046.89	-

Table 9. (Continued)

Year	Research		GDP for Transportation and Communication (AGDPTC)	Road Density (ROADDEN)
	Personnel (APERSON)	Expenditure (AEXPEND)		
	(scientist man-years)	(constant 1980 million U.S. dollars)	(million pesos)	(km/km ²)
1967	393	23.595	1,163.90	-
1968	419	27.836	1,270.95	-
1969	464	29.790	1,343.33	-
1970	538	36.318	1,783.00	-
1971	817	35.297	2,172.00	-
1972	921	40.464	2,418.00	-
1973	985	52.248	2,913.00	-
1974	1,128	46.731	3,664.00	-
1975	1,215	35.284	4,771.00	-
1976	1,282	42.584	6,072.00	-
1977	1,390	38.051	8,500.00	-
1978	1,416	38.671	9,894.00	1.41
1979	1,440	29.374	12,377.00	0.49
1980	1,465	28.704	16,444.00	0.51
1981	1,492	41.061	19,618.00	0.51
1982	1,729	32.056	22,363.19	0.51
1983	1,890	24.624	26,326.68	-
1984	2,052	22.561	36,145.62	0.52
1985	2,438	23.168	42,727.27	-
1986	2,898	35.976	46,454.28	-
			(million escudos)	
Portugal				
1960	-	-	3,600.00	-
1961	293	5.802	4,000.00	-
1962	299	5.623	4,100.00	-
1963	306	8.943	4,700.00	-
1964	314	10.498	4,900.00	-
1965	321	11.693	5,200.00	-
1966	329	12.683	6,000.00	-
1967	336	13.506	6,700.00	-
1968	342	14.329	7,700.00	-
1969	350	15.655	9,200.00	-
1970	358	17.665	10,500.00	-
1971	366	21.384	11,600.00	-
1972	376	16.678	13,300.00	-
1973	370	18.169	15,800.00	-
1974	363	19.394	19,800.00	-

Table 9. (Continued)

Year	Research		GDP for Transportation and Communication (AGDPTC)	Road Density (ROADDEN)
	Personnel (APERSON)	Expenditure (AEXPEND)		
	(scientist man-years)	(constant 1980 million U.S. dollars)	(million escudos)	(km/km ²)
1975	357	20.618	23,700.00	-
1976	351	22.643	19,387.50	-
1977	366	23.366	20,559.56	-
1978	379	24.089	21,731.62	0.57
1979	392	23.880	22,903.68	0.58
1980	404	23.669	24,075.74	0.58
1981	420	23.454	25,247.79	-
1982	438	23.239	26,419.85	-
1983	445	23.035	27,591.91	-
1984	452	22.837	28,763.97	-
1985	460	26.884	29,936.03	-
1986	462	27.596	31,108.09	-
			(billion won)	
South Korea				
1960	-	-	11.30	-
1961	460	2.335	14.15	-
1962	499	4.456	17.22	-
1963	521	8.650	19.97	-
1964	578	11.804	24.14	-
1965	622	12.658	32.69	-
1966	666	13.512	50.80	-
1967	747	21.265	71.09	-
1968	786	23.075	98.85	-
1969	819	24.422	119.91	-
1970	864	26.694	182.30	-
1971	757	31.102	224.20	-
1972	831	29.510	270.10	-
1973	969	22.794	365.10	-
1974	981	22.920	466.00	-
1975	992	24.327	606.70	-
1976	998	26.491	787.90	-
1977	911	23.181	1,017.20	-
1978	1,029	27.118	1,388.90	0.46
1979	1,027	29.136	1,705.10	0.47
1980	1,296	30.663	2,146.30	0.47
1981	1,334	31.015	2,980.80	0.51
1982	1,361	39.347	3,345.68	0.54

Table 9. (Continued)

Year	Research		GDP for Transportation and Communication (AGDPTC)	Road Density (ROADDEN)
	Personnel (APERSON)	Expenditure (AEXPEND)		
	(scientist man-years)	(constant 1980 million U.S. dollars)	(billion won)	(km/km ²)
1983	1,373	54.346	3,893.15	0.55
1984	1,355	53.897	4,330.80	0.51
1985	1,394	71.217	4,805.15	-
1986	1,433	84.064	5,476.11	-
			(million rupees)	
Sri Lanka				
1960	-	-	641.00	-
1961	40	6.544	632.26	-
1962	45	7.207	692.32	-
1963	51	7.870	695.60	-
1964	61	8.533	770.95	-
1965	67	9.196	847.00	-
1966	73	9.858	904.85	-
1967	90	11.325	907.03	-
1968	104	12.454	1,024.91	-
1969	114	13.246	1,156.98	-
1970	124	14.713	1,258.00	-
1971	147	13.985	1,270.00	-
1972	148	13.451	1,405.00	-
1973	148	12.917	1,596.00	-
1974	149	11.563	1,853.00	-
1975	182	12.190	2,079.00	-
1976	193	13.133	2,286.00	-
1977	247	17.169	2,723.00	-
1978	245	18.865	2,994.00	0.48
1979	243	20.033	4,744.00	-
1980	241	19.495	5,293.00	-
1981	291	20.517	7,307.00	-
1982	310	21.379	8,780.97	-
1983	391	22.562	10,139.93	-
1984	503	21.788	12,377.46	-
1985	679	22.451	13,649.11	-
1986	958	23.114	15,393.81	-

Table 9. (Continued)

Year	Research		GDP for Transportation and Communication (AGDPTC)	Road Density (ROADDEN)
	Personnel (APERSON)	Expenditure (AEXPEND)		
	(scientist man-years)	(constant 1980 million U.S. dollars)	(million baht)	(km/km ²)
Thailand				
1960	-	-	4,000.00	-
1961	228	11.775	3,800.00	-
1962	256	17.617	4,100.00	-
1963	287	25.272	4,300.00	-
1964	307	34.697	4,800.00	-
1965	350	45.498	6,000.00	-
1966	392	56.857	6,100.00	-
1967	418	67.550	6,800.00	-
1968	475	72.858	7,200.00	-
1969	492	76.914	7,500.00	-
1970	507	83.473	8,600.00	-
1971	522	83.165	9,000.00	-
1972	536	66.545	10,500.00	-
1973	554	50.717	13,200.00	-
1974	574	38.115	16,000.00	-
1975	596	56.165	18,800.00	-
1976	1,280	55.158	21,800.00	-
1977	1,320	62.226	24,700.00	-
1978	1,341	59.340	29,600.00	0.120
1979	1,429	52.523	37,800.00	0.124
1980	1,532	63.845	45,300.00	0.131
1981	1,668	71.764	57,100.00	0.132
1982	1,846	79.013	61,519.69	0.140
1983	2,074	84.935	68,161.20	0.144
1984	2,366	98.496	74,873.27	0.148
1985	2,739	116.834	80,681.09	-
1986	3,219	141.684	86,183.32	-
			(million liras)	
Turkey				
1960	-	-	3,200.00	-
1961	149	15.174	3,555.56	-
1962	200	18.357	4,029.63	-
1963	266	21.539	4,503.70	-
1964	267	24.722	4,977.78	-
1965	397	27.904	5,900.00	-
1966	411	31.087	6,276.60	-

Table 9. (Continued)

Year	Research		GDP for Transportation and Communication (AGDPTC)	Road Density (ROADDEN)
	Personnel (APERSON)	Expenditure (AEXPEND)		
	(scientist man-years)	(constant 1980 million U.S. dollars)	(million liras)	(km/km ²)
1967	424	18.758	7,280.85	-
1968	440	28.537	8,661.70	-
1969	460	38.316	9,414.89	-
1970	479	48.095	11,700.00	-
1971	485	46.473	14,900.00	-
1972	503	49.449	18,000.00	-
1973	520	52.425	25,300.00	-
1974	540	63.951	35,500.00	-
1975	651	68.275	43,300.00	-
1976	731	69.069	54,800.00	-
1977	796	114.513	72,200.00	-
1978	850	84.491	110,100.00	0.30
1979	904	67.298	223,800.00	0.29
1980	993	45.934	409,200.00	0.30
1981	1,133	52.617	623,300.00	0.30
1982	1,424	82.007	822,523.08	0.38
1983	1,549	85.189	1,105,857.04	0.39
1984	1,642	88.372	1,755,789.03	-
1985	1,800	91.554	2,539,555.84	-
1986	1,876	94.737	3,664,919.93	-
			(million kwacha)	
Zambia				
1960	-	-	24.60	-
1961	13	2.683	23.41	-
1962	17	2.734	23.53	-
1963	21	2.786	23.41	-
1964	27	2.837	24.60	-
1965	29	2.888	34.20	-
1966	32	2.940	36.31	-
1967	43	2.497	52.14	-
1968	46	2.439	48.66	-
1969	49	2.377	54.89	-
1970	53	2.323	48.80	-
1971	72	3.796	62.30	-
1972	79	3.536	63.50	-
1973	66	3.201	64.90	-
1974	85	3.167	76.30	-

Table 9. (Continued)

Year	Research		GDP for Transportation and Communication (AGDPTC)	Road Density (ROADDEN)
	Personnel (APERSON)	Expenditure (AEXPEND)		
	(scientist man-years)	(constant 1980 million U.S. dollars)	(million kwacha)	(km/km ²)
1975	76	4.309	88.50	-
1976	85	4.273	118.50	-
1977	61	4.216	134.40	-
1978	62	4.179	142.10	0.05
1979	56	3.851	162.80	0.05
1980	78	4.483	193.00	-
1981	81	3.558	196.00	0.05
1982	90	6.110	234.85	-
1983	116	1.974	254.22	-
1984	123	3.081	306.41	-
1985	138	2.249	419.55	-
1986	153	3.967	665.24	-

SOURCES: Pardey and Roseboom 1989; Boyce and Evenson 1983; U.N. annual statistics; World Bank 1976, 1984, 1987; IRF 1982, 1984.

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