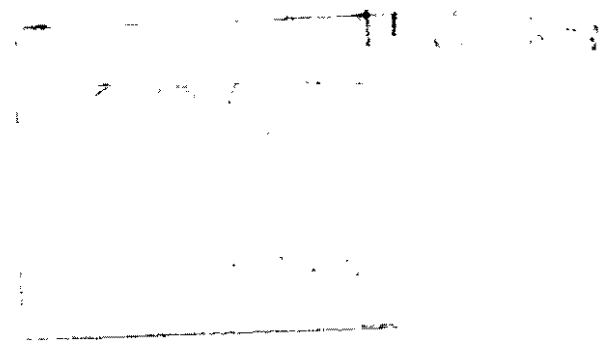
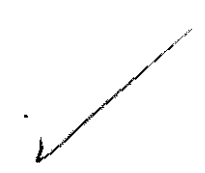


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Trends in CIAT Commodities



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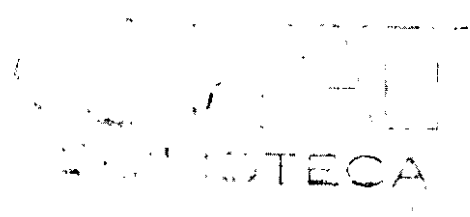
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TRENDS IN CIAT COMMODITIES

APRIL 1984

CIAT
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CALI, COLOMBIA

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PREFACE

The 1984 edition of Trend Highlights includes the traditional data on production, yields, and trade, as well as draft reports presenting early results of three on-going research projects at CIAT.

While past Trend Highlights have documented the decline in importance of fresh cassava as a food staple in Latin American urban areas, here an innovative strategy to reverse this process is put forward. It is argued that improved post harvest storage technology may be more important than increased yields for lowering the price and improving the consumer acceptability of fresh cassava in urban Latin America.

Food consumption, expenditures, and nutrition in Colombia are surveyed in a preliminary analysis of data kindly provided to CIAT by a DRI/PAN-DANE project. These quite comprehensive data have permitted a more thorough examination of the consumption of CIAT commodities in Colombia than has heretofore been possible.

As the Bean Program has recently launched a vigorous initiative in Africa, it is appropriate to present here for

the first time in the Trend Highlights a survey of recent charges and the overall structure of bean production and consumption in Africa.

Finally, as always updated tabular appendices are presented which cover the CIAT commodities as well as other products of special interest.

Douglas Pachico, Editor

URBAN CASSAVA MARKETS: THE IMPACT OF FRESH ROOT STORAGE

W. Janssen
C. Wheatley

Abstract

Although fresh cassava is important in rural nutrition patterns its role in urban food markets is limited and declining. Within the context of Colombia, both the structure of the marketing channel and consumer preferences are considered in explaining this difference. The principal factor limiting urban market volume and demand was identified as the rapid root post-harvest deterioration which necessitates high margins to cover marketing risks. Appropriate storage techniques which overcome this problem are evaluated and their possible positive impact, through reduction of marketing margins, on retail and farm-gate prices as well as on urban consumption is estimated.

Introduction

Cassava is the major root crop of the lowland tropics of Latin America, with a total production of 31.6 million tonnes in 1981 (FAO, 1982). It has several qualities which enable it to yield well in the marginal environments characteristic of many tropical regions especially in areas of poor soils and/or low rainfall (Cock, 1982). The roots have no period of absolute maturity, and can be harvested over a timespan of several months if necessary (Cock, 1982). The vigorous nature of the cassava growth habit makes it especially suitable for integration into the associated cropping systems important in small-scale tropical agriculture. Despite a relatively high labour requirement per hectare, this is evenly spread throughout the growth period (Diaz and Pinstrup-Andersen, 1977). Thus, cassava has a low cost of production per calorie at the farm level (Table 1).

The crop does, however, have some disadvantages: a protein content of only 1% of fresh weight, a moisture content of 70% which increases transport costs, and finally a very short post-harvest storage life. This latter is due to a rapid physiological deterioration of the root and can lead to very high losses within two or three days of harvest.

Estimates of 14 to 75% have been made for these losses (Tejada and Moscoso, 1979; Coursey and Booth, 1972; Wheatley, personal communication).

Cassava still constitutes an important part of the human diet in Latin America, supplying 7% of total calorie requirements in 1971 (Lynam, 1978). Data do, however, suggest that this proportion is decreasing (Table 2). Between 1971 and 1981 world cassava production increased by 24% but fell by 12% in Latin America (Table 2). During the same period, yearly population increases averaged 2.96% in Latin America i.e. per capita cassava production decreased by 24%, compared with a 4% decrease for potatoes and a 4% increase for rice (Table 1). The role of cassava as a calorie source has thus been declining during the last ten years with other crops, especially rice, expanding to take its place.

Fresh root consumption of cassava comprises about 17% of total Latin American production including Brazil, and about 50% excluding Brazil. The remainder is used for starch, flour, animal feed or alcohol production (Lynam and Pachico, 1983). Current evidence suggests that fresh cassava consumption is declining rapidly, due to two main factors: a decrease in consumption per head in urban areas (Table 4) and the rapid migration from rural regions to urban centres (Table 3). Cassava consumption is falling in urban areas because of its increasing price relative to that of other products (Table 5).

This article aims to explain why fresh cassava consumption is decreasing in urban areas in terms of the consequences of the very short post-harvest life on marketability, and to describe the effects of possible solutions. The context of this article is Colombia, the third most important cassava producing country in Latin America and one in which urbanization has proceeded apace in the last twenty years (Table 5B).

The nature of cassava post-harvest deterioration

Among the tropical root and tuber crops cassava is unique in having such a restricted post-harvest life (Booth, 1974). The deterioration in quality can be remarkably fast: sometimes roots become unacceptable for human consumption within 24 hr of harvest, although a 24-72 hr period is more usual (Booth 1976, Wheatley, 1982).

The short post-harvest life is due to the development of a blue-black pigmentation in the vascular tissues of the storage root accompanied by a desiccation of the parenchymal (starch containing) cells. These combine to give the roots an unwholesome black or brown appearance, very unsatisfactory cooking qualities and a bitter taste. These pigmentation reactions are the result of complex physiological changes in the root tissues, which are initiated within a few hours of harvest (Booth, 1976; Rickard, 1981; Wheatley, 1982). There are differences within and between varieties with regard to the rate and intensity of development of this 'physiological deterioration' (Wheatley, 1982).

Physiological deterioration is essentially an oxygen-mediated process (Booth, 1976; Noon and Booth, 1977), hence the drying out of root tissues, which facilitates the entry of oxygen, acts to accelerate the deterioration reactions (Marriott, et al., 1978). Areas of damage, especially the proximal and distal root ends, are the regions where deterioration initiates since these areas are the first to lose moisture. The avoidance of root damage by careful harvesting and handling can, by itself, reduce the incidence of deterioration significantly.

In order to increase the storage life of cassava roots this physiological deterioration must be prevented. However, there is a subsequent, microbial deterioration, consisting of general rotting and tissue fermentation which develops in roots stored for longer than four to seven days. In some ways symptoms can be similar to those of physiological deterioration since the vascular pigmentation can also occur, but with a different distribution in the root tissues. Establishment of the root pathogens involved in rotting is aided by the presence of damage, giving the micro-organisms easy access to the starch and sugar substrates of the root interior.

At present this microbial deterioration is rarely a problem since root acceptability is invariably affected previously by physiological deterioration. If this latter were prevented, however, a method for controlling this microbial problem would be necessary. Control of one without the other would hardly improve root storage life over the present one to three days.

The effect of deterioration on cassava root marketing in Colombia

Currently, no storage methods are used in the marketing of fresh cassava roots in Colombia. The rapid deterioration which occurs in the prevailing post-harvest ambient conditions effectively makes cassava storage impossible. Roots must be consumed within two days of harvest. In the case of urban markets, often distant from the producing regions, roots have to be handled within a very short time-span to reach the consumer before deterioration becomes visible. There is a substantial risk to the wholesalers and retailers that roots will deteriorate before they can be sold.

This necessitates a close integration of producer, intermediary, wholesaler, retailer and consumer, so that the daily demand can be transferred backwards down the marketing channel to the producer. Because of this reverse demand integration of the marketing channel, the following description will work from retailer to producer.

In Colombia, it is usual for retailers to have established contacts with wholesalers. For example, the retailers in Sincelejo and Barranquilla, two towns in the Atlantic coast region, trade in rather small quantities of roots: 90 to 160 kg of roots per day (Cecora, 1982), because (a) they do not want to risk being left with unsold, perishable roots, (b) they must make many, small transactions each day and (c) they are dispersed throughout the town in order to facilitate shopping by housewives. A higher percentage of cassava than of other crops is sold in local neighbourhood markets despite the higher price found for cassava only there compared with large, central markets (Table 6).

Urban wholesalers usually buy their cassava from rural intermediaries, without having to leave the town. These wholesalers also handle small volumes of roots per day (from 1000 kg in Sincelejo to 5000-7000 kg in Barranquilla). A wholesaler who buys 6000 kg/day and sells to retailers in 150 kg lots must make 40 transactions per day. These transactions are made in the early morning hours, allowing the retailer to sell the cassava during the remainder of the day. This, together with the risk of having unsold roots, effectively prevents him from increasing the quantity of roots handled.

Often, wholesalers will arrange future purchases and fix prices with rural intermediaries, who then organise producers' harvests to obtain

the required quantity. They offer prices to farmers based on the knowledge that the price with the wholesalers is already agreed. When agreement is reached between intermediary and farmer, the harvest is usually arranged for the following morning, although sometimes longer term agreements are made when demand is guaranteed. Thus it is clear that many people are involved in making small transactions: a feature which inevitably increases prices (Table 7).

Another factor contributing to high prices is the risk wholesalers and retailers face of having roots left unsold at the end of the day: deterioration could render them unmarketable the following day.

In order to avoid this traders will tend to order less than they expect to sell on an average day. Suppliers will be faced with an intermediate demand actually lower than the final consumer demand and will deliver a restricted amount of cassava on to the market. Oversupply in the market will thus be much less likely than undersupply and consequently daily prices above equilibrium level will be more likely than prices below equilibrium level (Fig. 1). This mechanism also holds at the level of the rural intermediary: he will harvest a sufficient amount to cover his guaranteed sales and no more. It is possible that he will not be able to harvest a sufficient quantity of roots to meet this target (e.g. when harvests get delayed) but he will never harvest more than the needs. When the price-elasticity of demand for cassava falls within a range of -1 to 0 , a restriction of marketed volumes leads to higher money turnovers, favoring the marketing agents: they get more money for less work. Cassava price-elasticity has been estimated at -0.96 in Colombia (Pachico, Janssen and Lynam, 1983) indicating that market restriction favouring traders could indeed be occurring in Colombia.

Deterioration thus puts pressure on the supply to be below the equilibrium level. Prices increase as a result, leaving traders with extra profits. This mechanism also explains why, while market prices are high, many farmers do not start growing more cassava: if they are not integrated into the market channels via the rural intermediaries they will be unable to sell their produce.

The negative effects of deterioration on the fresh market are twofold: the marketing channel has to be fast moving and labour

intensive and the high risk involved with this crop diminishes the quantities marketed and causes price rises. As a result the marketing margin for cassava is high, calculated at 64%, (Lynam and Pachico 1983) which would imply a per kilo margin of US\$0.35 in Colombia during 1982. For potatoes, a similarly bulky product produced at farms of similar size, a marketing margin of only 36% was calculated (van der Zaag and Horton, 1983) equal to US\$0.13 per kilo in Colombia during 1982.

Relative advantages and disadvantages of cassava for rural or urban consumers

In the rural areas cassava can often be stored simply by harvesting plants only as and when required. In the town, however, where consumers must buy and eat cassava on the same day, the high cassava shopping frequency that this necessitates leads to increased consumer purchasing costs because of the often large distances between home and market place.

These storage and market characteristics strongly influence the suitability of cassava for consumption by rural and urban societies. This can be seen in Table 8, where the relative advantages and disadvantages of cassava for rural and urban consumers have been compared with those of rice and potatoes by assigning values to ten consumer demand factors.

Cassava can thus be seen as a very attractive crop for rural subsistence communities with a low price and production costs (see Table 1), ease of association with other crops and year-round availability. The deterioration problem is not severe in rural areas since roots can usually be left unharvested until required for immediate local consumption. The low nutritional value due to the poor protein content is only a problem when additional protein sources are absent. The available data on nutrition in Latin America suggest that this is not the case (FAO, 1975-77).

In the urban market, however, the rapid perishability of the roots becomes a major disadvantage: because of the risk of large losses in storage, wholesalers and retailers need high marketing margins, which result in the roots being expensive for urban consumers. Low cassava production costs are completely outweighed by the higher marketing

costs. Rice is consistently cheaper than cassava throughout Latin America (Table 9). The supply of roots may also vary throughout the year as storage to even out fluctuations in supply and demand is impossible. Finally, the rapid perishability means that consumers must make frequent small purchases and still stay with a considerable risk of deterioration before consumption. These high purchasing costs for the consumer might also help to explain why potato consumption in urban areas is higher than cassava, even although cassava is often cheaper (Table 9).

All the above factors contribute to explaining the difference in consumption per head found between rural and urban areas. For those rural consumers who do not produce cassava themselves the situation is intermediate: they still face the high margin and the risk of deterioration, but to a more limited extent since marketing channels are shorter and quicker.

The emphasis placed on cassava in helping to feed expanding third world populations is based heavily on its production properties, but these are outweighed in urban communities by the marketing problems of fresh roots caused by post-harvest deterioration. In the last two decades urbanisation has continued at a rapid rate in Latin America (Table 2), limiting the incentive to improve cassava cultivation for rural communities and reducing the advantageous impact of improvements since the rural subsistence populations are relatively declining. An improvement in the production potential of cassava can only have a limited impact on its urban consumption as a fresh root since only 35% of the final urban price reaches the producer. To increase the role of cassava in the nutrition of the urban population of Latin America, a more direct and effective strategy would be to develop a solution to the problem of cassava root deterioration. In this manner, the marketing margin could be diminished and the attractiveness of fresh cassava roots to the urban consumer increased.

The prevention of post-harvest root deterioration

There are three aspects to the solution of the deterioration problem. One concerns the storage conditions which prevent the appearance of physiological deterioration, the second involves the inhibition of

microbial growth and subsequent root rots which can develop during storage and the third relates to the correct handling and selection of roots before storage with the aim of avoiding damaged roots which will not store. It is essential, even for relatively short term storage of only one week, that all three of these factors are taken into account. Together, they should not add greatly to the costs of marketing and should be simple to carry out with minimal capital costs because the producers of cassava tend to be small farmers with limited access to funds.

Some high cost, high technology storage processes have been developed for cassava which could be useful in the limited sphere of export markets, where the high product price would permit higher storage costs. Examples of this are paraffin wax coating of roots developed by IIT in Bogota, Colombia (Zapata and Riveras, 1978) and freezing of peeled, parboiled root pieces for supermarket sale. However, if we wish to introduce root storage into the normal fresh root marketing chain as presently operating in Colombia a simple, low technology method is required.

Before consideration of simple storage methods, the question of damage caused during harvest and handling must be considered: however effective the storage method may be, if broken or damaged roots are used the output will invariably be poor.

Both physiological and microbially-induced deteriorations tend to be initiated at points/regions of injury and subsequently spread to the rest of root. When roots are separated from the plant, two points of injury are necessarily made, one at the distal and one at the proximal end. In addition, the bark is often damaged. There are two strategies which can be considered for reducing deterioration through obtaining roots with less damage. One would be by breeding for roots with a tough/robust periderm which could withstand rough treatment during harvest and transportation. Root form is also important in this respect. If roots with a well-formed neck region are harvested, the proximal cut can be made without exposing large areas of root tissue.

After harvest, careful handling of roots is crucial. Frequently, roots are piled up into heaps in the field - sometimes even thrown not placed. The bark easily becomes damaged as roots rub against each

other. An improved harvesting and handling process in which roots were not subjected to the more damaging practices, would be a simple way of reducing the incidence of both types of deterioration without the use of costly inputs, as well as reducing losses due to broken, damaged roots which are currently unmarketable. The percentage of roots suitable for storage would also be increased.

Traditional cassava cultivators, who are principally subsistence farmers producing cassava for their own consumption, avoid the deterioration problem by harvesting a few plants at a time as needed. Where root storage is required after harvest, the usual practice is to rebury the roots in a trench, covering them with soil. This is rather unreliable because of the dependence on local environmental conditions and does not seem to be in widespread use (Ingram & Humphries, 1972; Rickard & Coursey, 1981).

In a TPI/CIAT project this reburial method was improved through the use of a straw lining, ventilation pipes and a drainage ditch. This worked well in less extreme tropical climates, but when temperatures inside the 'field clamp' structure exceeded 40°C, losses from microbial rotting were considerable (Booth, 1977). The method has not been adopted on a commercial basis, because in addition to its relative unreliability, it does not solve the problem of marketing fresh cassava, since roots cannot be transported during storage.

The reburial, or field clamp method relies for its success on the natural wound repair processes which the root itself initiates given the right conditions, namely high temperature (> 30°C) and high relative humidity (> 85%) (Booth, 1977). The root lays down a protective barrier over any injured tissues, effectively preventing moisture loss and air entry into the root. This takes approximately five days and completely inhibits the initiation of the reactions producing physiological deterioration, as well as providing a barrier against pathogen access to the starch substrate of the root interior. This curing process cannot, however, be completely effective if the amount of damage is too great: hence the importance of root selection prior to storage.

Unfortunately, the conditions needed to obtain fast curing are also favourable for the growth of microorganisms. Despite the physical barrier laid down over damaged areas, post-harvest root rots can rapidly

develope. A method of controlling this must therefore be integrated into any method in which root curing is used. One method would be to carefully maintain humidity and temperature at the minimum required to obtain curing with a reasonable timescale (five days). Another would be to treat roots with a broad spectrum anti-microbial agent prior to storage.

The prevention of physiological deterioration by root curing has been utilized in the development of two simple storage systems with low technology inputs which do seem to be suitable for fresh cassava marketing since, unlike the previous systems mentioned, storage is possible during transport and marketing operations.

In the first system, again developed by a TPI/CIAT project (Booth, 1977) roots were stored in wooden boxes packed with moist sawdust or other locally available materials. Roots could be stored successfully for from six to eight weeks and were of an acceptable quality for both human and animal consumption (Booth et al., 1976). They did, however, have a slightly sweeter taste caused by a breakdown of the root starch to sugars. Roots can be transported during storage, although it has been adopted only for the export of roots from the Caribbean area to the USA and Europe. To date, it has not been reported as used in internal marketing of roots in Colombia or any other Latin American country because transport costs are relatively high: box and packing material must be transported in addition to the 70% water content of the fresh roots.

More recently, trials of roots stored in plastic bags have proved successful (Oudit, 1976; Lozano et al., 1978; CIAT, 1982). The microclimate inside the bag is ideal for root curing: the roots themselves rapidly generate sufficient heat and humidity. However, a fungicide application prior to storage is necessary to inhibit the growth of micro-organisms. If no applications are made, roots begin to rot only five to seven days after harvest. Of course, it is necessary to ensure that any fungicide used does not leave toxic residues in the interior of the root, although this is unlikely given the thickness of the peel layer.

Given good control of the microbial rotting problem, storage times of two to three weeks with losses of < 5%, or only 1% after one week, are

readily obtainable (Wheatley, unpublished data). Roots maintain a fresh appearance both internally and externally and taste and texture after boiling are not altered, although there is a tendency for roots to taste sweeter after more than two weeks of storage as the root sugar content increases slightly. Neither the amount of roots packed per bag, nor the bag thickness or colour has any effect on the outturn. It is, however, important that roots should be packed within three hours of harvest. A longer delay allows physiological deterioration to start and curing is thus not completely effective. Root treatment and packing must be carried out in the field for this deadline to be met.

Plastic bag storage has advantages over the other methods mentioned previously. It is the best adapted for integration into the current marketing system. With the additional costs of plastic bag and chemical treatment (US\$0.03/kg) the traditional flexibility of the marketing chain is greatly improved. The two week storage time made feasible by this method is more than adequate to eliminate the problems of marketing fresh cassava.

Expected benefits from utilization of cassava storage technology

Eliminating deterioration of cassava in the fresh market through use of the storage technology discussed above will basically have two effects. Firstly, the pressure on the market channel for quick handling and limitation of traded volumes will be relieved. The marketing margin for cassava will fall and the product will be available at a lower price. This should lead to increased consumption (see Figure 2A). In Colombia in 1982 the marketing margin for cassava was US\$0.35 per kilo. We assume that this could ultimately be reduced to about US\$0.13, close to the marketing margin of potatoes (a similarly bulky but non-perishable crop). Taking into account the cost of the developed storage techniques (estimated at US\$0.03 per kilo) it would be more reasonable to expect margins of US\$0.18 to 0.23.

Secondly, the quality of cassava as a consumer-commodity will be improved. If deterioration can be prevented a constant availability in the market place is more easily guaranteed. The risk of perishability at home will be small and no special items like refrigerators will be needed to store cassava. Waste due to deterioration developing between

purchase and food preparation will be reduced. Purchasing costs will fall since the necessity to buy fresh roots every day will disappear. In this way, cassava would become a more attractive foodstuff for urban consumers who would be willing to pay more for it (Figure 2B) (Willig, 1976). Although almost all research tends to influence not only the availability of a product but also the quality, estimations of this effect are rare.

Consumer willingness to pay more for storable cassava is difficult to measure ex-ante because of the highly abstract nature of the question and the difficulty for the consumer of making a reliable estimation of the fall in costs on cassava consumption. Instead three different values were estimated for the increase in the willingness to pay (WNP): A zero increase, implying no growth in the WNP (ie. the benefits-calculation in its traditional form), a US\$0.05/kilo increase, equal to a 10% increase in WNP; and a US\$0.10 increase, equal to a 20% increase in WNP. The modest US\$0.05 increase is probably the best of these estimates.

In 1982 in Colombia almost 15 million people were living in towns of over 100,000 people (Hulsbosch, 1981), where reduction of deterioration could have considerable effect on the marketing margin. The consumption of cassava in these towns can be estimated at 10 kg per capita (40% down from the 1970 estimate). The price elasticity of demand is estimated at -0.96. Values for the price elasticity of supply are unknown, but values of 0.5 and 1.0 can be assumed (Pastore, 1977). Other assumptions are: linear demand and supply functions, a perfectly elastic supply of marketing services and a parallel shift in final demand and supply function through the application of storage technology. With these assumptions and using the method of Freebairn, Davis and Edwards (1982), the benefits of successful storage technology for the fresh market of Colombia would be between 27 and 37 million dollars per year (Table 10A).

Consumption per head in the urban areas would increase from 10 kg to between 11.8 and 13 kg (Table 10B). Prices at the consumer level would fall from US\$0.54 to between US\$0.48 and US\$0.42 per kg (Table 10C). Farm-level prices would increase from an average US\$0.17 to between US\$0.21 and US\$0.25 per kilo (Table 10).

In Latin America as a whole, fresh consumption of cassava is seven times greater than that in Colombia alone. The importance of rural versus urban consumption is similar to that of Colombia (Table 4). A rough estimate of total benefits for Latin America of cassava deterioration research then should be seven times the figure for Colombia, ie. between 189 and 259 million US-dollars per year if the assumptions made for Colombia hold for Latin America in general. The lowest expected value of the research benefits is 10.7 million dollars a year for Colombia, or about 75 million dollars per year for Latin America as a whole. This occurs when the marketing margin would only fall to US\$0.30 (18% decrease) and the WNP does not increase. This figure still compares very favourably with the benefits that can be expected from increased production technology for the fresh market. A yield increase from 9 to 15 tons per hectare was estimated to produce a benefit of between 7 and 9 million dollars per year in Colombia (Pachico, Janssen, Lynam, 1983) . Since the expected cost of deterioration research will certainly not be higher than the expected cost of yield improvement, a cassava deterioration research strategy will have a greater impact on the fresh market than a yield improvement strategy. These figures clearly indicate that in a product where over 60% of the final price accrues to the marketing channel, exploration of the marketing problem and the design of a related research strategy will be more efficient than trying to increase cassava yields.

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Table 1. Direct production costs of rice, potatoes and cassava in Colombia (1981) ^{1/} ^{2/} US-dollars/ha

| | Irrigated Rice | Potato | Cassava |
|--------------------------|----------------|-----------|-----------|
| Machinery | 185 | 83 | 81 |
| Labour | 108 | 473 | 289 |
| Water | 74 | - | - |
| Seed | 93 | 335 | 93 |
| Other inputs | 201 | 502 | 88 |
| Total costs | 661 | 1,394 | 551 |
| Yield (kg) | 2,560 | 20,000 | 22,000 |
| Yield (kcal) | 913,206 | 1,400,000 | 2,398,000 |
| Total costs per kg | 0.26 | 0.07 | 0.03 |
| <u>Total costs</u> | | | |
| 100,000 kcal | 72.4 | 99.6 | 23.0 |
| <u>Total cost-labour</u> | | | |
| 100,000 kcal | 60.6 | 65.78 | 10.93 |
| Total costs/100g protein | 0.34 | 0.42 | 0.27 |

^{1/} The table considers only direct costs, not land. Data are slightly biased in favor of cassava because of its longer growing cycle entailing higher land management and capital costs. These costs can be estimated at approximately US\$100 per crop for rice, \$160 for potato and \$173 for cassava.

^{2/} Sources: rice, CIAT (1981); potato, Flores et al., (1979); cassava, CIAT Cassava Programme Internal Document (1983).

Table 2. Area, yield and production of cassava, rice and potatoes on a global and Latin America basis, 1971 and 1981 ^{1/}

| | World | | | Latin America | | |
|---------|-------------------|---------------------------------|-------------------------------------|-------------------|--------------------------------|-------------------------------------|
| | Area (1000 ha) | Yield (kg ha ⁻¹) | Production (1000 metric tons) | Area (1000 ha) | Yield (kg h ⁻¹) | Production (1000 metric tons) |
| 1971 | | | | | | |
| Cassava | 10836 | 9436 | 102248 | 2597 | 13788 | 35808 |
| Rice | 134148 | 2304 | 309096 | 6581 | 1706 | 11224 |
| Potato | 22294 | 13140 | 292945 | 1127 | 8189 | 9229 |
| 1981 | | | | | | |
| Cassava | 14054 | 9055 | 127161 (24%) ^{2/} | 2734 | 11569 | 31631 (-12%) |
| Rice | 144915 | 2855 | 413785 (34%) | 8220 | 1896 | 15586 (39%) |
| Potato | 17861 | 14387 | 256978 (-12%) | 1046 | 11261 | 11779 (28%) |

^{1/} FAO - Production Yearbooks, 1972 and 1982.

^{2/} Growth over 10 year period given in parentheses.

Table 3A. Latin America: Rural, Urban and total population, 1960 and 1981

Latin America : Rural, Urban and Total Population, 1960 and 1981.

| | Rural Population | Urban Population | Total Population |
|-----------------|------------------|------------------|------------------|
| 1960-absolute : | 101.611.000 | 100.142.000 | 201.753.000 |
| % : | 50.4 | 49.6 | 100.0 |
| 1981-absolute : | 114.067.000 | 235.139.000 | 349.206.000 |
| % : | 32.7 | 67.3 | 100.0 |
| % growth : | 0.55 | 4.15 | 2.65 |

Table 3B. Colombia: Rural, Urban and total population, 1960 and 1981

| Colombia | Rural Population | Urban Population | Total Population |
|-----------------|------------------|------------------|------------------|
| 1960-absolute : | 8.957.000 | 8.256.000 | 17.213.000 |
| % : | 52.0 | 48.0 | 100.0 |
| 1981-absolute : | 5.833.000 | 20.832.000 | 26.665.000 |
| % : | 21.9 | 78.1 | 100.0 |
| % of growth : | -1.5 | 4.5 | 2.1 |

Source : Interamerican Development Bank (1981).

Table 4. Consumption of fresh cassava in different Latin American countries; total urban and rural consumption per head (kg/year)

| | Rural | Urban | Total |
|-------------------------|-------|-------|-------|
| Bolivia (72) | 17.0 | 5.4 | 15.3 |
| Brasil (75) | 11.2 | 2.7 | 6.3 |
| Colombia (70) | 35.0 | 16.5 | 20.4 |
| Cuba (76) | 30.0 | 12.4 | 18.8 |
| Dominican Republic (75) | 42.3 | 20.0 | 33.1 |
| Ecuador (74) | 31.0 | 6.0 | 19.0 |
| Paraguay (76) | 180.0 | 35.0 | 110.1 |
| Peru (76) | 18.3 | 5.6 | 11.0 |
| Venezuela (75) | 27.4 | 5.0 | 9.8 |
| Total | 19.1 | 5.9 | 11.4 |

Year of estimation in parenthesis.

Source: Lynam and Pachico (1983).

Table 5. Change in per capita consumption (kg/year) of cassava, rice and potatoes - Cali, 1970-1982

| | Per capita Consumption ^{1/} 1970 | Per capita Consumption ^{2/} 1982 | % Change | % Change in price |
|---------|---|---|----------|----------------------|
| Cassava | 27.4 | 12.8 | -53.3 | 210 |
| Rice | 33.2 | 37.8 | 13.8 | 16.0 |
| Potato | 27.9 | 56.6 | 102.9 | -4.3 |

Source : ^{1/} Pinstrup Andersen Nora de Londoño (1971).

^{2/} Nora de Londoño, personal communication, 1983.

Table 6. Percentage of total volume of cassava, potatoes and rice sold in neighbourhood shops and in the central market place in Cartagena, Colombia, 1973, compared with their price in each location

| Commodity | <u>Neighbourhood Shop</u> | | <u>Central Market Place</u> | |
|-----------|---------------------------|------------------------|-----------------------------|----------|
| | % Sold | Price/kg ^{1/} | % Sold | Price/kg |
| Cassava | 46 | 0.15 | 50 | 0.13 |
| Rice | 32 | 0.25 | 51 | 0.25 |
| Potato | 39 | 0.23 | 55 | 0.23 |

^{1/} Prices in US\$.

Source: CEIMA (1973).

Table 7. Characteristics of the wholesaler sector of Cucuta, 1973 ^{1/}

| Wholesalers | Number of employees | Buying frequency (days) | Average purchase (tons) | Trade per wholesaler per month (tons) | Always buy at same supplier (%) |
|----------------------------|---------------------|-------------------------|-------------------------|---------------------------------------|---------------------------------|
| Grains, processed products | 2.7 | 13.7 | 34.1 | 76 | 37.5 |
| Potato | 1.0 | 1.6 | 6.6 | 140 | 0. |
| Plantain/cassava | 1.3 | 1.1 | 2.5 | 75 | 100. |

^{1/} Source: CEIMA (1973).

Table 8. Comparison of the different characteristics of cassava, rice and potato in both rural-self-producing and urban-purchasing communities ^{6/}

| Characteristics | Rural | | | Urban | | |
|---|---------|------|--------|---------|------|--------|
| | Cassava | Rice | Potato | Cassava | Rice | Potato |
| <u>Price</u> ^{1/} | 5 | 3 | 4 | 3 | 5 | 3 |
| <u>Composition (nutritional quality)</u> | 2 | 4 | 4 | 2 | 4 | 4 |
| <u>Production flexibility</u> ^{2/} | 4 | 2 | 3 | n/a | n/a | n/a |
| <u>Combination in the diet</u> ^{3/} | 3 | 4 | 2 | 3 | 4 | 3 |
| <u>Availability through year</u> | 2 | 3 | 2 | 3 | 5 | 4 |
| <u>Perishability</u> | 4 | 4 | 3 | 1 | 4 | 3 |
| <u>Acquisition cost/effort</u> | n/a | n/a | n/a | 1 | 5 | 3 |
| <u>Waste in preparation</u> | 3 | 3 | 3 | 3 | 5 | 4 |
| <u>Facility of preparation</u> | 4 | 4 | 4 | 4 | 4 | 4 |
| <u>Utilization possibilities</u> ^{4/} | 5 | 3 | 4 | n/a | n/a | n/a |
| <u>Minimum size of consumption/purchase</u> ^{5/} | 3 | 5 | 3 | 2 | 5 | 3 |

^{1/} In rural societies this means production costs, especially cash expenses. In urban areas it refers to the retail price.

^{2/} As regards inter- and mixed cropping, planting and harvest times and spread of labour needs through crop cycle.

^{3/} Different ways in which it can be incorporated into a meal.

^{4/} Different ways the crop can be processed.

^{5/} Size of minimum purchase unit.

^{6/} Scale used: 5, good; 1, bad; n/a, not applicable.

Table 9. Relative price and consumption of potatoes and rice in comparison with cassava in several Latin American countries

| | Potato | | Rice | |
|-----------------------------|------------------------------|------------------------------------|----------------|----------------------|
| | relative price ^{1/} | Relative consumption ^{2/} | Relative price | Relative consumption |
| BRASIL ^{3/} | | | | |
| Recife | 3.19 | 1.06 | 0.66 | 13.0 |
| Sao Paulo | 2.15 | 8.18 | 0.35 | 115.0 |
| COLOMBIA | | | | |
| Barranquilla | 1.51 | 0.63 | 0.65 | 5.7 |
| Bogota | 0.85 | 3.06 | 0.43 | 7.18 |
| PERU | | | | |
| Lima | 1.41 | 7.54 | 0.66 | 27.0 |
| VENEZUELA | | | | |
| Caracas | 1.16 | 1.06 | 0.20 | 2.93 |

^{1/} Price calorie of rice or potato divided by price/calorie of cassava.

^{2/} Calories of rice or potato/calories of cassava.

^{3/} Sources. Lynam and Pachico (1983) for price data and for consumption figures:

Brasil: Anon (1977).

Colombia: Anon (1978).

Peru: P. Lizardo de las Casas Moyas: (1977).

Venezuela: Anon (1965).

Table 10. Effect of successful cassava-deterioration research in Colombia ^{1/}

| | Price elasticity of supply 0.5 | | | | Price elasticity of supply 1.0 | | | | |
|---|-----------------------------------|---------------------------|--------------|--------------|-----------------------------------|---------------------------|--------------|--------------|-------|
| | Margin decreases to | | | | Margin decreases to | | | | |
| | 0.13 ^{2/} | 0.18 | 0.23 | 0.28 | 0.13 | 0.18 | 0.23 | 0.28 | |
| A. Expected benefits: (million US\$/year) | | | | | | | | | |
| willingness to pay: | | | | | | | | | |
| (WNP) | 0 | 36.35 | 27.42 | 18.89 | 10.74 | 37.31 | 27.99 | 19.17 | 10.84 |
| | + 5 | 45.67 | <u>36.35</u> | <u>27.42</u> | 18.89 | 47.12 | <u>37.31</u> | <u>27.99</u> | 19.17 |
| | +10 | 55.38 | <u>45.67</u> | <u>36.35</u> | 27.42 | 57.41 | <u>47.12</u> | <u>37.31</u> | 27.99 |
| | | consumer benefits = 59.7% | | | | consumer benefits = 74.8% | | | |
| | | producer benefits = 40.3% | | | | producer benefits = 25.2% | | | |
| B. Projected consumption per capita (present consumption = 10 kg) | | | | | | | | | |
| (WNP) | + 0 | 12.35 | 11.82 | <u>11.29</u> | 10.76 | 12.93 | 12.26 | 11.60 | 10.94 |
| | + 5 | 12.88 | <u>12.35</u> | <u>11.82</u> | 11.29 | 13.60 | <u>12.93</u> | <u>12.26</u> | 11.60 |
| | +10 | 13.41 | 12.88 | <u>12.35</u> | 11.82 | 14.26 | <u>13.60</u> | <u>12.93</u> | 12.26 |
| C. Projected prices at retail level, WNP (present retail price = US\$0.54) | | | | | | | | | |
| (WNP) | + 0 | 0.41 | 0.44 | 0.47 | 0.50 | 0.38 | 0.41 | 0.45 | 0.49 |
| | + 5 | 0.43 | <u>0.46</u> | <u>0.49</u> | 0.52 | 0.39 | <u>0.43</u> | <u>0.46</u> | 0.50 |
| | +10 | 0.45 | <u>0.48</u> | <u>0.52</u> | 0.54 | 0.40 | <u>0.44</u> | <u>0.48</u> | 0.51 |
| D. Projected prices at farm level. (present farm price = US\$0.19) | | | | | | | | | |
| (WNP) | + 0 | 0.28 | 0.26 | 0.24 | 0.22 | 0.25 | 0.23 | 0.22 | 0.21 |
| | + 5 | 0.30 | <u>0.28</u> | <u>0.26</u> | 0.24 | 0.26 | <u>0.25</u> | <u>0.23</u> | 0.22 |
| | +10 | 0.32 | <u>0.30</u> | <u>0.28</u> | 0.26 | 0.27 | <u>0.26</u> | <u>0.25</u> | 0.23 |

^{1/} Most reasonably to be expected values are underlined.

^{2/} US\$.

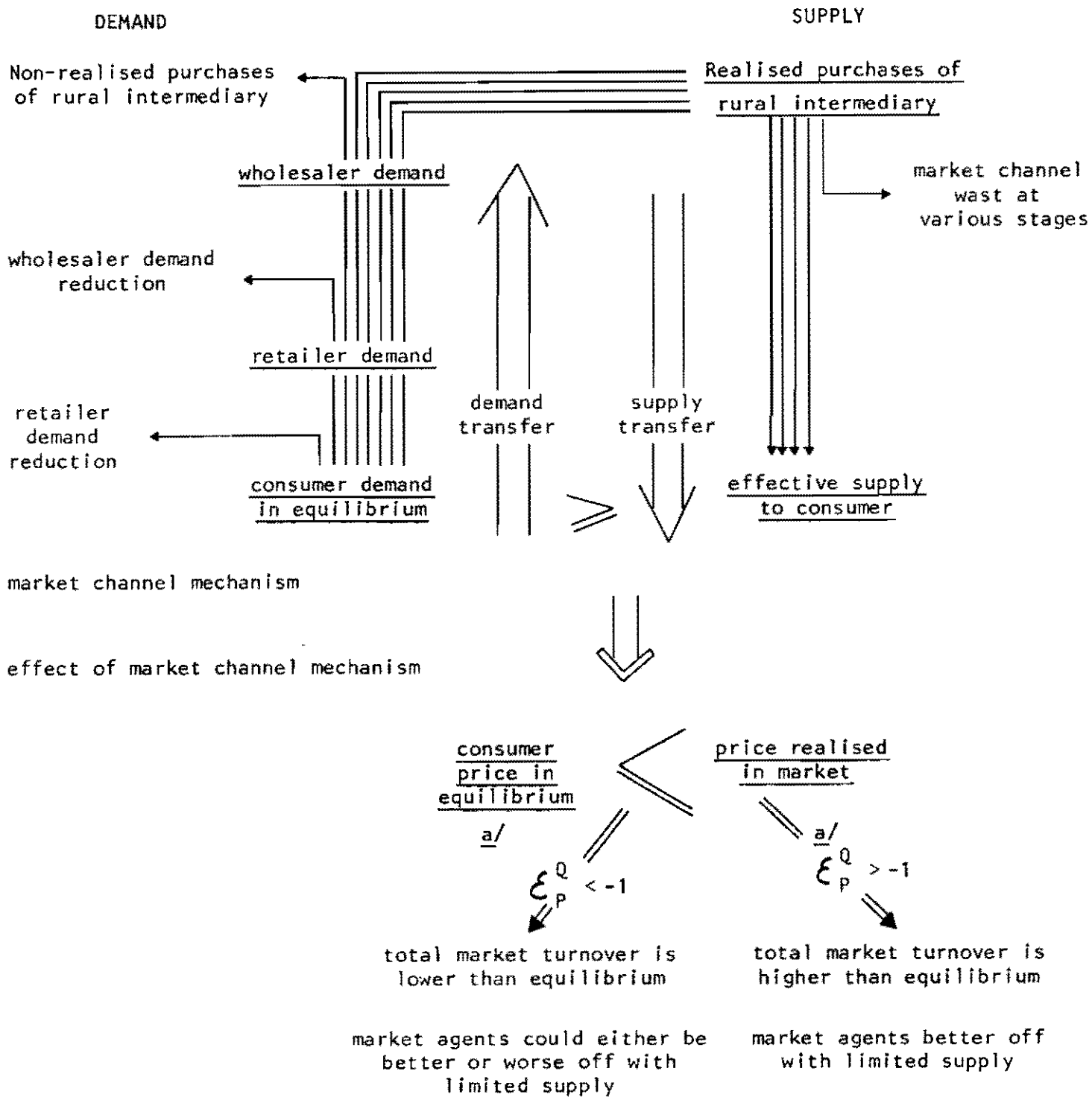


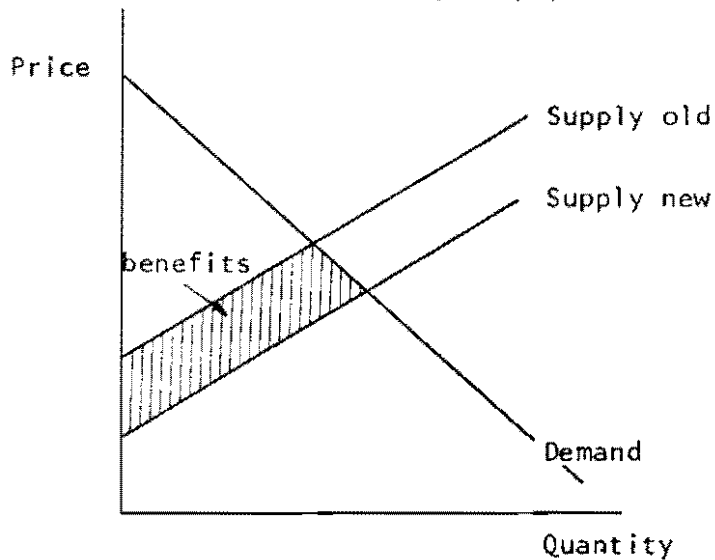
Fig. 1. The demand mechanism of fresh cassava in Colombia and its effect on prices

Explanation: The arrows upwards symbolise the demand that is transferred, the arrows downwards, the actual amount of supplied cassava. Starting from consumers' demand in equilibrium one sees that the demand transfer decreases gradually and that in the end less cassava than actually demanded reaches the consumer. This causes a price above equilibrium level

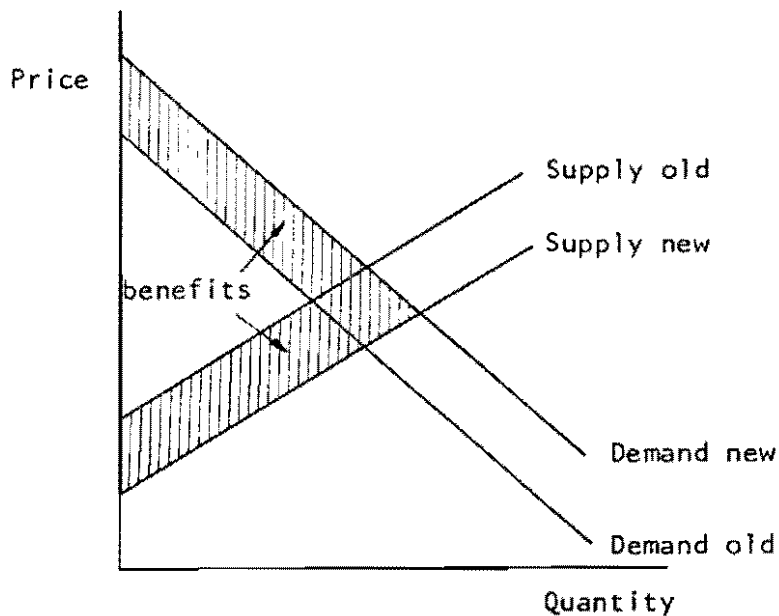
$\frac{a}{\epsilon_P^Q} = \text{Price elasticity of demand} = \frac{\text{percentual change in demand}}{\text{percentual change in price}}$

Fig. 2. Effects of successful deterioration research on socio-economic benefits

A : Decrease in the marketing margin and subsequent shift of supply function: traditional caso of socio-economic benefits (Benefits according to Curry, Murphy and Schmidt, 1971).



B : Increase in the willingness to pay because of improved quality and decrease in the marketing margin and subsequent shift of supply function: non traditional caso of socio-economic benefits (Benefits according to Curry, Murphy and Schmidt, 1971 and Willig, 1976).



✓
FOOD CONSUMPTION PATTERNS IN COLOMBIA -A CROSS-SECTIONAL ANALYSIS
OF THE DANE DRI 1981 HOUSEHOLD SURVEY ✓

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The responsibility for errors remains strictly with the authors.

Introduction

Nutrition-related issues of technology design and its impact have received increasing attention lately. It is generally acknowledged that the link between increased food production and improved nutrition, particularly of the poor is not as straight-forward as conventionally assumed.

The first step towards a better understanding of these relationships is to improve to knowledge of present consumption patterns and how they are influenced by prices, incomes, and other variables. CIAT started to work along this line as early as 1971, with a detailed survey of consumption patterns in Cali (ANDERSEN and LONDOÑO, 1976).

Several studies were undertaken for different commodities and groups of commodities based on the ECIEL data. This data set covered expenditure surveys in the major cities of Latin America during the early seventies (RUBINSTEIN and NORES, 1980). Recently a series of smaller specialized surveys were conducted in Cali and Medellín (PACHICO, LONDOÑO and DUQUE, 1983).

The offer by DRI-PAN to analyze their 1981 nutrition survey gave CIAT a very welcome opportunity to look into consumption patterns for the whole of Colombia with a representative sample and a sample size of a magnitude making it possible to disaggregate by urban vs rural sector, as well as different geographical regions and income strata.

Objective

The objective of this paper is to present quantitative information on Colombian consumption of different foods by region, urban or rural sector and income strata in terms of physical amounts, contribution to protein and calorie supply, and expenditure share. This shall be followed by the estimation of income, price and cross-price elasticities for various types of foods of particular relevance to CIAT research by income strata.

Data Base

The study is based on a cross sectional survey of 9000 households undertaken by Departamento Nacional de Planeación (DNP) and Departamento Administrativo Nacional de Estadística (DANE) in the course of the last trimester of 1981. The sample is representative for the population of all of Colombia except a few administrative units (intendencias and comisarías) in the east of the country, which are very sparsely populated.

The survey covers food expenditure and amounts consumed, including food produced by the household. The survey information has been converted into equivalent monthly consumption. A more detailed survey of food consumption during the 24 hours prior to the survey was performed for

1/3 of the households thus enabling certain cross-checks to be undertaken.

The sampling frame is based on the 1973 Housing and Population Census undertaken by DANE. The sample was drawn to obtain representative results for the urban and rural sectors as well as regions.

The country was divided into five regions¹ and each region, except the Distrito Especial (Bogotá) includes a rural and an urban area.²

In food policy research, particularly in relation to technological changes in food production, estimation of income and price elasticities of various commodities is a necessary first step to quantify welfare gains and losses of different groups of population. A particularly common issue is the impact of food price changes on the nutritional status of specific population groups, e.g. the urban poor, the "small" farmers, the landless.

Another question frequently raised is the impact of technical change in reducing the price of one food commodity or the price and/or quantity demanded of other goods, and the consequent distribution of welfare gains and losses.

These processes of substitution among commodities become more evident as more disaggregated analysis is undertaken. Substitution in reaction to changes in relative prices is prone to be larger between poultry and beef than between animal and vegetable protein sources such as beans.

1/ The regions are: (1) Atlantic (Córdoba, Sucre, Magdalena, Atlántico, Bolívar, Cesar and Guajira); (2) Eastern (Norte de Santander, Santander del Sur, Cundinamarca and Meta); (3) Bogota, Distrito Especial de Bogotá; (4) Central (Antioquia, Caldas, Huila, Tolima, Quindío and Risaralda); (5) Pacific (Chocó, Nariño, Cauca and Valle del Cauca).

2/ More detailed information reported by DANE (1981). Encuesta Nacional de Hogares, Etapa 33, Alimentación y Nutrición, four volumes.

Given the interest in specific commodities, the present analysis was undertaken at a fair degree of disaggregation made possible because the primary data was broken down to 570 items.

The survey has a very marked nutritional emphasis, which is reflected by the fact that for each food item the calorie and protein content are included besides the physical amount and corresponding expenditure. In addition each household record includes information on the expansion factor to generate estimates on the universe. It must be stressed that the survey does not include out-of-home food expenditure.

Reported income information is frequently imprecise in household surveys. In this survey, in some cases total income was below the corresponding food expenditure. In such cases the value of food expenditure was used as income parameter.

The fact that the survey is a food expenditure survey and not a household expenditure survey determines that other household expenditures are quantified rather poorly. Thus, total household expenditures could not be used as a proxy for income. Therefore total income was used for the definition of the income quintiles and for the computation of income elasticities.

Methodology

The attractiveness of using cross-sectional data for food consumption analyses stems from the added dimensions of variability of the socioeconomic characteristics of households that can be included for inferences. In this case income, rural or urban sector and geographic region were the variables considered most interesting by which food consumption is broken down in the descriptive part of the analysis.

The variables used in the consumption models included income and various implicit prices. The functional form was not predetermined but chosen according to the following criteria:

- logic of the relationship;
- validity over the range of observations giving priority to the precision at the lower income levels;

-ease of estimation.

Similar approaches were used by TIMMER and ALDERMAN (1979) and HASSAN and JOHNSTON (1979).

The estimation of a complete demand system was discarded due to the limitations it imposes on the flexibility of model specification, functional forms and the degree of disaggregation since the number of parameters to be estimated is an exponential of the number of equations (n) of the order of $n^2 + n + 1$.

DUNCAN tests at 10% error probability showed significant variation in prices across income strata, regions and rural/urban sectors for various products of interest to CIAT. Significant differences also existed in quantities consumed and expenditure for these food items. Therefore a conventional model of household consumption following by TIMMER and ALDERMAN (1979) was chosen:

$$(1) \quad Q_{ih} = f(Y_h, P_i, P_j \dots P_2, H_h, T_h)$$

where:

Q_{ih} = quantity of the good i consumed per time unit by the household h

Y_h = income of the household h

P_i = price per unit of the good i

$P_j \dots P_2$ = prices of other goods which may influence the consumption of the good i

H_h = size of the household

T_h = tastes and preferences of the household h represented by region, rural or urban sector, etc.

Elasticities were calculated from double-log or Cobb Douglas Engel functions as suggested by TIMMER and ALDERMAN (1979).

The general specification used was:

$$(2) \quad Q_x = A + A_1 + a_1 TI + a_2 TI^2 + a_3 P_x + a_4 P_{y4} \dots + a_k P_{yk} + a_{k+1} R_r + a_{k+2} PTI + a_{k+3} H + a_{k+4} D + E.$$

where:

- Q_x = logarithm of the mean quantity of the good x consumed by the households of each cell (region by urban/rural sector by income quintile)
 A = intercept
 A_1 = specific intercept for each quintile
 TI = logarithm of the mean income of the households of each cell
 TI² = TI square
 P_x = implicit price (expenditure/amount consumed) of the good x in each cell
 P_{yk} = implicit prices per cell of other j products (j = 4, k)
 R_r = 0-1 dummy for urban and rural sectors
 RTI = $R_r \times TI$
 H = average household size per cell in terms of adult equivalents (based on calorie consumption)
 D = 0-1 dummy for each income quintile

In addition log-lineal functions with a single income term (TI) were used and log lineal functions with five income terms (D x TI); this latter function was tested in an attempt to estimate quintile specific income elasticities without predetermining a curvilinear monotonous change of the income elasticities with increasing income.

The model with a single income term assumes constant income elasticities across quintiles, thus underestimating income elasticities of the lower strata by neglecting the curvature of the Engel functions. The models including multiplicative dummies to estimate independent elasticities for each quintile yielded biased estimates due to the high collinearity between the dummies. To reduce this problem of collinearity, principal components analyses were performed, accepting the fact that coefficients obtained are not unbiased. The most widely used model was equation (2) which implies incomes elasticities of $a_1 + 2a_2 TI$ with generally negative values for $2a_2$ implying higher elasticities for lower income groups.

TIMMER and ALDERMAN also used the log-lineal function with an inverse income term to estimate curvilinear elasticities. They realized that this form tends to underestimate elasticities at the low income levels while the quadratic form tends to underestimate the elasticities at the higher income levels. Given the fact that for food policy analysis the elasticities of the lower income strata are particularly relevant, the quadratic form is preferred.

To reduce heteroskedasticity problems caused by uneven number of cases per cell, data is weighted by the square root of the number of households per cell. Additionally, NORES and RUBINSTEIN (1980) pointed out that the use of double-log functions is the best maximum likelihood transformation to reduce heteroskedasticity problems.

Consumption Patterns

Table 1 presents information on absolute consumption levels of 28 major food items which in the aggregate represent 96.7% of the national food expenditure. Data have been converted to an annual basis per adult equivalent, referring to physical amounts as purchased (products like milk and different dairy products have not been converted into fresh milk equivalents). It must be kept in mind that they do not include food eaten out-of-home. Furthermore, extrapolation to an annual basis has not taken account of seasonal patterns of consumption. These factors probably explain most of the variation between these estimates and per capita consumption estimated from aggregate data.

The most outstanding result is the high degree of variability among diets both at the regional level and within regions between the urban and rural sector. This is pinpointed by the case of beef. The Atlantic region, a beef surplus region has the highest beef consumption levels with 30 kg in rural areas and 46 kg p.a. in urban areas¹. At the same time this region has high fish consumption explained by the location along the Caribbean coast. While fish is mainly consumed in rural

¹/ These levels are not directly comparable with aggregate statistics because offals are included in addition to carcasses.

Table 1. Food consumption in Colombia, by geographical region and rural/urban sector, 1981
(kg/adult equivalent/year)

| Type of food | Atlantic ¹ | | Eastern ² | | Bogota | Central ³ | | Pacific ⁴ | | Average |
|-------------------|-----------------------|--------|----------------------|-------|--------|----------------------|-------|----------------------|-------|---------|
| | Rural | Urban | Rural | Urban | Urban | Rural | Urban | Rural | Urban | |
| Beef ⁵ | 29.99 | 46.02 | 23.04 | 34.90 | 32.90 | 30.60 | 31.92 | 16.19 | 31.94 | 31.72 |
| Pork | 1.48 | 1.68 | 0.16 | 0.43 | 0.77 | 1.19 | 2.57 | 0.62 | 2.25 | 1.38 |
| Poultry | 1.42 | 2.95 | 0.98 | 1.43 | 3.19 | 1.10 | 2.24 | 0.93 | 4.58 | 2.25 |
| Eggs | 5.16 | 6.75 | 7.20 | 8.87 | 9.68 | 6.19 | 8.64 | 3.94 | 9.09 | 7.68 |
| Fish | 15.79 | 9.50 | 0.44 | 1.02 | 1.27 | 0.57 | 0.64 | 2.50 | 3.97 | 3.39 |
| Dairy products | 84.94 | 78.50 | 79.00 | 84.83 | 88.58 | 45.09 | 68.03 | 35.60 | 58.86 | 70.59 |
| Rice | 65.07 | 58.50 | 26.00 | 30.13 | 33.51 | 31.15 | 32.00 | 43.66 | 49.22 | 39.58 |
| Maize | 7.30 | 10.45 | 26.30 | 9.00 | 9.45 | 46.39 | 29.93 | 20.16 | 11.90 | 19.76 |
| Wheat | 0.41 | 0.82 | 6.92 | 7.16 | 3.33 | 2.76 | 1.75 | 7.23 | 4.52 | 3.55 |
| Bread | 3.03 | 11.37 | 10.10 | 22.82 | 20.38 | 2.05 | 7.24 | 4.90 | 21.03 | 11.86 |
| Noodles | 4.76 | 10.66 | 9.76 | 9.36 | 8.03 | 3.89 | 3.71 | 6.08 | 6.28 | 6.16 |
| Other cereals | 1.00 | 3.16 | 3.26 | 3.48 | 4.40 | 1.94 | 3.38 | 3.00 | 4.49 | 3.28 |
| Potatoes | 11.93 | 24.28 | 83.76 | 82.09 | 80.07 | 42.36 | 45.83 | 66.40 | 65.34 | 56.11 |
| Plantains | 104.30 | 101.96 | 39.17 | 37.30 | 31.96 | 86.39 | 58.79 | 105.02 | 91.55 | 68.89 |
| Cassava | 72.62 | 42.26 | 39.00 | 23.50 | 7.17 | 35.41 | 12.50 | 17.29 | 8.28 | 25.47 |
| Yams | 13.54 | 28.92 | 0.06 | 0.08 | 0.03 | 0.00 | 0.00 | 0.11 | 0.04 | 4.35 |
| Other root crops | 0.25 | 0.89 | 6.93 | 3.04 | 3.10 | 2.02 | 2.83 | 3.70 | 3.02 | 2.88 |
| Sugar | 34.64 | 38.02 | 55.07 | 52.30 | 46.50 | 77.92 | 61.42 | 54.17 | 57.65 | 53.86 |
| Beans | 4.52 | 4.74 | 4.68 | 4.80 | 6.01 | 12.51 | 10.45 | 5.00 | 8.25 | 7.22 |
| Chickpeas | 0.04 | 0.16 | 0.66 | 1.04 | 1.93 | 0.04 | 0.14 | 0.04 | 0.46 | 0.55 |
| Green peas | 0.80 | 1.32 | 8.18 | 7.65 | 9.50 | 1.98 | 3.82 | 1.65 | 4.46 | 4.66 |
| Lentils | 0.30 | 1.74 | 1.65 | 2.70 | 3.74 | 0.41 | 1.36 | 1.43 | 3.93 | 2.02 |
| Other pulses | 0.16 | 0.22 | 2.33 | 1.66 | 2.03 | 0.07 | 0.22 | 5.61 | 3.85 | 1.57 |
| Fats | 11.63 | 21.18 | 11.94 | 13.94 | 18.05 | 12.73 | 15.23 | 12.24 | 20.76 | 15.78 |
| Soft drinks | 2.40 | 14.80 | 7.70 | 9.19 | 12.42 | 0.89 | 4.14 | 0.18 | 6.30 | 6.90 |
| Coffee | 4.92 | 4.38 | 4.16 | 4.59 | 4.03 | 3.20 | 3.03 | 8.91 | 5.38 | 4.40 |
| Fruits | 62.50 | 88.13 | 60.92 | 68.34 | 79.42 | 36.52 | 47.11 | 30.97 | 76.07 | 62.09 |
| Vegetables | 25.21 | 48.60 | 35.29 | 46.80 | 56.38 | 19.93 | 35.48 | 33.94 | 58.97 | 41.32 |
| Others | 13.32 | 13.73 | 12.35 | 10.04 | 9.92 | 12.31 | 9.95 | 12.12 | 10.31 | 11.31 |

1/ Includes the departments of: Córdoba, Sucre, Magdalena, Atlántico, Bolívar, Cesar and Guajira.

2/ Includes the departments of: Norte de Santander, Santander del Sur, Cundinamarca and Meta.

3/ Includes the departments of: Antioquia, Caldas, Huila, Tolima, Quindio and Risaralda.

4/ Includes the departments of: Chocó, Nariño, Cauca and Valle del Cauca.

5/ Includes all cuts of beef and offals.

Source: Estimates based on the 1981 DRI-PAN nutrition survey of Colombia.

settings, beef and poultry are typical urban commodities. Differences are more marked in terms of the basic calorie sources in the diets. Rice consumption is very high in both coastal lowland regions while corn is important in the central region with higher topography and small farms. Wheat is an urban commodity. Potato consumption is concentrated in the highland areas of the Eastern region, Bogota and to a lower degree the Southern Highlands which correspond to the Pacific region. Plantains present a regional pattern similar to the one of rice; they are mainly consumed in the two coastal regions. Urban consumption levels are only slightly below rural ones. Cassava presents a markedly more rural consumption pattern and is highly concentrated in the North Coast.

Bean consumption per adult equivalent ranges between 4.5 and 12 kg p.a. with a clear concentration in the central region, thus following the pattern of corn, a fact associated with the practice of mixed cropping of these two crops in that region. No marked differences between rural and urban consumption levels can be determined. Green peas consumption is very variable across regions reaching levels between 7.5 kg and 9.5 kg in Bogota and the Eastern region.

High levels of consumption are reported for fruits and vegetables reaching levels of 88 and 58 kg p.a. respectively with a marked tendency to higher levels in urban areas.

Observed consumption patterns correlate closely with the factor endowment of the regions and are consistent with previous information.

Protein Supply

The fact that information supplied by DANE/DRI included the conversion of all food into energy and protein made it possible to estimate availability per adult-equivalent. Table 2 presents some aggregate indicators of nutrient intake broken down by income level, geographical region and urban or rural areas. More detailed information on the income characteristics of each quintile and on the structure of the protein and energy supply are given in Appendix Tables A.1 to A.13.

Table 2. Calorie and protein intake per adult equivalent by income strata, urban/rural sector and geographic region, Colombia, 1981

a) Income quintiles

| | I | II | III | IV | V |
|-----------------------------|--------|--------|--------|--------|--------|
| Protein (g/day) | 40.33 | 60.04 | 74.29 | 82.76 | 84.93 |
| Percentage of animal origin | 32.93 | 39.91 | 44.03 | 46.26 | 49.28 |
| Energy (cals/day) | 1904.5 | 2576.3 | 2961.1 | 3197.1 | 3118.8 |

b) Geographic regions

| | Atlantic | Eastern | Bogota | Central | Pacific |
|-----------------------------|----------|---------|---------|---------|---------|
| Protein (g/day) | 72.28 | 68.25 | 69.73 | 64.75 | 70.28 |
| Percentage of animal origin | 53.03 | 40.35 | 43.50 | 44.23 | 37.76 |
| Energy (cals/day) | 2826.00 | 2750.50 | 2522.70 | 2673.53 | 2983.40 |

c) Urban versus rural areas

| | Urban | Rural |
|-----------------------------|---------|---------|
| Protein (g/day) | 70.50 | 64.93 |
| Percentage of animal origin | 45.90 | 39.55 |
| Energy (cals/day) | 2689.44 | 2868.41 |

If the norm of 62 g of protein/day/adult equivalent is accepted (for a discussion of these FAO norms see FAO Report No.52 1973) at least the poorest 20% of the Colombian population are in protein deficit and the following quintile is barely reaching the requirement. Distribution of animal protein consumption is even more skewed among income groups. While the poorest quintile consumes only 33% of the 40 g of protein as animal protein, the upper quintile consumes 50% of the total of 85 g of protein as protein of animal origin. Across regions differences are less pronounced with the Atlantic region having the highest levels, only 8 g above the lowest ranking Central region.

The Pacific region shows the lowest percentage of animal protein in total protein intake with only 38%. This does not correlate with its total protein intake, which is the second highest in this region.

Energy Supply

According to the requirements estimated by DRI-PAN per adult equivalent of 3000 Cals/day, 50% of the Colombian population are consuming enough calories (Table 2). This confirms the general hypothesis of nutritionists, that in most cases energy is in worse supply than protein. Clearly the most critical situation is in Bogotá. The strata I to III of the urban sector, show consumption lower than 3000 calories. In the rural sector this only occurs in the stratas I to II. The calories consumption of the rural sector is higher than that of the urban sector.

Sugar and cereals (rice, maize) are the most important energy sources across regions followed by fats and root crops (potatoes, cassava). The latter are the second energy source in the Eastern region, mainly due to the share of potatoes. Cassava contributes between 8.5% of total energy intake in the Atlantic region and 0.92% in Bogota.

Very distinct patterns of change of energy sources by income levels can be observed. Sugar and cereals drop somewhat in shares with rising incomes, root crops and particularly cassava drop more markedly, pulses

remain about constant while fats, meat, dairy products and eggs increase substantially (Annex Table A.11).

Expenditure Shares

Table 3 presents the expenditure shares of the main food items ordered in terms of decreasing importance. The 28 categories reported cover 96.7% of the national average total food expenditure. Beef and milk rank first and second respectively both in the urban and rural areas. They comprise 28.2% of the total food expenditure in urban sectors and 23.4% in rural areas. They are followed by sugar, vegetables and fruits. Positions 6 to 9 are occupied by energy sources: rice, oils and fats, potatoes and plantains; the latter two being consumed more in rural areas. Eggs follow in position 10. These ten commodities represent 75% of total expenditure on a national average.

The regional differences in expenditure shares for selected food items are presented in Table 4. Differences clearly follow consumption levels but are frequently less marked due to price changes, e.g. the Atlantic region has the highest beef consumption levels but only the second highest expenditure shares for beef. Similarly the differences among regions in expenditure shares for beans and cassava are less marked than differences in consumption levels. The expenditure shares for sugar are very high in all regions reaching 12.4% in Central region, second only to beef in that region.

Interactions between rural/urban areas and income levels with respect to expenditure shares are presented in Table 5. The general pattern of changes with rising income is similar for both rural and urban areas: beef, dairy products, fruits and vegetables rise with increasing incomes while rice, cassava, sugar and potatoes drop in importance. Beans and fats present diverting patterns: in urban areas their participation drops with rising incomes while the contrary occurs in rural areas.

Elasticities

Table 6 presents income and price elasticities for 17 food items. With

Table 3. Expenditure shares of main food types as percentages of total food expenditure, Colombia, 1981 (percentage)

| Type of food | Expenditure share | | |
|------------------|-------------------|--------------|--------------|
| | National average | Urban | Rural |
| Beef | 16.7 | 17.7 | 14.3 |
| Dairy products | 10.1 | 10.5 | 9.1 |
| Sugar | 8.7 | 8.0 | 10.4 |
| Vegetables | 7.1 | 7.6 | 6.0 |
| Fruits | 6.7 | 7.5 | 4.8 |
| Rice | 6.1 | 5.7 | 7.2 |
| Fats | 6.0 | 6.1 | 5.6 |
| Potatoes | 5.0 | 4.3 | 6.7 |
| Plantains | 5.0 | 3.9 | 7.6 |
| Eggs | 3.4 | 3.5 | 3.1 |
| Bread | 3.2 | 3.9 | 1.6 |
| Maize | 2.6 | 2.1 | 3.9 |
| Beans | 2.1 | 2.0 | 2.2 |
| Cassava | 2.0 | 1.4 | 3.7 |
| Coffee | 1.5 | 1.3 | 1.8 |
| Other cereals | 1.5 | 1.7 | 1.1 |
| Fish | 1.4 | 1.4 | 1.5 |
| Poultry | 1.3 | 1.6 | 0.8 |
| Noodles | 1.2 | 1.3 | 1.5 |
| Green peas | 1.2 | 1.3 | 1.0 |
| Pork | 0.9 | 1.1 | 0.5 |
| Lentils | 0.7 | 0.8 | 0.4 |
| Soft drinks | 0.7 | 0.8 | 0.4 |
| Wheat | 0.5 | 0.4 | 0.7 |
| Yams | 0.3 | 0.3 | 0.3 |
| Other root crops | 0.3 | 0.3 | 0.3 |
| Other pulses | 0.3 | 0.2 | 0.4 |
| Chickpeas | 0.2 | 0.2 | 0.4 |
| Other foods | 3.3 | 3.2 | 3.1 |
| Total | 100.0 | 100.0 | 100.0 |

Table 4. Expenditure shares (percentage) of main food types by geographic region, Colombia, 1981

| Type of food | R e g i o n | | | | |
|----------------|-------------|-------------|-------------|-------------|-------------|
| | Atlantic | Eastern | Bogota | Central | Pacific |
| Beef | 17.3 | 14.5 | 15.1 | 19.6 | 15.5 |
| Dairy products | 11.4 | 10.2 | 11.4 | 9.4 | 8.3 |
| Rice | 8.7 | 4.6 | 4.5 | 5.3 | 7.2 |
| Beans | 1.4 | 1.4 | 1.6 | 3.4 | 1.9 |
| Cassava | 3.1 | 2.6 | 0.8 | 2.0 | 1.4 |
| Sugar | 5.0 | 9.1 | 7.2 | 12.4 | 8.2 |
| Vegetables | 8.7 | 7.5 | 9.4 | 5.2 | 5.6 |
| Fruits | 6.7 | 6.3 | 10.2 | 4.7 | 6.9 |
| Fats | 6.1 | 5.0 | 5.4 | 6.6 | 6.4 |
| Potatoes | 1.6 | 8.6 | 5.3 | 3.7 | 7.0 |
| Total | 70.0 | 69.8 | 70.9 | 72.3 | 68.4 |

Table 5. Expenditure shares (percentage) of main food types by income quintile and area, Colombia, 1981

| Type of food | Urban area | | | Rural area | | |
|----------------|-----------------|------------------|-------------|-----------------|------------------|-------------|
| | Lowest quintile | Highest quintile | Average | Lowest quintile | Highest quintile | Average |
| Beef | 14.2 | 16.6 | 17.7 | 11.6 | 15.1 | 14.3 |
| Dairy products | 8.7 | 11.3 | 10.5 | 7.7 | 10.4 | 9.1 |
| Rice | 9.7 | 4.2 | 5.7 | 9.4 | 5.6 | 7.2 |
| Beans | 2.7 | 1.6 | 2.0 | 1.8 | 2.7 | 2.2 |
| Cassava | 2.0 | 1.0 | 1.4 | 4.8 | 2.7 | 3.7 |
| Sugar | 12.0 | 6.8 | 8.0 | 12.2 | 9.5 | 10.4 |
| Vegetables | 6.7 | 7.5 | 7.6 | 5.1 | 7.2 | 6.0 |
| Fruits | 3.4 | 10.5 | 7.5 | 3.3 | 6.3 | 4.8 |
| Fats | 6.9 | 5.5 | 6.1 | 5.3 | 6.0 | 5.6 |
| Potatoes | 6.5 | 3.2 | 4.3 | 8.8 | 4.7 | 6.7 |
| Total | 72.8 | 68.2 | 70.8 | 70.0 | 70.2 | 70.0 |

Table 6. Price and income elasticities of demand for selected food items in Colombia, 1981

| Product | Average own price elasticity | Income elasticity by quintile | | | | | |
|------------------|------------------------------------|-------------------------------|--------|--------|--------|--------|---------|
| | | I | II | III | IV | V | Average |
| Animal products: | | | | | | | |
| . beef | -1.05 | 2.46 | 1.56 | 1.28 | 0.86 | -0.39 | 0.66 |
| . pork | -1.48 | 1.66 | 2.00 | 2.12 | 2.27 | 2.76 | 2.36 |
| . poultry | -0.59 | 0.48 | 1.27 | 1.54 | 1.90 | 3.03 | 2.09 |
| . fish | -2.07 | 1.55 | 1.53 | 1.52 | 1.52 | 1.48 | 1.51 |
| . eggs | -0.67* | 1.30 | 0.88 | 0.73 | 0.50 | -0.34 | 0.37 |
| . dairy products | -0.46 | 1.92 | 1.31 | 1.10 | 0.82 | -0.06 | 0.67 |
| Crop products: | | | | | | | |
| . rice | 1.42* | 0.89 | 0.87 | 0.85 | 0.82 | 0.74 | 0.83 |
| . beans | -0.70* | 0.96 | 0.58 | 0.43 | 0.23 | -0.55 | 0.11 |
| . cassava | -0.88 | 1.17 | 0.73 | 0.57 | 0.33 | -0.55 | 0.20 |
| . fruits | -0.35 | 1.84 | 1.28 | 1.09 | 0.84 | 0.64 | 0.70 |
| . fats | -1.00 | 1.39 | 0.94 | 0.77 | 0.53 | -0.37 | 0.40 |
| . bread | -2.09 | 1.74 | 1.22 | 1.05 | 0.81 | 0.07 | 0.69 |
| . potatoes | 0.26* | -0.02* | -0.03* | -0.04* | -0.04* | -0.05* | -0.04* |
| . green peas | -1.80 | 2.63 | 1.89 | 1.64 | 1.30 | 0.24 | 1.12 |
| . maize | -3.01 | 1.04 | 0.75 | 0.64 | 0.49 | 0.09 | 0.40 |
| . vegetables | -0.26 | 1.40 | 0.91 | 0.76 | 0.53 | -0.15 | 0.42 |
| . plantains | -1.25 | 1.04 | 0.64 | 0.48 | 0.26 | -0.56 | 0.14 |

* Not significant at $\alpha = 0.2$

the exception of pork and poultry meat they all present the same pattern: decreasing income elasticities with rising incomes. Quadratic functional forms were used in most cases. For green peas, bread, fruits and dairy products a better fit was obtained with the inverse income term. The potato income elasticities were the only ones not statistically significant at 20% level.

In general, income elasticities of animal products proved higher than those of crops reflecting the high consumer preference for the former, particularly among low income strata.

Average price elasticities were significant in 13 out of 17 cases and were all negative. Among the statistically significant cases eight present elasticities above one and five below one.

For the different meat types, cross-price elasticities were estimated (Table 7). The beef price has a strong substitutive effect on pork and poultry consumption. Relations between pork, poultry and fish are mostly not significant except for the complementarity between pork and poultry. This is mainly due to the overriding importance of beef in the Colombian meat consumption pattern.

Conclusions

The present analysis contributes important new elements for the assessment of agricultural research benefits and their distribution among consumers of different incomes and geographical areas.

The extent of malnutrition, particularly calorie supply is striking. If energy is in such short supply, protein can be expected to be transformed into energy, thus increasing the protein deficit. However, more disaggregated information is also needed on requirements and more thorough review of the estimation procedures would be of use to confirm these facts. If confirmed, the survey data could certainly be a valuable tool to identify priority regions and appropriate instruments.

Consistent with the high variability in agroclimatic zones, Colombia

Table 7. Cross-price elasticities among different meat types, Colombia, 1981

| Price | | Quantity consumed | | | |
|---------|-----------|-------------------|-------------------|----------------------|-------------------|
| | | Beef (Q_v) | Pork (Q_c) | Poultry (Q_a) | Fish (Q_p) |
| Beef | (P_v) | -1.05 | 6.02 | 1.76 | 1.89* |
| Pork | (P_c) | 0.08 | -1.48 | -0.83 | -0.97* |
| Poultry | (P_a) | 0.28* | -0.85* | -0.58 | -1.53* |
| Fish | (P_p) | 0.00 | 0.00 | 0.00 | -2.07 |

* Not significant at $\alpha = 0.2$

presents a very range of distinct diets. This clearly implies that not only producers but also consumers of different regions will benefit to varying degrees of technological change in any specific crop.

It is particularly striking that such large regional differences are shown by the survey in spite of the fact that some regions include very heterogeneous areas. Such is the case for the Pacific region which includes highlands in Nariño where wheat and potatoes are grown, the Cauca Valley and the high rainfall lowlands along the Pacific coast.

This heterogeneity implies that elasticities computed across consumer groups with widely different consumption patterns and preferences will produce "hybrid" estimates of limited value for use at the regional level.

In spite of some limitations, such as the lack of out-of-home food consumption data, this survey offers a wide range of possibilities of analysis due to the disaggregation level of the data and the regional and urban/rural break-down. The reported results are the product of a first look at the data. More in-depth analyses are expected to follow.

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A N N E X

Table A.1 DRI-PAN survey household distribution by geographic region and rural/urban sectors, 1981 (number of households)

| Geographic region | Sector | | |
|-------------------|-------------|-------------|--------------------|
| | Urban | Rural | Total ¹ |
| Atlantic | 946 | 693 | 1639 |
| Eastern | 920 | 811 | 1731 |
| Bogota D.E. | 1168 | 0 | 1168 |
| Central | 1564 | 939 | 2503 |
| Pacific | 1039 | 679 | 1718 |
| Total | 5637 | 3122 | 8759 |

1/ Excludes 241 surveys that do not have information about food consumption and income levels.

Source: Estimate based on the 1981 DRI-PAN nutrition survey of Colombia.

Table A.2 Household food expenditure by income quintile, Colombia, 1981 (national average)

| Income quintile | Cash income (\$/month/ household) | Total food expenditure (\$/month/ household) | Food expenditure as share of cash income (%) |
|---------------------|--|--|--|
| I | 6048.8 | 5507.4 | 91.0 |
| II | 9485.1 | 8512.5 | 89.7 |
| III | 11243.8 | 9386.3 | 83.5 |
| IV | 14347.2 | 10495.8 | 73.2 |
| V | 35665.7 | 11582.8 | 32.5 |
| National average | 16465.8 | 9347.7 | 56.8 |

Table A.3 Protein consumption by type of food and geographic region, Colombia, 1981 (g/adult equivalent/day)

| Type of food | Atlantic | Eastern | Bogotá | Central | Pacific | Average |
|------------------|--------------|--------------|--------------|--------------|--------------|--------------|
| Beef | 18.76 | 13.51 | 14.82 | 16.66 | 13.08 | 15.54 |
| Pork | 0.65 | 0.11 | 0.34 | 0.78 | 0.64 | 0.54 |
| Poultry | 0.77 | 0.40 | 1.09 | 0.61 | 1.05 | 0.75 |
| Eggs | 1.96 | 2.56 | 3.10 | 2.49 | 2.93 | 2.46 |
| Fish | 3.66 | 0.24 | 0.55 | 0.26 | 1.25 | 1.12 |
| Dairy products | 12.61 | 10.78 | 10.42 | 7.76 | 7.62 | 9.62 |
| Rice | 13.61 | 6.05 | 7.26 | 6.86 | 10.34 | 8.67 |
| Maize | 1.18 | 3.96 | 1.38 | 8.30 | 2.74 | 4.11 |
| Wheat | 0.23 | 2.52 | 1.26 | 0.80 | 2.09 | 1.31 |
| Bread | 2.04 | 4.02 | 5.10 | 1.39 | 3.90 | 3.01 |
| Noodles | 1.48 | 2.85 | 2.39 | 1.12 | 1.85 | 1.84 |
| Other cereals | 0.68 | 0.95 | 1.17 | 0.72 | 1.14 | 0.90 |
| Potatoes | 1.04 | 7.19 | 5.00 | 2.54 | 5.92 | 4.10 |
| Plantains | 2.63 | 0.99 | 0.69 | 1.89 | 2.84 | 1.85 |
| Cassava | 1.31 | 0.90 | 0.13 | 0.48 | 0.25 | 0.62 |
| Yams | 1.55 | 0.00 | 0.00 | 0.00 | 0.00 | 0.13 |
| Other root crops | 0.02 | 0.11 | 0.10 | 0.06 | 0.08 | 0.07 |
| Sugar | 0.22 | 0.23 | 1.06 | 1.14 | 0.62 | 0.84 |
| Beans | 2.50 | 2.16 | 2.89 | 6.16 | 3.79 | 3.80 |
| Chickpeas | 0.06 | 0.45 | 1.05 | 0.06 | 0.17 | 0.30 |
| Green peas | 0.39 | 3.30 | 2.88 | 1.15 | 1.34 | 1.70 |
| Lentils | 0.76 | 1.40 | 2.44 | 0.67 | 1.96 | 1.32 |
| Other pulses | 0.10 | 0.59 | 0.71 | 0.09 | 1.05 | 0.45 |
| Fats | 0.08 | 0.09 | 0.14 | 0.45 | 0.15 | 0.21 |
| Soft drinks | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Coffee | 0.50 | 0.45 | 0.44 | 0.35 | 0.69 | 0.47 |
| Fruits | 1.71 | 1.06 | 1.23 | 0.70 | 0.94 | 1.08 |
| Vegetables | 1.38 | 1.29 | 1.85 | 0.83 | 1.55 | 1.30 |
| Others | 0.40 | 0.09 | 0.24 | 0.25 | 0.30 | 0.25 |
| Total | 72.28 | 68.25 | 69.73 | 64.57 | 70.28 | 68.36 |

Source: Estimates based on the 1981 DRI-PAN nutrition survey of Colombia.

Table A.4 Protein consumption by type of food and income strata, Colombia, 1981 (g/adult equivalent/day)

| Type of food | Income Strata | | | | | Average |
|------------------|---------------|--------------|--------------|--------------|--------------|--------------|
| | I | II | III | IV | V | |
| Beef | 6.65 | 12.90 | 18.00 | 20.10 | 20.09 | 15.54 |
| Pork | 0.08 | 0.22 | 0.38 | 0.75 | 1.25 | 0.54 |
| Poultry | 0.10 | 0.03 | 0.57 | 0.99 | 1.79 | 0.75 |
| Eggs | 1.10 | 2.00 | 2.51 | 3.10 | 3.56 | 2.46 |
| Fish | 0.78 | 1.11 | 1.00 | 1.27 | 1.41 | 1.12 |
| Dairy products | 4.57 | 7.70 | 10.23 | 11.80 | 13.75 | 9.62 |
| Rice | 7.00 | 8.60 | 9.31 | 9.80 | 8.62 | 8.67 |
| Maize | 4.00 | 4.90 | 4.46 | 3.10 | 3.23 | 4.11 |
| Wheat | 1.00 | 1.19 | 1.53 | 1.40 | 1.42 | 1.31 |
| Bread | 1.19 | 2.00 | 2.93 | 4.21 | 4.71 | 3.01 |
| Noodles | 1.18 | 1.59 | 2.05 | 2.29 | 2.07 | 1.84 |
| Other cereals | 0.48 | 0.59 | 0.82 | 1.06 | 1.56 | 0.90 |
| Potatoes | 3.54 | 4.40 | 4.49 | 4.40 | 3.60 | 4.10 |
| Plantains | 1.55 | 1.90 | 2.16 | 2.00 | 1.67 | 1.85 |
| Cassava | 0.69 | 0.78 | 0.72 | 0.56 | 0.37 | 0.62 |
| Yams | 0.17 | 0.29 | 0.32 | 0.46 | 0.23 | 0.13 |
| Other root crops | 0.05 | 0.06 | 0.09 | 0.07 | 0.08 | 0.07 |
| Sugar | 0.60 | 0.84 | 0.90 | 0.94 | 0.91 | 0.84 |
| Beans | 2.42 | 3.68 | 4.33 | 4.49 | 4.09 | 3.80 |
| Chickpeas | 0.06 | 0.16 | 0.32 | 0.43 | 0.53 | 0.30 |
| Green peas | 0.93 | 1.62 | 2.06 | 1.90 | 2.00 | 1.70 |
| Lentils | 0.35 | 0.85 | 1.38 | 1.84 | 2.17 | 1.32 |
| Other pulses | 0.42 | 0.29 | 0.45 | 0.54 | 0.57 | 0.45 |
| Fats | 0.07 | 0.17 | 0.22 | 0.32 | 0.29 | 0.21 |
| Soft drinks | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Coffee | 0.34 | 0.40 | 0.51 | 0.54 | 0.58 | 0.47 |
| Fruits | 0.43 | 0.75 | 1.05 | 1.50 | 1.69 | 1.08 |
| Vegetables | 0.52 | 0.91 | 1.31 | 1.66 | 2.10 | 1.30 |
| Others | 0.06 | 0.11 | 0.19 | 0.03 | 0.59 | 0.25 |
| Total | 40.33 | 60.04 | 74.29 | 82.76 | 84.93 | 68.36 |

Source: Estimate based on the 1981 DRI-PAN nutrition survey of Colombia.

Table A.5 Share of main food types in total protein consumption by income strata, Colombia, 1981 (percentage)

| Type of food | Income Strata | | | | | Average |
|---------------------------------------|---------------|--------------|--------------|--------------|--------------|--------------|
| | I | II | III | IV | V | |
| <u>Meat</u> | 18.88 | 23.76 | 26.85 | 27.99 | 28.88 | 26.26 |
| Beef | 16.50 | 21.50 | 24.20 | 24.29 | 23.65 | 22.73 |
| Pork | 0.20 | 0.37 | 0.50 | 0.92 | 1.47 | 0.79 |
| Poultry | 0.25 | 0.04 | 0.80 | 1.23 | 2.10 | 1.10 |
| Fish | 1.93 | 1.85 | 1.35 | 1.55 | 1.66 | 1.64 |
| <u>Dairy products and Eggs</u> | 14.05 | 16.15 | 17.18 | 18.27 | 20.39 | 17.67 |
| Dairy products | 11.33 | 12.82 | 13.80 | 14.47 | 16.20 | 14.07 |
| Eggs | 2.72 | 3.33 | 3.38 | 3.80 | 4.19 | 3.60 |
| <u>Cereals</u> | 28.45 | 21.87 | 19.63 | 17.34 | 15.79 | 20.01 |
| Rice | 17.34 | 14.30 | 12.53 | 12.00 | 10.15 | 12.68 |
| Maize | 9.92 | 6.59 | 6.00 | 3.80 | 3.80 | 6.01 |
| Others | 1.19 | 0.98 | 1.10 | 1.54 | 1.84 | 1.32 |
| <u>Root crops</u> | 10.60 | 8.73 | 7.13 | 6.17 | 4.77 | 7.01 |
| Cassava | 1.71 | 1.30 | 0.97 | 0.69 | 0.44 | 0.91 |
| Potatoes | 8.77 | 7.33 | 6.04 | 5.40 | 4.24 | 6.00 |
| Others | 0.12 | 0.10 | 0.12 | 0.08 | 0.09 | 0.10 |
| <u>Pulses</u> | 7.04 | 6.60 | 6.43 | 6.15 | 5.49 | 6.22 |
| Beans | 6.00 | 6.12 | 5.82 | 5.50 | 4.82 | 5.56 |
| Others | 1.04 | 0.48 | 0.61 | 0.65 | 0.67 | 0.66 |
| Total | 79.02 | 77.11 | 77.22 | 75.92 | 75.32 | 77.17 |

Source: Estimate based on the 1981 DRI-PAN nutrition survey of Colombia.

Table A.6 Share of main food types in total protein consumption by geographic region, Colombia, 1981 (percentage)

| Type of food | Atlantic | Eastern | Bogota | Central | Pacific | Average |
|---------------------------------------|--------------|--------------|--------------|--------------|--------------|--------------|
| <u>Meat</u> | 32.92 | 20.80 | 24.14 | 28.35 | 22.79 | 26.26 |
| Beef | 25.90 | 19.70 | 21.30 | 25.80 | 18.60 | 22.73 |
| Pork | 0.90 | 0.16 | 0.49 | 1.21 | 0.91 | 0.79 |
| Poultry | 1.06 | 0.59 | 1.56 | 0.94 | 1.50 | 1.10 |
| Fish | 5.06 | 0.35 | 0.79 | 0.40 | 1.78 | 1.64 |
| <u>Dairy products and Eggs</u> | 20.11 | 19.55 | 19.36 | 15.88 | 14.97 | 17.67 |
| Dairy products | 17.40 | 15.80 | 14.90 | 12.02 | 10.80 | 14.07 |
| Eggs | 2.71 | 3.75 | 4.46 | 3.86 | 4.17 | 3.60 |
| <u>Cereals</u> | 20.46 | 14.70 | 12.39 | 23.52 | 18.60 | 20.01 |
| Rice | 18.83 | 8.90 | 10.41 | 10.62 | 14.70 | 12.68 |
| Maize | 1.63 | 5.80 | 1.98 | 12.90 | 3.90 | 6.01 |
| Others | 0.94 | 1.39 | 1.68 | 1.12 | 1.62 | 1.32 |
| <u>Root crops</u> | 3.27 | 11.98 | 7.50 | 4.76 | 8.89 | 7.01 |
| Cassava | 1.81 | 1.32 | 0.19 | 0.74 | 0.36 | 0.91 |
| Potatoes | 1.44 | 10.50 | 7.17 | 3.93 | 8.42 | 6.00 |
| Others | 0.02 | 0.16 | 0.14 | 0.09 | 0.11 | 0.10 |
| <u>Pulses</u> | 3.60 | 4.02 | 5.16 | 9.68 | 6.88 | 6.22 |
| Beans | 3.46 | 3.16 | 4.14 | 9.54 | 5.39 | 5.56 |
| Other pulses | 0.14 | 0.86 | 1.02 | 0.14 | 1.49 | 0.66 |
| Total | 80.36 | 71.05 | 68.55 | 82.19 | 72.13 | 77.17 |

Source: Estimate based on the 1981 DRI-FAN nutrition survey of Colombia.

Table A.7 Protein consumption by rural/urban sector and income strata, Colombia, 1981. (g/adult equivalent/day)

| Type of food | Urban Sector | | | | | Rural Sector | | | | | Average |
|--------------------------------|---------------|--------------|--------------|--------------|--------------|---------------|--------------|--------------|--------------|--------------|--------------|
| | Income Strata | | | | | Income Strata | | | | | |
| | I | II | III | IV | V | I | II | III | IV | V | |
| Meat | 7.65 | 14.27 | 19.86 | 23.44 | 25.22 | 7.59 | 14.83 | 20.24 | 22.39 | 20.15 | 17.95 |
| Beef | 6.74 | 13.13 | 18.08 | 20.59 | 20.44 | 6.57 | 12.65 | 17.93 | 18.46 | 17.72 | 15.54 |
| Pork | 0.08 | 0.16 | 0.33 | 0.81 | 1.38 | 0.09 | 0.28 | 0.47 | 0.53 | 0.40 | 0.54 |
| Poultry | 0.15 | 0.28 | 0.62 | 1.04 | 2.00 | 0.06 | 0.33 | 0.48 | 0.81 | 0.51 | 0.75 |
| Fish | 0.68 | 0.70 | 0.83 | 1.00 | 1.40 | 0.87 | 1.57 | 1.36 | 2.59 | 1.52 | 1.12 |
| Dairy products and Eggs | 5.07 | 8.76 | 12.28 | 15.42 | 17.56 | 6.16 | 10.86 | 13.59 | 13.34 | 15.64 | 12.08 |
| Dairy products | 4.00 | 6.63 | 9.61 | 12.17 | 13.85 | 5.05 | 8.94 | 11.36 | 10.75 | 13.08 | 9.62 |
| Eggs | 1.07 | 2.13 | 2.67 | 3.25 | 3.71 | 1.11 | 1.92 | 2.23 | 2.59 | 2.56 | 2.46 |
| Cereals | 10.56 | 12.29 | 13.03 | 13.90 | 12.68 | 12.32 | 16.22 | 17.39 | 17.35 | 17.81 | 13.68 |
| Rice | 7.01 | 8.29 | 9.03 | 9.50 | 8.50 | 6.98 | 9.00 | 9.80 | 10.61 | 9.07 | 8.67 |
| Maize | 3.11 | 3.35 | 3.09 | 3.30 | 2.52 | 4.83 | 6.70 | 6.94 | 5.81 | 7.86 | 4.11 |
| Others | 0.44 | 0.65 | 0.91 | 1.10 | 1.66 | 0.51 | 0.52 | 0.65 | 0.93 | 0.88 | 0.90 |
| Root crops | 3.23 | 4.22 | 4.57 | 4.51 | 3.80 | 5.19 | 6.35 | 6.61 | 7.13 | 5.76 | 4.79 |
| Cassava | 0.27 | 0.32 | 0.37 | 0.39 | 0.26 | 1.05 | 1.28 | 1.34 | 1.11 | 1.14 | 0.62 |
| Potatoes | 2.94 | 3.84 | 4.10 | 4.05 | 3.46 | 4.06 | 5.00 | 5.20 | 5.95 | 4.50 | 4.10 |
| Others | 0.02 | 0.06 | 0.10 | 0.07 | 0.08 | 0.08 | 0.07 | 0.07 | 0.07 | 0.12 | 0.07 |
| Pulses | 3.01 | 3.88 | 4.70 | 4.77 | 4.57 | 2.70 | 4.08 | 4.92 | 5.86 | 5.23 | 4.25 |
| Beans | 2.77 | 3.62 | 4.28 | 4.34 | 3.96 | 2.13 | 3.75 | 4.42 | 4.98 | 4.94 | 3.80 |
| Others | 0.24 | 0.26 | 0.42 | 0.43 | 0.61 | 0.57 | 0.33 | 0.50 | 0.88 | 0.29 | 0.45 |
| Total | 38.43 | 56.10 | 71.50 | 82.04 | 85.26 | 42.14 | 65.24 | 79.31 | 85.17 | 83.13 | 68.36 |

Source: Estimate based on the 1981 DRI-PAN nutrition survey of Colombia.

Table A.8 Calorie consumption by type of food and geographic region, Colombia, 1981 (calories/adult equivalent/day)¹

| Type of food | Atlantic | Eastern | Bogota | Central | Pacific | Average |
|------------------|----------------|----------------|----------------|----------------|----------------|----------------|
| Beef | 148.40 | 116.07 | 109.54 | 133.00 | 102.68 | 123.80 |
| Pork | 10.49 | 1.81 | 3.98 | 12.85 | 9.30 | 8.37 |
| Poultry | 7.69 | 4.06 | 9.58 | 5.96 | 10.60 | 7.30 |
| Eggs | 24.89 | 32.52 | 39.44 | 31.68 | 29.33 | 31.29 |
| Fish | 22.09 | 2.06 | 5.79 | 2.59 | 8.93 | 7.79 |
| Dairy products | 212.70 | 185.88 | 179.54 | 132.59 | 127.25 | 163.83 |
| Rice | 626.40 | 278.28 | 334.01 | 315.64 | 475.02 | 398.72 |
| Maize | 49.97 | 163.78 | 65.08 | 346.35 | 113.97 | 172.43 |
| Wheat | 6.17 | 65.47 | 30.85 | 19.62 | 51.49 | 33.09 |
| Bread | 74.72 | 150.19 | 189.88 | 50.79 | 140.88 | 110.80 |
| Noodles | 48.38 | 93.16 | 78.19 | 36.71 | 60.41 | 59.97 |
| Other cereals | 25.04 | 33.58 | 46.06 | 31.93 | 40.29 | 34.53 |
| Potatoes | 45.51 | 317.24 | 217.40 | 110.26 | 257.98 | 179.37 |
| Plantains | 289.84 | 113.93 | 78.56 | 209.00 | 311.84 | 205.44 |
| Cassava | 239.63 | 162.70 | 23.19 | 87.38 | 46.02 | 113.51 |
| Yams | 67.68 | 0.20 | 0.00 | 0.00 | 0.16 | 12.89 |
| Other root crops | 1.85 | 12.54 | 8.90 | 6.11 | 7.55 | 7.19 |
| Sugar | 371.98 | 516.72 | 454.65 | 626.54 | 548.56 | 518.13 |
| Beans | 36.77 | 31.94 | 42.60 | 90.85 | 56.80 | 56.25 |
| Chickpeas | 1.07 | 7.87 | 18.23 | 1.00 | 2.85 | 5.20 |
| Green peas | 5.32 | 42.81 | 37.88 | 14.90 | 17.51 | 22.23 |
| Lentils | 10.25 | 18.74 | 32.77 | 8.98 | 26.27 | 17.69 |
| Other pulses | 1.30 | 8.30 | 10.42 | 0.97 | 14.00 | 6.14 |
| Fats | 308.56 | 264.21 | 348.79 | 317.68 | 394.30 | 324.19 |
| Soft drinks | 14.53 | 12.49 | 17.11 | 4.33 | 5.63 | 9.93 |
| Coffee | 12.60 | 11.86 | 11.11 | 8.55 | 18.10 | 12.03 |
| Fruits | 111.39 | 64.99 | 69.74 | 39.03 | 53.60 | 64.80 |
| Vegetables | 32.90 | 30.47 | 41.75 | 17.82 | 36.24 | 29.92 |
| Others | 17.88 | 6.65 | 17.64 | 14.41 | 15.74 | 14.32 |
| Total | 2826.00 | 2750.52 | 2522.68 | 2677.52 | 2983.30 | 2751.15 |

^{1/} The adult equivalent based on calorie consumption is calculated as sum of the calorie recommendations of the members of the household divided by the calorie consumption recommended for a male adult. The calorie recommendation for a male adult is of 3000 calories/day.

Source: Estimate based on the 1981 DRI-PAN nutrition survey of Colombia.

Table A.9 Calorie consumption by type of food and income strata, Colombia, 1981 (calories/adult equivalent/day)

| Type of food | Income Strata | | | | | Average |
|------------------|---------------|---------------|---------------|---------------|---------------|----------------|
| | I | II | III | IV | V | |
| Beef | 55.6 | 103.2 | 142.9 | 156.0 | 161.5 | 123.80 |
| Pork | 1.4 | 3.6 | 6.4 | 11.7 | 18.8 | 8.37 |
| Poultry | 1.0 | 3.4 | 5.9 | 9.5 | 16.6 | 7.30 |
| Eggs | 13.8 | 25.9 | 31.9 | 39.5 | 45.4 | 31.29 |
| Fish | 4.8 | 6.9 | 7.8 | 8.6 | 11.8 | 7.79 |
| Dairy products | 78.7 | 132.5 | 174.2 | 200.5 | 233.4 | 163.83 |
| Rice | 321.5 | 396.6 | 428.0 | 451.2 | 396.3 | 398.72 |
| Maize | 165.8 | 204.2 | 185.4 | 165.8 | 140.9 | 172.43 |
| Wheat | 26.6 | 29.8 | 38.5 | 35.3 | 35.4 | 33.09 |
| Bread | 44.0 | 74.6 | 108.9 | 155.3 | 171.8 | 110.80 |
| Noodles | 38.4 | 51.9 | 67.0 | 74.9 | 67.7 | 59.97 |
| Other cereals | 16.0 | 20.7 | 30.3 | 41.5 | 64.3 | 34.53 |
| Potatoes | 156.2 | 193.3 | 196.6 | 195.6 | 155.0 | 179.37 |
| Plantains | 169.0 | 212.5 | 237.3 | 220.3 | 188.0 | 205.44 |
| Cassava | 125.1 | 141.2 | 131.0 | 101.9 | 68.1 | 113.51 |
| Yams | 7.5 | 12.6 | 14.0 | 20.2 | 10.2 | 12.89 |
| Other root crops | 5.9 | 6.0 | 8.0 | 7.2 | 8.9 | 7.19 |
| Sugar | 388.8 | 508.4 | 559.6 | 582.5 | 551.4 | 518.13 |
| Beans | 35.9 | 54.4 | 64.0 | 66.4 | 60.6 | 56.25 |
| Chickpeas | 1.1 | 2.7 | 5.4 | 7.4 | 9.3 | 5.20 |
| Green peas | 12.0 | 21.2 | 26.7 | 24.9 | 26.3 | 22.23 |
| Lentils | 4.7 | 11.4 | 18.5 | 24.7 | 29.2 | 17.69 |
| Other pulses | 5.5 | 4.0 | 6.1 | 7.4 | 7.7 | 6.14 |
| Fats | 173.3 | 265.2 | 343.6 | 414.1 | 425.0 | 324.19 |
| Soft drinks | 1.0 | 6.6 | 6.5 | 16.4 | 19.1 | 9.93 |
| Coffee | 8.9 | 10.4 | 13.3 | 13.6 | 13.9 | 12.03 |
| Fruits | 27.4 | 46.2 | 63.6 | 88.0 | 98.9 | 64.80 |
| Vegetables | 12.3 | 21.3 | 29.7 | 38.0 | 48.3 | 29.92 |
| Others | 2.3 | 5.6 | 10.0 | 18.7 | 35.0 | 14.32 |
| Total | 1904.5 | 2576.3 | 2961.1 | 3197.1 | 3118.8 | 2751.15 |

Source: Estimate based on the 1981 DRI-PAN nutrition survey of Colombia.

Table A.10 Share of the main food types in total calorie consumption by geographic region, Colombia, 1981 (percentage)

| Type of food | Atlantic | Eastern | Bogota | Central | Pacific | Average |
|------------------------------------|--------------|--------------|--------------|--------------|--------------|--------------|
| Sugars | 13.16 | 18.80 | 18.00 | 23.40 | 18.39 | 18.80 |
| Sugar | 13.16 | 18.80 | 18.00 | 23.40 | 18.39 | 18.80 |
| Cereals | 24.81 | 17.29 | 17.65 | 25.88 | 21.09 | 22.02 |
| Rice | 22.17 | 10.12 | 13.24 | 11.79 | 15.92 | 14.49 |
| Maize | 1.75 | 5.95 | 2.58 | 12.90 | 3.82 | 6.27 |
| Others | 0.89 | 1.22 | 1.83 | 1.19 | 1.35 | 1.26 |
| Fats | 10.92 | 9.61 | 13.83 | 11.86 | 13.22 | 11.78 |
| Fats | 10.92 | 9.61 | 13.83 | 11.86 | 13.22 | 11.78 |
| Root crops | 10.08 | 17.89 | 9.54 | 7.58 | 10.44 | 10.91 |
| Cassava | 8.48 | 5.90 | 0.92 | 3.26 | 1.54 | 4.13 |
| Potatoes | 1.60 | 11.53 | 8.62 | 4.12 | 8.65 | 6.52 |
| Others | 0.00 | 0.46 | 0.00 | 0.20 | 0.25 | 0.26 |
| Pulses | 1.34 | 1.46 | 2.10 | 3.42 | 2.38 | 2.26 |
| Beans | 1.30 | 1.16 | 1.69 | 3.39 | 1.91 | 2.04 |
| Other pulses | 0.04 | 0.30 | 0.41 | 0.03 | 0.47 | 0.22 |
| Meat | 6.67 | 4.51 | 5.11 | 5.77 | 4.41 | 5.35 |
| Beef | 5.25 | 4.22 | 4.34 | 4.97 | 3.44 | 4.50 |
| Pork | 0.37 | 0.07 | 0.16 | 0.48 | 0.31 | 0.30 |
| Poultry | 0.27 | 0.15 | 0.38 | 0.22 | 0.36 | 0.27 |
| Fish | 0.78 | 0.07 | 0.23 | 0.10 | 0.30 | 0.28 |
| Dairy products and Eggs | 8.41 | 7.93 | 8.68 | 6.13 | 5.25 | 7.09 |
| Dairy products | 7.53 | 6.75 | 7.12 | 4.95 | 4.27 | 5.95 |
| Eggs | 0.88 | 1.18 | 1.56 | 1.18 | 0.98 | 1.14 |
| TOTAL | 75.39 | 77.49 | 74.91 | 84.04 | 75.18 | 78.21 |

Source: Estimate based on the 1981 DRI-PAN nutrition survey of Colombia.

Table A.11 Share of the main food types in total calorie consumption by income strata, Colombia, 1981 (percentage)

| Type of food | Income Strata | | | | | Average |
|--------------------------------|---------------|--------------|--------------|--------------|--------------|--------------|
| | I | II | III | IV | V | |
| Sugars | 20.40 | 19.70 | 18.90 | 18.20 | 17.70 | 18.80 |
| Sugar | 20.40 | 19.70 | 18.90 | 18.20 | 17.70 | 18.80 |
| Cereals | 26.49 | 24.52 | 22.54 | 20.48 | 18.57 | 22.02 |
| Rice | 16.90 | 15.40 | 14.45 | 14.10 | 12.70 | 14.49 |
| Maize | 8.70 | 7.90 | 6.26 | 5.19 | 4.52 | 6.27 |
| Others | 0.89 | 1.22 | 1.83 | 1.19 | 1.35 | 1.26 |
| Fats | 9.10 | 10.29 | 11.60 | 12.95 | 13.60 | 11.78 |
| Fats | 9.10 | 10.29 | 11.60 | 12.95 | 13.60 | 11.78 |
| Root crops | 14.77 | 13.00 | 11.04 | 9.31 | 7.15 | 10.65 |
| Cassava | 6.57 | 5.50 | 4.40 | 3.19 | 2.18 | 4.13 |
| Potatoes | 8.20 | 7.50 | 6.64 | 6.12 | 4.97 | 6.52 |
| Pulses | 2.16 | 2.27 | 2.37 | 2.31 | 2.19 | 2.26 |
| Beans | 1.88 | 2.11 | 2.16 | 2.08 | 1.94 | 2.04 |
| Other pulses | 0.28 | 0.16 | 0.21 | 0.23 | 0.25 | 0.22 |
| Meat | 3.27 | 4.54 | 5.50 | 5.82 | 6.69 | 5.35 |
| Beef | 2.90 | 4.00 | 4.82 | 4.88 | 5.18 | 4.50 |
| Pork | 0.07 | 0.14 | 0.22 | 0.37 | 0.60 | 0.30 |
| Poultry | 0.05 | 0.13 | 0.20 | 0.30 | 0.53 | 0.27 |
| Fish | 0.25 | 0.27 | 0.26 | 0.27 | 0.38 | 0.28 |
| Dairy products and Eggs | 4.82 | 6.10 | 6.96 | 7.51 | 8.94 | 7.09 |
| Dairy products | 4.10 | 5.10 | 5.88 | 6.27 | 7.48 | 5.95 |
| Eggs | 0.72 | 1.00 | 1.08 | 1.24 | 1.46 | 1.14 |
| TOTAL | 81.01 | 80.42 | 78.91 | 76.58 | 74.84 | 77.95 |

Source: Estimate based on the 1981 DRI-PAN nutrition survey of Colombia

Table A.12 Calorie consumption by rural/urban sector and income strata, Colombia, 1981 (calories/adult equivalent/day)

| Type of food | Urban Sector | | | | | Rural Sector | | | | | Average |
|--------------------------------|---------------|---------|---------|---------|---------|---------------|---------|---------|---------|---------|---------|
| | Income strata | | | | | Income strata | | | | | |
| | I | II | III | IV | V | I | II | III | IV | V | |
| Meat | 60.90 | 112.17 | 157.55 | 187.88 | 214.80 | 64.60 | 122.60 | 170.45 | 178.89 | 168.06 | 147.26 |
| Beef | 54.10 | 102.49 | 140.54 | 158.83 | 164.11 | 56.93 | 103.95 | 147.20 | 146.45 | 144.25 | 123.80 |
| Pork | 1.21 | 2.57 | 5.35 | 12.12 | 20.57 | 1.61 | 4.79 | 8.21 | 10.30 | 6.93 | 8.37 |
| Poultry | 1.38 | 2.41 | 5.79 | 9.92 | 18.21 | 0.70 | 4.58 | 6.18 | 8.21 | 6.16 | 7.30 |
| Fish | 4.23 | 4.70 | 5.87 | 7.01 | 11.91 | 5.36 | 9.28 | 8.86 | 13.93 | 10.72 | 7.79 |
| Dairy products and eggs | 82.06 | 140.49 | 197.12 | 247.57 | 281.98 | 101.35 | 178.60 | 222.55 | 214.40 | 257.77 | 195.12 |
| Dairy products | 68.46 | 113.33 | 163.32 | 206.21 | 234.71 | 87.36 | 154.12 | 194.04 | 181.30 | 225.00 | 163.83 |
| Eggs | 13.60 | 27.16 | 33.80 | 41.36 | 47.27 | 13.99 | 24.48 | 28.51 | 33.10 | 32.77 | 31.29 |
| Cereals | 464.94 | 543.14 | 579.38 | 625.47 | 574.13 | 536.04 | 709.54 | 760.56 | 769.52 | 753.57 | 605.68 |
| Rice | 322.39 | 381.09 | 415.36 | 440.13 | 393.08 | 320.74 | 414.05 | 450.91 | 488.40 | 417.26 | 398.72 |
| Maize | 128.43 | 140.75 | 131.19 | 142.74 | 112.51 | 197.74 | 275.48 | 283.96 | 243.28 | 327.53 | 172.43 |
| Others | 14.12 | 21.30 | 32.83 | 42.60 | 68.54 | 17.56 | 20.01 | 25.69 | 37.84 | 8.78 | 34.53 |
| Root crops | 179.81 | 232.79 | 255.37 | 254.62 | 204.31 | 378.88 | 461.61 | 481.60 | 473.32 | 414.49 | 413.58 |
| Cassava | 48.40 | 58.81 | 68.39 | 71.52 | 47.37 | 190.56 | 233.78 | 245.06 | 204.15 | 204.75 | 113.51 |
| Potatoes | 129.34 | 168.64 | 178.77 | 176.04 | 148.56 | 179.23 | 221.00 | 229.02 | 261.55 | 197.34 | 179.37 |
| Others | 2.07 | 5.34 | 8.21 | 7.06 | 8.38 | 9.09 | 6.83 | 7.52 | 7.62 | 12.40 | 7.19 |
| Pulses | 44.22 | 57.16 | 69.32 | 70.55 | 67.05 | 38.96 | 59.72 | 71.60 | 80.99 | 76.64 | 62.39 |
| Beans | 41.16 | 53.55 | 63.47 | 64.29 | 58.72 | 31.41 | 55.27 | 65.09 | 73.37 | 72.94 | 56.25 |
| Others | 3.06 | 3.61 | 5.85 | 6.26 | 8.33 | 7.55 | 4.45 | 6.51 | 7.62 | 3.70 | 6.14 |
| Total | 1717.00 | 2282.87 | 2731.48 | 3080.51 | 3075.65 | 2064.78 | 2906.40 | 3376.02 | 3588.84 | 3403.14 | 2751.15 |

Source: Estimate based on the 1981 DRI-PAN nutrition survey of Colombia.

Table A.13

F values of Duncan tests for differences in price, quantity and value of selected products by quintile and region, Colombia, 1981

| Commodity | Price | | Quantity | | Value | |
|----------------|----------|--------|----------|--------|----------|--------|
| | Quintile | Region | Quintile | Region | Quintile | Region |
| Beef | 51.71 | 108.60 | 24.32 | 19.30 | 43.88 | 27.53 |
| Pork | 3.09 | 8.16 | 7.89 | 6.84 | 7.16 | 5.72 |
| Poultry | 4.01 | 1.68* | 21.20 | 3.30 | 17.19 | 2.75 |
| Fish | 12.79 | 8.45 | 0.53* | 40.52 | 3.76 | 33.38 |
| Dairy products | 5.63 | 4.88 | 23.33 | 35.01 | 32.96 | 12.86 |
| Rice | 2.50 | 0.54* | 4.81 | 53.26 | 5.53 | 84.34 |
| Beans | 18.30 | 9.43 | 4.59 | 54.94 | 9.07 | 65.87 |
| Cassava | 1.90* | 28.46 | 2.39 | 66.79 | 1.57* | 21.70 |

$$F_{4,16, .1} = 2.3$$

* Not significant at $\alpha = 0.10$

BEAN CONSUMPTION AND PRODUCTION IN SUB-SAHARAN AFRICA
A PRELIMINARY REVIEW

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March 1984

Although beans are an important crop in sub-Saharan Africa, few studies have tried to assemble existing information on regional bean production (Londoño et al 1981). This paper presents some available data on 1) Recent production trends, 2) The structure of bean production in some major African producers; 3) A review of consumer preferences and marketing issues.

Bean Trends 1962-81

Sub-Saharan Africa is second only to Latin America among the world's leading producing regions of Phaseolus vulgaris L. (East Asia's great production of dry beans being almost entirely of other species. See Table 1). Within Africa, bean production is concentrated in the cooler highlands. Eastern Africa accounts for some 850,000 tons/year, or over half (54%) of Sub-Saharan bean production, while Kenya alone contributes more than one fourth (29%) of the region's bean output (Table 2) Tanzania and Uganda are also major bean producers in Eastern Africa. The Great Lakes Region of Burundi, Rwanda and the Kivu district of Zaire is the second leading bean production zone in Africa, with 435,000

tons/year or about one-fourth of Sub-Saharan production. Southern and West Africa are much less important as bean producers than the highlands of East and Central Africa.

Available data on area planted similarly show that Eastern Africa is the leading Sub-Saharan region in terms of land devoted to dry bean production, followed by the Great Lakes Region and Southern Africa (Table 3). As with the production data, however, the interpretation of both regional totals and individual country trends is somewhat hampered both by gaps in the data (for Kenya and Zaire, two of the major producers) and also by obvious discontinuities in the data (eg. Malawi). This is largely a reflection of the difficulty of estimating the production of a basic food crop which is principally kept for home consumption on a large number of small farms which produce beans. Moreover, some important discrepancies exist for individual country data, depending upon the source used (Table 4). Comparison of FAO statistics with those provided by national sources suggests that FAO may be underestimating African bean production. Despite these problems in the data, the overall picture of where beans are important in Africa is clear: principally in Eastern Africa and also in the Great Lakes Region; less so in Southern Africa; and relatively unimportant in West Africa, except locally in the northwest of Cameroon.

Although Sub-Saharan bean yields are generally low (Table 5), particularly when compared to yields in the high income countries, (648 vs. 963 kg/ha in 1979-81), they compare quite favorably with the regional average yield of 549 kg/ha in Latin America. Higher yields in the developed countries are due in large part to greater use of chemical

inputs as well as production in monoculture. Africa and Latin America share the characteristics that in both regions beans are typically produced on small farms; much of the time in mixed cropping systems where bean yields are depressed by inter-species competition; and especially in Africa, with minimum use of chemical inputs. If the data are indeed reasonably correct, one possible reason for the apparently higher yields in Africa is that disease and pest pressures may be lower there since the crop is outside its center of origin. While this is highly speculative and is almost certainly not the only factor involved, with other factors such as soils and cultural practices being potentially different, the higher yields in Africa, and the likely lower disease pressure there both suggest that a bean improvement strategy for Africa may have to be somewhat different from that of one for Latin America where diseases are such a critical constraint.

Since 1962 of the sub-Saharan countries for which adequate time series data exist, half have experienced historic rates of growth in bean production that are at least 1% per annum less than current estimates of population growth, while in the rest of the countries there has been a rough balance between production and population growth (Table 6). However, yields have been essentially stagnant and past achievements in increasing output are due almost solely to expansion of area cultivated (Table 6). Since land is limited, this historic area expansion can not continue indefinitely, particularly in countries like Rwanda and Burundi where population densities are very high (higher, for example, than in China or Indonesia). The Great Lakes Region and Eastern Africa are likely soon to face increasing pressure to increase

bean yields so that output growth does not begin to lag significantly behind population growth. However, the Sub-Saharan record on yield increases is not favorable. Only some atypical countries in Southern Africa have achieved any consistent rises in bean yields.

The practical impossibility of sustaining long term production growth through continued area expansion is illustrated by a comparison of growth rate in the 1960's with those of the 1970's (Table 7). These data show first, that in many countries growth in bean production was quite buoyant in the 1960's furthermore, the relative success of output expansion in the 1960's was often principally a product of increased area (Uganda, Burundi, Rwanda). In the 1970's, almost all sub-Saharan countries experienced a marked decline in bean production growth rates, and this was largely a result of slowdowns in area growth (Uganda, Burundi, Rwanda, Angola, Madagascar). Thus, it is clear that many countries are finding it impossible to achieve needed production growth through area expansion, and future output growth will have to come increasingly from productivity improvements. As bean production is becoming progressively unable to match population growth from the 1960's to the 1970's, it is clear that many countries critically require an increased effort to raise productivity, either to reverse recent declines in per capita bean consumption, or in more favored countries, to at least be able to continue to maintain historic consumption levels which in many cases have been nutritionally inadequate.

The urgency of improving bean productivity and increasing output is made clear by data on per capita bean consumption in the decade of the 1970's in the Sub-Saharan region. Over 70% of the countries in the

region experienced declines in apparent bean consumption (Table 8). This development is particularly grave given the central role played by beans in the diet of many African countries. In Burundi and Rwanda, over one-third of total protein consumption is from beans, while in Kenya as much as one-fifth of protein comes from beans. They also supply one-sixth of protein in Uganda and in Angola about one-tenth. (Table 9). In three countries beans are the leading source of protein in the diet, while in another three countries beans are the third leading source of protein. The importance of beans for protein nutrition is especially great when protein quality is taken into account. Among high quality sources of protein (ie excluding cereals, roots and tubers), beans are the leading contributor of high quality protein in nine countries, where they provide between one-fifth and two thirds of high quality protein. Thus, 110 million people in sub-Saharan Africa live in countries where beans are the leading source of quality protein in the average diet. Consequently, the decline of per capita bean consumption observed during the 1970's, may have a critical impact on protein nutrition due to the prominence of beans as a protein source in African diets.

Production Structure

Beans are produced in a variety of cropping systems and environmental conditions in Africa. Despite this diversity, there are several important similarities in bean production in the region. First, and most importantly, beans are grown principally by small farmers. As a consequence, they are often cultivated in mixed cropping systems; they

are typically a subsistence crop; input use is almost frequently negligible. Some available information on bean cropping systems and regions for some major bean producing countries will now be briefly summarized.

Rwanda

Beans are grown throughout Rwanda (Table 10), and play a critical role in the diet in all regions (Table 11). In the central plateau bean production is greatest in the first rains from September-January (Table 12). Beans are grown principally with maize, in monoculture, or with bananas though it is also sometimes grown with cassava and sorghum. Bananas and coffee are the main cash crops in the system, while beans, cassava and sweet potatoes are the main foodstaples. Banana and sorghum production are both principally for the manufacture of beer. While in the central plateau and the south-east (Kibungo) bush beans predominate (types I, II and IIIa), in the northeast highlands (Ruhengeri) and along the shores of Lake Kivu climbing beans are cultivated, sometimes in association with maize, but also often on Pennisetum stakes (Davis 1982 a).

Land preparation is by hand and the bean crop is weeded once or twice. Chemical fertilizers, herbicides, fungicides and insecticides are almost never used in bean production (Nyabyenda et al 1981), but beans in storage are sometimes treated with Malathion (Pachico 1984). Some composte is applied, though it is not usually available in sufficient quantities to be used in all bean fields.

Malawi

Some 99% of beans in Malawi are estimated to be grown in mixed cropping systems, principally with maize, and most are climbing or semi-climbing types (Edje et al 1981; Laing 1984).

In the south (Thyolo, Mulanje, Chiradzulu), relay cropping of climbing beans with maize is the main system, while in the rest of the country indeterminate or climbing types are usually row intercropped or mixed with maize planted on ridges (Edje et al 1981; Davis 1982b). On tobacco estates a bean crop often follows the tobacco harvest in order to contribute to the food needs of the large labor force on the estates. Farmers do not usually fertilize beans directly, but maize is often fertilized when grown in association with beans (Edje 1983).

Tanzania

The northeastern districts of Arusha and Tanga comprise the main bean producing zone in Tanzania, supplying some 44% of total national production (Table 13). This region is characterized by a dual structure in production, with small farmers producing alongside state farms where beans are produced on a large scale with mechanization. Some of the mechanized production is for export to Europe, especially as seed (Karel et al 1981). The southern highlands (Mbeya, Rukwa, Ruvuma) form the second major bean producing region (23% of national production), while West Lake and Kigoma contribute 19% of Tanzania's beans.

Beans are commonly intercropped with maize, but are also sometimes grown in monoculture. In the short rains, indeterminate climbers are frequently grown with maize, while in the long rains, bush bean types are typically cultivated as a sole crop. Chemical fertilizers are not used in bean production in small farms, but composte is applied when available. (Karel et al 1981).

Kenya

Beans are by far the most important food legume in Kenya, and though they hold this prime position in all provinces except the Coast, bean production is concentrated in Eastern, Central and Wesbern Provinces (Table 14). The relative importance of Eastern Province, already the leading bean producer, may be still increasing as competition from cash crops continues to displace bean production from the high agricultural potential zones of Central Province. Much of Eastern province is semi-arid, however, so beans are moving to a more severely drought stressed environment where yield instability is likely to be greater (Mukunya 1983).

Throughout much of the three principal bean producing provinces, beans are cultivated both in one first rain (spring) and the second rains (fall). In general, the proportion of area planted to beans on small farms is greater than that on medium or large farms (Tables 15-23), making beans a relatively more important part of the farm enterprise for small farmers.

In general more beans are sown in the first rain than in the second, but in many districts of Eastern and Central provinces, the

second rain planting is quite important, amounting, for example, to more than 20% of total farm area (including Follow and pasture), in small farms in Eastern Province (Table 15).

In the major producing zones of Kenya, beans are generally grown more often in association with maize, than in monoculture (Tables 14-23). However, monoculture bean production is fairly important in parts of Central and Eastern Provinces where in many districts it equals or surpasses association in terms of production area. Monoculture bean production tends to be relatively more important in the second rains season than in the first, and in some districts it surpasses association in importance during the second rains. In contrast, area planted to beans in association is usually greater in the first rains than in the second.

Yields also vary by cropping system and season (Tables 24-25). Generally, the average of monoculture bean yields is greater than that of associated bean yields (965 kg./ha vs. 480 kg./ha in the first rains), while differences between seasons are rather less marked, holding production system constant. Although monoculture yields are typically greater than bean yields in association, input use is more frequent and at a higher level in association (Tables 24-25). This occurs principally because farmers are applying inputs for the maize (Zoehl 1983). Nevertheless, beans yields may be boosted by fertilizer and pesticide applications, even if these inputs are applied primarily on maize. Some usage of improved bean varieties is also reported, though it lags far behind use of improved maize varieties. These data on input use need to be treated with some caution, as the sampling

procedure used to obtain these data probably contains some bias towards the selection of more commercial farmers.

Nevertheless these data are a reasonably reliable portrayal of the pattern of how inputs are currently used in Kenya, and are seen as good indicators of the likely trend in input use in Kenya by the mid-1980's (Jaetzold and Schmidt 1983). They do suggest that use of some low levels of inputs is possible in African bean production. Nevertheless, beans remain a relatively low priority for input use compared to more commercial crops (eg. coffee, tea, pyrethrum) which offer a higher return investment. However, with increasing urbanization and more specialization in agricultural production, commercial opportunities for bean production may well improve in the near future, thereby making greater investment in the bean crop more attractive (Zoehl 1983).

Consumer Preferences and Marketing

In much of the Sub-Saharan region, beans are produced in varietal mixtures (Edje 1983; Karel et al 1981; Nyabyenda et al 1981). While this doubtlessly contributes to yield stability, it is less clear that this practice maximizes yields. Typically African consumers appear to readily accept mixtures of grain types of varying, colors, shapes, and sizes. Despite this degree of flexibility, nonetheless important consumer preferences do exist. In most countries, it appears that large beans are preferred (medium are well accepted), especially red, tan red mottled, pinkish or purple grain types, though yellows and whites are also accepted in some regions. In general, consumers seem not to like small beans; in particular small blacks are not esteemed (Edje et al 1981; Karel et al 1981; Rubaihayo 1981). Another important food use of beans is the consumption of young green leaves as a fresh vegetable. Although most beans that enter the market are sold as mixtures (or blends), in Malawi the Agricultural Development and Marketing Corporation (ADMARC) requires growers to sort seeds into groups based on color and shape. Premium prices are paid for uniform grain types (Edje et al 1981). Similarly, in Uganda, mixed color beans receive lower prices than uniform grain types. (Rubaihayo et al 1981). In contrast, in Rwanda there is no price discount for mixtures (Pachico 1984; Davis 1982a). It is possible that as urbanization progresses and a greater proportion of beans enter market channels, there will be increasing pressure for standardization and grading of beans. Hence, economic incentives may to some degree tend to undermine the biotic

stability of the traditional system of producing beans in genetic mixtures. Such a development would, though, make increased disease and pest resistance in pure lines an important breeding objective to thus meet goals of maintaining production stability while meeting market requirements.

This change may not be rapid, however, since in most countries only a fairly small proportion of beans are marketed, with most still being produced for home consumption (Nyaybenda et al 1981; Edje et al 1981; Karel et al 1981; Rubaihayo et al 1981). Moreover, the development of commercial bean production has been inhibited in some countries by government policy. Marketing boards sometimes offer farmers prices well below parallel free market prices, either in an effort to keep consumer prices low, or in order to maintain a high profit margin in marketing. In Uganda, for example, in 1978 and 1979 the Produce Marketing Board was unable to execute any purchases of beans because it was not prepared to pay farmers a sufficiently high price (Rubaihayo et al 1981).

Likewise in Tanzania the official government fixed price of the National Milling Corporation has been half or less of unofficial (black) market prices (Karel et al 1981).

Maintenance of low bean prices tends to make bean production unprofitable, thereby discouraging increased production and the search for and adoption of new production increasing technology. Some studies suggest that small farm bean production is not profitable in sub-saharan Africa (Zoeb1 1983; Nyabyenda et al 1981). While factors other than

price are involved, clearly artificially low prices for beans act as obstacle both to bean production and to investment in new technology. Consequently, economic studies of government bean Africa and storage policies are a critical adjunct of CIAT proposed research in the sub-Saharan region, as there policies may often be a critical determinant of the profitability of new technology.

Table 1. World Dry Bean Production, 1979-81 - ('000 tons).

| | <u>('000 tons)</u> | <u>(%)</u> |
|--------------------------------------|--------------------|------------|
| <u>Developing Countries</u> | | |
| East Asia | 4888 ^a | 37.3 |
| Latin America | 4116 | 31.4 |
| Sub-Saharan Africa | 1640 | 12.5 |
| West Asia and North Africa | 307 | 2.3 |
| Total Developing Countries | 10951 | 83.6 |
| <u>Developed Countries</u> | | |
| North America | 1252 | 9.6 |
| East Europe | 425 | 3.2 |
| West Europe | 291 | 2.2 |
| Others | 173 | 1.3 |
| <u>Total Developed Countries</u> | 2141 | 16.4 |
| World Total | 13092 | 100.0 |

- a. The FAO dry bean figures officially cover Phaseolus vulgaris, P. lunatus, P. acutifolius, P. coccineus, Vigna radiata, V. mungo and V. angularis. These last three species are especially important in Asia, where less than 10% of dry beans are estimated to be P. vulgaris. Elsewhere P. vulgaris comprises the great bulk of dry bean production.

SOURCE: FAO Production Yearbook, Vol 35, 1982.

Table 2. Bean production in Sub-Saharan Africa,
1962-64, 1969-71, 1979-81 averages. ('000 tons)

| | <u>1962-64</u> | <u>1969-71</u> | <u>1979-81</u> |
|---------------------------|------------------|------------------|------------------|
| <u>Eastern Africa</u> | | | |
| Ethiopia | 62 | 74 | 15 |
| Kenya | a | a | 476 ^c |
| Somalia | 0.3 | 2 | 8 |
| Tanzania | 92 | 123 | 150 |
| Uganda | 93 | 155 | 203 |
| <u>Great Lakes Region</u> | | | |
| Burundi | 119 | 190 | 173 |
| Rwanda | 86 | 145 | 176 |
| Zaire ^d | a | a | 86 |
| <u>Southern Africa</u> | | | |
| Angola | 60 | 70 | 47 |
| Lesotho | 2 | 4 | 6 |
| Madagascar | 48 | 59 | 49 |
| Malawi | 7 | 7 | 61 |
| Rep. South Africa | 45 | 50 | 68 |
| Swaziland | 0.3 | 1 | 1 |
| Zimbabwe | 21 | 24 | 23 |
| <u>West Africa</u> | | | |
| Cameroon | 48 | 33 | 98 |
| Total | 684 ^b | 934 ^b | 1640 |

a. Data not available

b. Not including Kenya and Zaire

c. Estimate for 1974-75. See Njungunah *et.al.*, 1980.

d. Zaire's bean production occurs in Kivu province in the Great Lakes Region.

SOURCE : Fao Production Yearbooks

Table 3. Bean Area in Sub-Saharan Africa, 1962-64, 1969-71, 1979-81 ('000 ha)

| | <u>1962-64</u> | <u>1969-71</u> | <u>1979-81</u> |
|---------------------------|-------------------|-------------------|------------------|
| <u>Eastern Africa</u> | | | |
| Ethiopia | 88 | 95 | 16 |
| Kenya | a | a | 763 ^c |
| Somalia | 2 | 3 | 24 |
| Tanzania | 214 | 243 | 299 |
| Uganda | 143 | 78 | 249 |
| <u>Great Lakes Region</u> | | | |
| Burundi | 174 | 279 | 259 |
| Rwanda | 116 | 161 | 216 |
| Zaire | a | a | 167 |
| <u>Southern Africa</u> | | | |
| Angola | 67 | 120 | 113 |
| Lesotho | 6 | 15 | 9 |
| Madagascar | 62 | 65 | 56 |
| Malawi | 13 | 13 | 95 |
| Rep. South Africa | 87 | 75 | 66 |
| Swaziland | 2 | 2 | 1 |
| Zimbabwe | 53 | 50 | 40 |
| <u>West Africa</u> | | | |
| Cameroon | 64 | 73 | 154 |
| TOTAL | 1091 ^b | 1177 ^b | 2527 |

a. Data not available

b. Not including Kenya and Zaire

c. 1974-75 estimate. See Njungunah *et.al.*, 1980.

d. Zaire's bean production occurs in Kivu province in the Great Lake Region.

SOURCE: FAO Production Yearbooks.

Table 4. Alternative Sources for African Bean Production Data.
('000 tons)

| Country | Year | FAO Production | National estimates |
|----------|---------|-------------------|-----------------------|
| Kenya | 1974-75 | a | 476 |
| Tanzania | 1975-77 | 144 | 254 |
| Uganda | 1975-77 | 194 | 305 |
| Rwanda | 1976-78 | 160 | 168 |

a. Data not available.

SOURCE: FAO Production Yearbooks, 1978, 1979; S. K. Njungunah, A.M.M. Ndeqwa, H. A. van Rheenen and D.M. Mukunya, "Bean Production in Kenya," 1980; Bulletin of Food Crop Statistics, Ministry of Agriculture, Tanzania; Rapports Annuels du Ministere de l'Agriculture et de l'Elevage, Rwanda; all cited in Londoño, Gathe and Sanders, Bean Production Trends in Africa, 1966-79.

Table 5. Bean Yields in Sub-Saharan Africa, 1962-64, 1969-71 and 1979-81 averages - (kg/ha).

| | <u>1962-1964</u> | <u>1969-1971</u> | <u>1979-1981</u> |
|---------------------------|------------------|------------------|------------------|
| <u>Eastern Africa</u> | | | |
| Ethiopia | 703 | 777 | 944 |
| Kenya | a | a | 624 ^c |
| Somalia | 171 | 500 | 330 |
| Tanzania | 427 | 507 | 500 |
| Uganda | 651 | 594 | 816 |
| <u>Great Lakes Region</u> | | | |
| Burundi | 687 | 675 | 668 |
| Rwanda | 740 | 900 | 815 |
| Zaire d | a | a | 514 |
| <u>Southern Africa</u> | | | |
| Angola | 896 | 579 | 415 |
| Lesotho | 267 | 239 | 688 |
| Madagascar | 785 | 852 | 871 |
| Malawi | 560 | 539 | 644 |
| Rep. South Africa | 525 | 670 | 1033 |
| Swaziland | 349 | 373 | 419 |
| Zimbabwe | 398 | 487 | 583 |
| <u>West Africa</u> | | | |
| Cameroon | 701 | 449 | 631 |
| TOTAL | 627 ^b | 794 ^b | 648 |

a. Data not available.

b. Not including Kenya and Zaire

c. 1974-75 estimate. See Njungunah *et.al.*, 1980.

d. Zaire's bean production occurs in Kivu province in the Great Lakes Region.

SOURCE: FAO Production Yearbooks.

Table 6. Growth Rates in Bean, Production, Area and Yields in Selected^a

African Countries, 1962-81, and Projected Population Growth 1980-2000

| <u>Country</u> | <u>Population</u> | <u>Production</u> | <u>Area</u> | <u>Yield</u> |
|---------------------------|-------------------|-------------------|-------------|--------------|
| <u>Eastern Africa</u> | | | | |
| Ethiopia | 2.8 | -9.39 | -10.10 | -0.47 |
| Tanzania | 3.3 | 3.15 | 2.48 | 0.67 |
| Uganda | 3.3 | 4.41 | 4.53 | -0.12 |
| <u>Great Lakes Region</u> | | | | |
| Burundi | 2.5 | 1.94 | 2.35 | -0.72 |
| Rwanda | 3.5 | 3.82 | 3.50 | 0.31 |
| <u>Southern Africa</u> | | | | |
| Angola | 2.7 | -0.65 | 2.00 | -2.66 |
| Madagascar | 3.1 | 0.30 | -0.39 | 0.68 |
| Rep. South Africa | 2.9 | 3.22 | -1.44 | 4.62 |
| Zimbabwe | 4.3 | 0.55 | -1.35 | 1.99 |

a. Countries with obvious discontinuities in data or short series of data have been omitted.

SOURCE : FAO Production Yearbooks; World Development Report.

Table 7. Growth Rates in Bean Production, area and Yields in Selected^a African Countries, 1962-70 and 1970-81.

| | 1962-70 | | | 1970-81 | | |
|---------------------------|-------------------|-------------|--------------|-------------------|-------------|--------------|
| | <u>Production</u> | <u>Area</u> | <u>Yield</u> | <u>Production</u> | <u>Area</u> | <u>Yield</u> |
| <u>Eastern Africa</u> | | | | | | |
| Ethiopia | 2.44 | 1.02 | 1.54 | -20.21 | -21.62 | -1.53 |
| Tanzania | 4.25 | 1.24 | 2.50 | 1.43 | 1.61 | -0.15 |
| Uganda | 7.95 | 9.62 | -1.66 | 1.39 | -0.53 | 1.92 |
| <u>Great Lakes Region</u> | | | | | | |
| Burundi | 3.46 | 6.04 | -2.58 | -2.43 | -2.67 | -0.10 |
| Rwanda | 7.46 | 4.98 | 2.43 | 3.06 | 3.59 | -0.55 |
| <u>Southern Africa</u> | | | | | | |
| Angola | 2.20 | 8.60 | -6.57 | -4.34 | -0.61 | -3.76 |
| Madagascar | 2.08 | 0.51 | 1.50 | -1.93 | -2.11 | 2.81 |
| Rep. South Africa | 1.93 | -2.43 | 4.29 | 3.87 | -1.22 | 5.02 |
| Zimbabwe | 2.15 | -0.45 | 2.88 | -0.87 | -2.41 | 1.55 |

^a Countries with obvious discontinuities in data or short series of data have been eliminated.

SOURCE : FAO Production Yearbooks.

Table 8. Apparent Per Capita Bean Consumption in Sub-Saharan Africa.
(kg/cap/yr)

| <u>Country</u> | <u>1969-71</u> | <u>1979-81</u> |
|---------------------------|------------------|-------------------|
| <u>Eastern Africa</u> | | |
| Ethiopia | 3.0 | 0.5 |
| Kenya | a | 6.1 |
| Somalia | 0.7 | 1.7 |
| Tanzania | 9.3 | 8.4 |
| Uganda | 18.1 | 15.4 |
| <u>Great Lakes Region</u> | | |
| Burundi | 52.8 | 40.8 |
| Rwanda | 40.4 | 36.7 |
| Zaire | a | 3.0 |
| <u>Southern Africa</u> | | |
| Angola | 12.3 | 6.6 |
| Lesotho | 3.8 | 4.5 |
| Madagascar | 8.1 | 5.6 |
| Malawi | 1.5 | 9.9 |
| South Africa | 2.5 | 2.3 |
| Swaziland | 2.4 | 1.8 |
| Zimbabwe | 4.8 | 3.1 |
| <u>West Africa</u> | | |
| Cameroon | 5.7 ^b | 11.6 ^b |
| TOTAL | 8.6 ^b | 7.5 ^b |

a. Data not available.

b. Excluding Zaire and Kenya

SOURCE : FAO Production Yearbook; Njungunah et. al.; FAO Food Balance Sheets

Table 9. The Nutritional Role of Beans in Sub-Saharan Africa, 1975-77.

| <u>Country</u> | Per Cent of Total Protein from Beans | Percent of Quality Protein from Beans ^a | Rank of Beans Among Protein Sources | Rank of Beans Among Quality Proteins ^a | Per Cent of Calories from Beans |
|---------------------------|--------------------------------------|--|-------------------------------------|---|---------------------------------|
| <u>Eastern Africa</u> | | | | | |
| Ethiopia | 0.5 | 1.4 | 15 | 11 | 0.3 |
| Kenya | 18.0 | 37.0 | 2 | 1 | 8.4 |
| Somalia | 0.8 | 1.4 | 8 | 6 | 3.0 |
| Tanzania | 8.5 | 20.7 | 4 | 1 | 3.1 |
| Uganda | 16.5 | 36.3 | 1 | 1 | 6.8 |
| <u>Great Lakes Region</u> | | | | | |
| Burundi | 33.8 | 68.1 | 1 | 1 | 13.9 |
| Rwanda | 33.6 | 65.7 | 1 | 1 | 13.5 |
| Zaire | 5.5 | 19.6 | 7 | 1 | 1.3 |
| <u>Southern Africa</u> | | | | | |
| Angola | 11.2 | 32.7 | 4 | 1 | 3.6 |
| Lesotho | 1.1 | 4.8 | 7 | 5 | 0.5 |
| Madagascar | 4.5 | 16.9 | 5 | 2 | 1.6 |
| Malawi | 6.0 | 22.0 | 3 | 1 | 2.9 |
| Rep. South Africa | 1.7 | 5.6 | 7 | 6 | 0.7 |
| Swaziland | 2.1 | 5.1 | 7 | 4 | 0.8 |
| Zimbabwe | 2.6 | 9.5 | 8 | 2 | 1.1 |
| <u>West Africa</u> | | | | | |
| Cameroon | 8.0 | 31.2 | 3 | 1 | 3.0 |

^a Quality protein is defined as protein from meat, fish, dairy, pulses, and eggs.

SOURCE: FAO Food Balance Sheets, 1980. Kenyan data adjusted by Njunganah *et.al*, 1980.

Table 10. Population, bean production, yield and cultivated area per county in Rwanda in 1978

| County | Area (ha) | Yield (kg/ha) | Production (t) | Population* |
|-----------------------|--------------|------------------|-------------------|-------------|
| Kigali | 26,986 | 800 | 21,589 | 698,063 |
| Gitarama | 21,949 | 700 | 15,364 | 602,752 |
| Butare | 25,416 | 720 | 18,300 | 601,165 |
| Gikongoro | 18,501 | 720 | 13,321 | 369,891 |
| Cyangugu | 19,700 | 880 | 17,478 | 331,300 |
| Kibuye | 15,111 | 800 | 12,089 | 337,729 |
| Gisenyi | 20,763 | 820 | 17,026 | 468,786 |
| Ruhengeri | 23,296 | 800 | 18,642 | 528,649 |
| Byumba | 22,675 | 800 | 18,140 | 519,968 |
| Kibungo | 20,542 | 890 | 18,282 | 360,934 |
| Total and averages | 214,939 | 721 | 170,231 | 4,819,237 |

*General population and housing census for 1978.

Source: Nyabyenda et.al.

Table 11. Sources of Dietary Protein in Rwandan Diets.
Per Cent by Food.

| | <u>Butare</u> | <u>Ruhengari</u> | <u>Kibungo</u> |
|----------------|---------------|------------------|----------------|
| Sweet potatoes | 32.1 | 1.1 | 17.9 |
| Beans | 54.6 | 30.6 | 45.6 |
| Potatoes | 1.1 | 4.7 | 3.3 |
| Peas | 3.8 | 14.3 | 2.3 |
| Maize | 1.2 | 41.5 | 12.5 |
| Sorghum | 2.0 | 0.5 | 0.8 |
| Yams | 0.7 | 0 | 0.04 |
| Greens | 1.1 | 3.0 | 0.8 |
| Milk | 1.4 | 2.7 | 2.9 |
| Meat | 1.5 | 1.6 | 3.1 |
| Bananas | 0.5 | 0 | 10.8 |

Source: Calculated from data in Vis et al., 1975.

Table 12. Cropping Pattern in Central Plateau of Rwanda.

Average land use of 90 Farms, 1970-72.

| | First Rains (%) | Second Rains (%) |
|----------------------|-----------------------|------------------------|
| Bean noncultivate | 17.9 | .06 |
| Bean/Maize | 9.3 | .06 |
| Cassava/beans | 1.5 | 0.3 |
| Cassava/beans/maize | 1.0 | 0.2 |
| Bananas/beans | 7.7 | 0.8 |
| Banana/beans/maize | 2.5 | 0.6 |
| Banana/sorghum/beans | 0 | 0.4 |
| Sorghum/beans | 0 | 4.9 |
| Peanuts | 1.1 | 1.0 |
| Potatoes | 0.7 | 0.5 |
| Sweetpotatoes | 4.8 | 6.7 |
| Cassava monoculture | 8.1 | 7.3 |
| Sorghum monoculture | 0 | 31.3 |
| Banana monoculture | 14.1 | 9.4 |
| Banana/sorghum | 0 | 10.4 |
| Coffee | 20.7 | 17.5 |
| Other crops | 10.6 | 8.6 |

Source: Dalepierre

Table 13. Phaseolus bean production in Tanzania from 1963 to 1977.

| Regions | BEAN PRODUCTION (T) | |
|-----------------|---------------------|---------------|
| | 1963-64 | 1976-77 |
| Arusha | 12196 | 64431 |
| Kigoma | 20123 | 35086 |
| Kilimanjaro | 6870 | 1800 |
| Mbeya | 17176 | 27000 |
| Morogoro | 8333 | 5323 |
| Mwanza | 101 | 18313 |
| Rukwa | - | 23217 |
| Ruvuma | 606 | 15000 |
| Tanga | 12250 | 61350 |
| West Lake | 10163 | 27000 |
| Others | 4778 | 8425 |
| Tanzania | 92596 | 286945 |

Source: Karet et al.

Table 14. Estimated areas under grain legumes by province in the 1974-75 crop year.

| Province | Area (000 ha) | | | | | Total |
|--------------|---------------|--------------|--------------|-------------|-------------|---------------|
| | Beans | Pigeon peas | Cowpeas | Field peas | Other | |
| Eastern | 284.6 | 104.5 | 208.4 | 2.8 | 30.2 | 630.5 |
| Central | 232.4 | 4.2 | 7.8 | 13.6 | 0.0 | 258.0 |
| Western | 148.4 | 0.0 | 13.2 | 0.4 | 1.4 | 163.4 |
| Nyanza | 73.6 | 0.0 | 2.9 | 0.0 | 1.7 | 78.2 |
| Coast | 17.5 | 6.5 | 38.9 | 9.1 | 4.1 | 67.1 |
| Rift Valley | 7.0 | 0.0 | 0.0 | 0.0 | 0.0 | 7.0 |
| Total | 763.5 | 115.2 | 271.2 | 25.9 | 37.4 | 1204.2 |

Source : Thairu, 1979

Table 15. Role of Bean Production in land use Small farms Eastern Province Kenya 1979. Per cent of total farm area by bean Production system.

| | FIRST RAINS | | SECOND RAINS | |
|-----------------------|-------------|-------------|--------------|-------------|
| | Association | Monoculture | Association | Monoculture |
| EMBU(41) ^a | 16.7 | 8.30 | 8.4 | 8.4 |
| EMBU(42) | 33.3 | 6.70 | 26.6 | 6.7 |
| EMBU(43) | 5.9 | 17.60 | 11.8 | 0 |
| MERU(44) | 20.0 | 10.0 | 10.0 | 10.0 |
| MERU(45) | 18.5 | 7.4 | 14.8 | 7.4 |
| MERU(46) | 18.2 | 9.1 | 27.0 | 0 |
| MACHAKOS (47) | 20.0 | 6.7 | 20.0 | 6.7 |
| MACHACKOS(48) | 46.2 | 7.7 | 46.1 | 15.4 |
| KITUI (49) | 16.7 | 5.5 | 16.7 | 5.5 |
| KIUTI (50) | 5.9 | 0 | 11.8 | 0 |

Source : Farm management handbook of Kenya 1983.

^a Area as defined in source.

Table 16. Role of bean production in land use Medium farms eastern province Kenya 1979. Percent of total farm area by bean Production System.

| | FIRST RAINS | | SECOND RAINS | |
|-----------------------|-------------|-------------|--------------|-------------|
| | Association | Monoculture | Association | Monoculture |
| EMBU(41) ^a | 20.0 | 0 | 0 | 0 |
| EMBU(42) | 15.4 | 3.8 | 15.4 | 7.7 |
| EMBU(43) | 11.1 | 11.1 | 11.1 | 0 |
| MERU(44) | 16.7 | 0 | 5.6 | 0 |
| MERU(45) | 5.2 | 12.0 | 3.5 | 10.3 |
| MERU(46) | 15.8 | 0 | 5.3 | 5.3 |
| MACHAKOS(47) | 27.0 | 0 | 27.0 | 0 |
| MACHAKOS(48) | 10.8 | 5.4 | 13.5 | 8.1 |
| KUTUI(49) | 5.9 | 14.7 | 5.9 | 14.7 |
| KITUI(50) | 5.3 | 2.6 | 2.6 | 7.9 |

Source : Farm management Handbook of Kenya 1983

^a As defined in source

Table 17. Role of Bean Production in land use. Large farms Eastern Province Kenya 1979. Per cent of total farm area by Bean Production System.

| | FIRST RAINS | | SECOND RAINS | |
|-----------------------|-------------|-------------|--------------|-------------|
| | Association | Monoculture | Association | Monoculture |
| EMBU(41) ^a | 26.7 | 4.4 | 13.3 | 0 |
| EMBU(42) | 1.7 | 6.6 | 1.7 | 11.6 |
| EMBU(43) | 3.8 | 7.5 | 7.6 | 0 |
| MERU(44) | 8.1 | 2.7 | 2.7 | 0 |
| MERU(45) | 2.3 | 4.7 | 2.3 | 4.7 |
| MERU(46) | 10.0 | 2.5 | 10.0 | 2.5 |
| MACHAKOS(47) | 2.0 | 1.9 | 1.9 | 1.0 |
| MACHAKOS(48) | 1.9 | 6.7 | 1.9 | 6.7 |
| KITUI(49) | 7.1 | 11.2 | 7.5 | 9.7 |
| KITUI(50) | 3.2 | 4.3 | 2.2 | 5.3 |

Source : Farm management Handbook of Kenya 1983

a As defined in source

Table 18. Role of Bean Production in land use Small farms Central Province Kenya 1979. Per cent of total farm area by Bean Production System.

| | FIRST RAINS | | SECOND RAINS | |
|-------------------------|-------------|-------------|--------------|-------------|
| | Association | Monoculture | Association | Monoculture |
| KIAMBU(29) ^a | 14.3 | 7.10 | 7.2 | 7.2 |
| KIAMBU(30) | 11.1 | 11.1 | 11.1 | 0 |
| KIAMBU(31) | 5.3 | 0 | 5.3 | 0 |
| MURANG'A(32) | 23.1 | 0 | 23.1 | 0 |
| MURANG'A(33) | 30.0 | 0 | 20.0 | 0 |
| MURANG'A(34) | 41.7 | 0 | 2.50 | 8.3 |
| NYERI(35) | 25.0 | 0 | 8.3 | 0 |
| NYERI(36) | 18.2 | 0 | 18.2 | 0 |
| NYERI(37) | 27.3 | 0 | 9.1 | 18.2 |
| KIRINYAGA(38) | 25.0 | 0 | 25.0 | 0 |
| KIRINYAGA(39) | 41.7 | 0 | 16.7 | 16.7 |
| KIRINYAGA(40) | 33.3 | 5.6 | 38.9 | 5.5 |

Source :Farm management handboook of Kenya. 1983

^a As defined in source.

Table 19 Role of Bean Production in land use Medium farms Central.
Province Kenya 1979. Per cent of total farm area by Bean
Production System.

| | FIRST RAINS | | SECOND RAINS | |
|-------------------------|-------------|-------------|--------------|-------------|
| | Association | Monoculture | Association | Monoculture |
| KIAMBU(29) ^a | 3.6 | 0 | 3.6 | 3.6 |
| KIAMBU(30) | 10.0 | 5.0 | 5.0 | 0 |
| KIAMBU(31) | 13.5 | 5.4 | 8.1 | 0 |
| MURANG'A(32) | 13.3 | 0 | 0 | 0 |
| MURANG'A(33) | 16.7 | 11.1 | 16.7 | 11.1 |
| MURANG'A(34) | 17.2 | 0 | 13.8 | 0 |
| NYERI(35) | 26.9 | 0 | 7.7 | 0 |
| NYERI(36) | 21.4 | 3.6 | 3.6 | 17.8 |
| NYERI(37) | 15.8 | 10.5 | 5.3 | 5.3 |
| KIRINYAGA(38) | 4.6 | 0 | 4.6 | 27.2 |
| KIRINYAGA(39) | 34.5 | 0 | 17.2 | 13.8 |
| KIRINYAGA(40) | 34.2 | 0 | 29.3 | 4.9 |

Source: Farm management handbook of Kenya.1983

^a As defined in source

Table 20 Role of Bean Production in land use large farms Central Province
Kenya 1979. Per cent of total farm area by Bean Production
system.

| | FIRST RAINS | | SECOND RAINS | |
|-------------------------|-------------|-------------|--------------|-------------|
| | Association | Monoculture | Association | Monoculture |
| KIAMBU(29) ^a | 5.0 | 0 | 0 | 0 |
| KIAMBU(30) | 3.1 | 0 | 7.7 | 0 |
| KIAMBU(31) | 10.0 | 0 | 26.7 | 0 |
| MURANG'A(32) | 1.3 | 0 | 0 | 0 |
| MURANG'A(33) | 11.8 | 2.9 | 3.0 | 8.8 |
| MURANG'A(34) | 7.8 | 0 | 14.1 | 0 |
| NYERI(35) | 17.7 | 0 | 4.8 | 0 |
| NYERI(36) | 9.3 | 1.6 | 7.8 | 0 |
| NYERI(37) | 12.9 | 6.5 | 5.6 | 0 |
| KIRINYAGA(38) | 2.8 | 0 | 2.8 | 19.4 |
| KIRINYAGA(39) | 4.4 | 0 | 5.5 | 0 |
| KIRINYAGA(40) | 14.6 | 5.7 | 8.1 | 3.3 |

Source Management Handbook of Kenya 1983.

^a As defined in source.

Table 21. Role of Bean Production in land use Small farms Western Province Kenya 1979. Per Cent of Total farm area by Bean Production System.

| | FIRST RAINS | | SECOND RAINS | |
|--------------------------|-------------|-------------|--------------|-------------|
| | Association | Monoculture | Association | Monoculture |
| BUNGOMA(11) ^a | 37.0 | 0 | 0 | 0 |
| BUNGOMA(12) | 4.4 | 0 | 0 | 0 |
| KAKAMEGA(13) | 35.0 | 5 | 0 | 0 |
| KAKAMEGA(14) | 30.0 | 0 | 30.0 | 0 |

Role of Bean Production in land use Medium farms

| | FIRST RAINS | | SECOND RAINS | |
|--------------|-------------|-------------|--------------|-------------|
| | Association | Monoculture | Association | Monoculture |
| BUSIA(9) | 0 | 0 | 1.6 | 0 |
| BUNGOMA(11) | 40.4 | 0 | 1.8 | 0 |
| BUNGOMA(12) | 7.6 | 0 | 0 | 0 |
| KAKAMEGA(13) | 13.2 | 0 | 0 | 0 |
| KAKAMEGA(14) | 26.3 | 5.3 | 15.8 | 0 |

Role of Bean Production in land use Large farms

| | FIRST RAINS | | SECOND RAINS | |
|--------------|-------------|-------------|--------------|-------------|
| | Association | Monoculture | Association | Monoculture |
| BUSIA(9) | 0 | 0 | 0.7 | 0 |
| BUNGOMA(11) | 15.4 | 2.5 | 0 | 0 |
| BUNGOMA(12) | 4.5 | 0 | 0 | 0 |
| KAKAMEGA(13) | 16.4 | 1.4 | 0 | 0 |
| KAKAMEGA(14) | 21.6 | 0 | 5.4 | 0 |

Source : Farm Management Handbook of Kenya 1983

Table 22. Input use in maize/bean association. First Rains, Kenya, 1977.

| Province/District | Improved Seed (% farms) | | Nitrogen (kg/ha) | P ₂ O ₅ (kg/ha) | K ₂ O (kg/ha) | Manure (tons/ha) | Insec- ticides (kg/ha) | Fungi- cides (kg/ha) | Yields (kg/ha) | |
|-------------------|----------------------------|-------|---------------------|--|-----------------------------|---------------------|------------------------------|----------------------------|-------------------|-------|
| | Maize | Beans | | | | | | | Maize | Beans |
| WESTERN | | | | | | | | | | |
| Bungoma (11) | 95 | 0 | 38 | 26 | 6 | 0.08 | 1 | 0 | 3288 | 525 |
| Bungoma (12) | 88 | 13 | 0 | 16 | 0 | 0.79 | 0 | 0 | 2527 | 264 |
| Kakamega (13) | 100 | 5 | 9 | 37 | 0 | 0.09 | 1 | 0 | 2779 | 245 |
| Kakamega (14) | 87 | 0 | 14 | 51 | 0 | 0.06 | 2 | 0 | 2511 | 493 |
| CENTRAL | | | | | | | | | | |
| Kiambu (29) | 55 | 9 | 3 | 23 | 0 | 0 | 0 | 0 | 1318 | 315 |
| Kiambu (30) | 20 | 20 | 28 | 70 | 0 | 0 | 8 | 0 | 1310 | 737 |
| Kiambu (31) | 69 | 6 | 2 | 7 | 0 | 0 | 0 | 0 | 713 | 321 |
| Murang'a (33) | 81 | 0 | 6 | 38 | 0 | 0.58 | 4 | 0 | 2513 | 682 |
| Murang'a (34) | 54 | 0 | 0 | 1 | 0 | 0.21 | 1 | 0 | 1194 | 332 |
| Nyeri (35) | 92 | 0 | 24 | 36 | 0 | 0.02 | 5 | 0 | 1741 | 655 |
| Nyeri (36) | 100 | 5 | 9 | 28 | 0 | 0.01 | 3 | 0 | 1982 | 376 |
| Nyeri (37) | 91 | 0 | 1 | 23 | 0 | 0.15 | 7 | 0 | 1496 | 316 |
| Kirinyaga (38) | 89 | 11 | 16 | 20 | 0 | 0.06 | 7 | 0 | 1567 | 505 |
| Kirinyaga (39) | 100 | 0 | 14 | 11 | 0 | 0.01 | 5 | 0 | 1577 | 396 |
| Kirinyaga (40) | 60 | 0 | 6 | 5 | 0 | 0 | 2 | 0 | 1503 | 512 |
| EASTERN | | | | | | | | | | |
| Embu (41) | 100 | 0 | 5 | 35 | 0 | 0.10 | 9 | 0 | 2282 | 500 |
| Embu (42) | 100 | 0 | 6 | 31 | 0 | 0 | 5 | 0 | 1824 | 417 |
| Embu (43) | 60 | 10 | 0 | 1 | 0 | 0.49 | 1 | 0 | 1286 | 497 |
| Meru (46) | 85 | 0 | 0 | 38 | 0 | 0.19 | 3 | 0 | 2242 | 1000 |
| Machakos (47) | 41 | 0 | 3 | 6 | 0 | 0.92 | 2 | 0 | 974 | 454 |
| Machakos (48) | 40 | 0 | 0 | 6 | 0 | 0.31 | 1 | 0 | 1093 | 431 |
| Kitui (49) | 89 | 0 | 0 | 0 | 0 | 2.37 | 0 | 0 | 998 | 415 |

SOURCE: Farm Management Handbook of Kenya. 1983.

Table 23. Input use in maize/bean association, Second Rains, Kenya 1977.

| Province / District | Improved Seed (% farms) | | Nitrogen (kg/ha) | P ₂ O ₅ (kg/ha) | K ₂ O (kg/ha) | Manure (tons/ha) | Insec- ticides (kg/ha) | Fungi- cides (kg/ha) | Yields (kg/ha) | |
|---------------------|----------------------------|-------|---------------------|--|-----------------------------|---------------------|------------------------------|----------------------------|-------------------|-------|
| | Maize | Beans | | | | | | | Maize | Beans |
| WESTERN | | | | | | | | | | |
| Kakamega (14) | 52 | 0 | 6 | 38 | 0 | 0 | 4 | 4 | 2016 | 411 |
| CENTRAL | | | | | | | | | | |
| Kiambu (31) | 55 | 18 | 0 | 1 | 0 | 0 | 0 | 0 | 468 | 193 |
| Murang'a (32) | 86 | 29 | 9 | 11 | 0 | 0.07 | 0 | 0 | 1411 | 180 |
| Murang'a (33) | 87 | 0 | 8 | 37 | 0 | 2.95 | 10 | 10 | 2148 | 553 |
| Murang'a (34) | 35 | 0 | 0 | 1 | 0 | 0 | 1 | 1 | 756 | 220 |
| Kirinyaga (38) | 75 | 25 | 13 | 24 | 0 | 0 | 33 | 33 | 1166 | 568 |
| Kirinyaga (40) | 73 | 0 | 0 | 1 | 0 | 0.01 | 2 | 2 | 739 | 318 |
| EASTERN | | | | | | | | | | |
| Embu (41) | 100 | 13 | 6 | 39 | 0 | 0 | 18 | 24 | 2726 | 510 |
| Embu (42) | 100 | 0 | 5 | 30 | 0 | 0 | 10 | 10 | 2656 | 383 |
| Meru (44) | 72 | 6 | 11 | 18 | 0 | 0 | 4 | 4 | 2059 | 857 |
| Meru (46) | 71 | 0 | 14 | 23 | 0 | 0.10 | 6 | 6 | 2140 | 760 |
| Machakos (47) | 40 | 0 | 3 | 6 | 0 | 0.87 | 3 | 3 | 1053 | 806 |

SOURCE: Farm Management Handbook of Kenya. 1983.

Table 24. Input use in bean monoculture, First Rains, Kenya 1977.

| Province/District | Improved Seed | Nitrogen (kg/ha) | P ₂ O ₅ (kg/ha) | K ₂ O (kg/ha) | Manure (tons/ha) | Insec- ticides (kg/ha) | Fungi- cides (kg/ha) | Yields |
|-------------------|---------------|---------------------|--|-----------------------------|---------------------|------------------------------|----------------------------|---------|
| | (% farms) | | | | | | | (kg/ha) |
| | Beans | | | | | | | Beans |
| WESTERN | | | | | | | | |
| Bungoma (12) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 706 |
| CENTRAL | | | | | | | | |
| Kiambu (30) | 33 | 41 | 106 | 0 | 0 | 0 | 0 | 1290 |
| Kiambu (31) | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 421 |
| Nyeri (36) | 0 | 17 | 46 | 0 | 0 | 3 | 0 | 909 |
| Kirinyaga (40) | 13 | 3 | 3 | 0 | 0 | 0 | 0 | 896 |
| EASTERN | | | | | | | | |
| Embu (43) | 31 | 0 | 0 | 0 | 0.06 | 0 | 0 | 994 |
| Meru (44) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 777 |
| Meru (45) | 14 | 0 | 0 | 0 | 0.02 | 2 | 0 | 1487 |
| Meru (46) | 20 | 0 | 0 | 0 | 0 | 0 | 0 | 2124 |
| Machakos (47) | 0 | 6 | 0 | 0 | 0.98 | 0 | 0 | 915 |
| Machakos (48) | 0 | 0 | 3 | 0 | 0.21 | 0 | 0 | 708 |
| Kitui (49) | 0 | 0 | 0 | 0 | 0.25 | 0 | 0 | 656 |
| Kitui (50) | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 661 |

SOURCE: Farm Management Handbook of Kenya. 1983..

Table 25. Input use in bean monoculture, Second Rains. Kenya 1977.

| Province / District | Improved Seed | Nitrogen (kg/ha) | P ₂ O ₅ (kg/ha) | K ₂ O (kg/ha) | Manure (tons/ha) | Insec- ticides (kg/ha) | Fungi- cides (kg/ha) | Yields |
|---------------------|---------------|---------------------|--|-----------------------------|---------------------|------------------------------|----------------------------|---------|
| | (% farms) | | | | | | | (kg/ha) |
| | Beans | | | | | | | Beans |
| WESTERN | | | | | | | | |
| Bungoma (11) | 0 | 0 | 17 | 0 | 0 | 0 | 0 | 304 |
| CENTRAL | | | | | | | | |
| Kiambu (30) | 25 | 41 | 104 | 0 | 0 | 0 | 0 | 1031 |
| Murang'a (33) | 0 | 8 | 3 | 0 | 0.43 | 0 | 0 | 802 |
| Murang'a (34) | 0 | 0 | 36 | 0 | 0 | 0 | 0 | 438 |
| Nyeri (35) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1049 |
| Nyeri (36) | 0 | 4 | 12 | 0 | 0.10 | 1 | 1 | 691 |
| Nyeri (37) | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 687 |
| Kirinyaga (38) | 0 | 2 | 2 | 0 | 0 | 0 | 0 | 860 |
| Kirinyaga (39) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 723 |
| Kirinyaga (40) | 11 | 0 | 0 | 0 | 0 | 5 | 5 | 569 |
| EASTERN | | | | | | | | |
| Embu (42) | 11 | 0 | 12 | 0 | 0 | 1 | 1 | 892 |
| Embu (43) | 21 | 0 | 0 | 0 | 0.04 | 0 | 0 | 1383 |
| Meru (45) | 14 | 0 | 0 | 0 | 0.05 | 5 | 5 | 1672 |
| Machakos (47) | 0 | 5 | 0 | 0 | 0.59 | 0 | 0 | 845 |
| Machakos (48) | 0 | 0 | 9 | 0 | 0.18 | 0 | 0 | 765 |
| Kitui (49) | 0 | 0 | 0 | 0 | 0.27 | 0 | 0 | 572 |
| Kitui (50) | 0 | 0 | 0 | 0 | 0.03 | 2 | 2 | 714 |

SOURCE: Farm Management Handbook of Kenya. 1983.

DATA APPENDICES

BY

ARTURO FRANCO AND CAROLINA CORREA

WHEAT

PRODUCTION, RELATIVE IMPORTANCE IN THE REGION
AND PER CAPITA PRODUCTION LEVELS

(CIAT)

| COUNTRY | P R O D U C T I O N -----1000 MT----- | | | PERCENTAGE OF TOTAL X | PER CAPITA PRODUCTION KG |
|-------------------------|--|---------|---------|--------------------------|--------------------------------|
| | 1960/62 | 1970/72 | 1980/82 | 1980/82 | 1980/82 |
| BRAZIL | 655 | 1613 | 2253 | 12.794 | 21 |
| MEXICO | 1349 | 2105 | 3481 | 19.763 | 58 |
| | 2004 | 3718 | 5734 | 32.557 | 34 |
| BOLIVIA | 48 | 48 | 64 | 0.365 | 13 |
| COLOMBIA | 150 | 59 | 59 | 0.335 | 3 |
| ECUADOR | 68 | 67 | 37 | 0.210 | 5 |
| PARAGUAY | 8 | 35 | 60 | 0.341 | 22 |
| PERU | 154 | 123 | 99 | 0.562 | 6 |
| VENEZUELA | 1 | 1 | 0 | 0.002 | 0 |
| TROPICAL SOUTH AMERICA | 427 | 332 | 320 | 1.815 | 4 |
| GUATEMALA | 29 | 40 | 50 | 0.282 | 8 |
| HONDURAS | 1 | 1 | 1 | 0.006 | 0 |
| CENTRAL AMERICA, PANAMA | 30 | 41 | 51 | 0.288 | 3 |
| CARIBBEAN | 0 | 0 | 0 | 0.000 | 0 |
| TROPICAL LATIN AMERICA | 2460 | 4091 | 6104 | 34.660 | 22 |
| ARGENTINA | 5128 | 6167 | 10403 | 59.069 | 410 |
| CHILE | 1039 | 1290 | 767 | 4.357 | 75 |
| URUGUAY | 415 | 292 | 337 | 1.913 | 118 |
| TEMPERATE SOUTH AMERICA | 6582 | 7749 | 11508 | 65.340 | 300 |
| LATIN AMERICA | 9042 | 11840 | 17612 | 100.000 | 56 |

COLUMNS MAY NOT ADD EXACTLY DUE TO ROUNDING

(CIAT)

WHEAT

ANNUAL GROWTH RATES

| COUNTRY | PRODUCTION | | | | AREA | | | YIELD | | |
|-------------------------|------------|---------|---------|----------|---------|---------|---------|---------|---------|--|
| | 1960/70 | 1971/82 | 1960/82 | 1960/70 | 1971/82 | 1960/82 | 1960/70 | 1971/82 | 1960/82 | |
| BRAZIL | 9.0** | 3.2 | 8.5*** | 4.3 | 2.2 | 7.5*** | 4.8** | 1.0 | 1.0 | |
| MEXICO | 7.0*** | 5.5*** | 4.2*** | 0.3 | 2.4* | -0.0 | 6.7*** | 3.1*** | 4.3*** | |
| | 7.6*** | 4.6** | 5.8*** | 2.7 | 2.4 | 5.0*** | 5.0*** | 2.2 | 0.8 | |
| BOLIVIA | -1.7 | 2.1** | 1.9*** | -3.3 | 5.0*** | 1.2 | 3.6* | -2.9*** | 1.3** | |
| COLOMBIA | -7.3*** | -1.2 | -5.7*** | -11.1*** | -3.4* | -7.8*** | 3.8*** | 2.1 | 2.2*** | |
| ECUADOR | 3.8* | -5.8** | -3.1*** | 1.2 | -8.3*** | -4.9*** | 2.8* | 2.5*** | 1.4*** | |
| PARAGUAY | 17.6*** | 8.3** | 9.9*** | 15.5*** | 6.2* | 8.5*** | 2.1 | 2.2 | 1.4* | |
| PERU | -2.7*** | -2.5** | -2.1*** | -1.3*** | -5.4*** | -2.7*** | -1.4*** | 2.9*** | 0.6** | |
| VENEZUELA | -5.1 | -4.8*** | -4.9*** | -0.8 | -3.4** | -2.7*** | -4.3* | -1.4* | -2.2*** | |
| TROPICAL SOUTH AMERICA | -1.6** | -0.6 | -1.6*** | -0.8 | -1.4** | -1.8*** | -0.8 | 0.9* | 0.3 | |
| GUATEMALA | 1.5 | 1.9* | 3.5*** | -2.0 | 3.6** | 1.7** | 3.5*** | -1.7 | 1.8*** | |
| HONDURAS | -6.9** | 5.3** | -0.2 | -8.2** | 3.4* | -1.0 | 1.3 | 1.9*** | 0.8 | |
| CENTRAL AMERICA, PANAMA | 1.2 | 2.0* | 3.4*** | -2.2 | 3.6** | 1.6** | 3.5*** | -1.6 | 1.8*** | |
| TROPICAL LATIN AMERICA | 6.5*** | 4.2** | 5.1*** | 2.1 | 2.1 | 4.1*** | 4.4*** | 2.2 | 1.0* | |
| ARGENTINA | 0.8 | 4.6* | 2.1** | 1.8 | 3.3** | 0.9 | -1.0 | 1.2 | 1.2** | |
| CHILE | 2.2*** | -3.9** | -1.7*** | -1.3** | -4.3*** | -2.5*** | 3.5*** | 0.4 | 0.8** | |
| URUGUAY | -1.1 | 0.8 | -1.3 | -2.2 | -2.1 | -2.7*** | 1.1 | 3.0 | 1.4* | |
| TEMPERATE SOUTH AMERICA | 0.9 | 3.6* | 1.5** | 1.1 | 2.4* | 0.4 | -0.2 | 1.2 | 1.2*** | |
| LATIN AMERICA | 2.6 | 3.8** | 2.6*** | 1.5 | 2.3** | 1.6*** | 1.1 | 1.4* | 1.0*** | |

LEVEL OF SIGNIFICANCE IS REPRESENTED AS FOLLOWS

***, P<0.005 ** P<0.01 * P<0.05

(CIAT) WHEAT TRENDS IN AREA LEVEL BY COUNTRY 1960/82

| COUNTRY | ANNUAL GROWTH | AVERAGE AREA | AVERAGE AREA | AVERAGE AREA |
|-------------------------|------------------------------|-------------------|--------------|--------------|
| | RATE IN AREA 1960/82 X | 1960/62 | 1970/72 | 1980/82 |
| | | -----1000 HA----- | | |
| BRASIL | 7.536 *** | 968.7 | 2161.4 | 2623.7 |
| MEXICO | -0.049 | 808.3 | 729.0 | 871.0 |
| | 5.010 *** | 1777.0 | 2890.4 | 3494.7 |
| BOLIVIA | 1.160 | 75.0 | 62.4 | 100.0 |
| COLOMBIA | -7.848 *** | 158.7 | 51.0 | 40.0 |
| ECUADOR | -4.859 *** | 82.0 | 69.4 | 32.0 |
| PARAGUAY | 8.524 *** | 10.0 | 42.9 | 57.3 |
| PERU | -2.659 *** | 153.7 | 136.6 | 85.0 |
| VENEZUELA | -2.665 *** | 1.7 | 1.4 | 1.0 |
| TROPICAL SOUTH AMERICA | -1.838 *** | 428.7 | 363.7 | 315.3 |
| GUATEMALA | 1.667 ** | 36.5 | 32.6 | 42.7 |
| HONDURAS | -0.980 | 1.5 | 0.8 | 1.0 |
| CENTRAL AMERICA, PANAMA | 1.594 ** | 38.0 | 33.5 | 43.7 |
| TROPICAL LATIN AMERICA | 4.071 *** | 2231.0 | 3287.6 | 3853.7 |
| ARGENTINA | 0.926 | 3921.7 | 4326.9 | 6247.7 |
| CHILE | -2.525 *** | 812.3 | 726.5 | 450.7 |
| URUGUAY | -2.697 *** | 452.0 | 287.1 | 252.3 |
| TEMPERATE SOUTH AMERICA | 0.350 | 5186.0 | 5340.5 | 6950.7 |
| LATIN AMERICA | 1.576 *** | 7417.0 | 8628.1 | 10804.3 |

LEVEL OF SIGNIFICANCE IS REPRESENTED AS FOLLOWS
 *** P<0.005 ** P<0.01 * P<0.05

| [CIAT] WHEAT | | TRENDS IN YIELD LEVEL BY COUNTRY 1960/82 | | | | |
|----------------|-------------------------------|--|---------------|---------------|--------|--------|
| COUNTRY | ANNUAL GROWTH | AVERAGE YIELD | AVERAGE YIELD | AVERAGE YIELD | | |
| | RATE IN YIELD 1960/82 x | 1960/62 | 1970/72 | 1980/82 | | |
| | | -----KG/HA----- | | | | |
| BRAZIL | 1.007 | 702.8 | 761.1 | 889.9 | | |
| MEXICO | 4.265 *** | 1679.0 | 2878.6 | 3961.0 | | |
| ----- | | 0.812 | 1152.4 | 1295.5 | 1668.8 | |
| BOLIVIA | 1.301 ** | . | 773.2 | 644.2 | | |
| COLOMBIA | 2.181 *** | 947.0 | 1152.4 | 1468.3 | | |
| ECUADOR | 1.356 *** | . | 955.9 | 1157.7 | | |
| PARAGUAY | 1.352 * | 775.0 | 781.3 | 1031.4 | | |
| PERU | 0.606 ** | 1000.0 | 897.6 | 1161.7 | | |
| VENEZUELA | -2.220 *** | 666.7 | 417.8 | 398.7 | | |
| ----- | | TROPICAL SOUTH AMERICA | 0.278 | 1027.2 | 912.3 | 1009.0 |
| GUATEMALA | 1.818 *** | 777.9 | 1231.3 | 1188.6 | | |
| HONDURAS | 0.757 | 750.0 | 852.4 | 1000.0 | | |
| ----- | | CENTRAL AMERICA, PANAMA | 1.811 *** | 773.6 | 1222.1 | 1183.7 |
| ----- | | TROPICAL LATIN AMERICA | 1.029 * | 1108.2 | 1250.9 | 1605.7 |
| ARGENTINA | 1.175 ** | 1305.8 | 1412.3 | 1637.6 | | |
| CHILE | 0.826 ** | 1281.2 | 1775.0 | 1698.4 | | |
| URUGUAY | 1.441 * | 930.3 | 1016.6 | 1337.9 | | |
| ----- | | TEMPERATE SOUTH AMERICA | 1.187 *** | 1270.5 | 1444.5 | 1635.8 |
| ----- | | LATIN AMERICA | 1.037 *** | 1222.2 | 1374.9 | 1613.7 |

LEVEL OF SIGNIFICANCE IS REPRESENTED AS FOLLOWS

*** P<0.005 ** P<0.01 *P<0.05

(CIAT) WHEAT

SUMMARY OF LATIN AMERICA TRADE (THOUSAND TONS)

| REGION | EXPORT | | | IMPORT | | | +IMPORT-EXPORT | | |
|-------------------------|---------|---------|---------|---------|---------|---------|----------------|---------|---------|
| | 1960/62 | 1970/72 | 1980/82 | 1960/62 | 1970/72 | 1980/82 | 1960/62 | 1970/72 | 1980/82 |
| BRAZIL | 0 | 0 | 2 | 2040 | 1849 | 4449 | 2040 | 1849 | 4447 |
| MEXICO | 1 | 48 | 12 | 15 | 273 | 784 | 14 | 225 | 772 |
| | 1 | 48 | 14 | 2055 | 2122 | 5233 | 2054 | 2074 | 5219 |
| BOLIVIA | 0 | 1 | 0 | 150 | 198 | 284 | 150 | 197 | 284 |
| COLOMBIA | 0 | 0 | 0 | 125 | 368 | 515 | 125 | 368 | 515 |
| CUBA | 0 | 0 | 0 | 319 | 840 | 1379 | 319 | 840 | 1379 |
| DOMINICAN RP | 0 | 0 | 2 | 39 | 45 | 162 | 39 | 45 | 160 |
| ECUADOR | 0 | 0 | 0 | 44 | 84 | 267 | 44 | 84 | 267 |
| PARAGUAY | 0 | 0 | 0 | 81 | 64 | 61 | 81 | 64 | 61 |
| PERU | 2 | 1 | 4 | 398 | 613 | 832 | 396 | 612 | 828 |
| VENEZUELA | 1 | 0 | 0 | 329 | 669 | 853 | 328 | 669 | 853 |
| TROPICAL SOUTH AMERICA | 3 | 2 | 6 | 1485 | 2881 | 4353 | 1482 | 2879 | 4347 |
| COSTA RICA | 0 | 1 | 1 | 37 | 71 | 96 | 37 | 70 | 95 |
| EL SALVADOR | 1 | 1 | 2 | 29 | 64 | 124 | 28 | 63 | 122 |
| GUATEMALA | 0 | 1 | 1 | 54 | 79 | 107 | 54 | 78 | 106 |
| HONDURAS | 0 | 1 | 2 | 19 | 48 | 72 | 19 | 47 | 70 |
| NICARAGUA | 0 | 1 | 0 | 24 | 40 | 43 | 24 | 39 | 43 |
| PANAMA | 0 | 1 | 1 | 23 | 49 | 56 | 23 | 48 | 55 |
| CENTRAL AMERICA, PANAMA | 1 | 6 | 7 | 186 | 351 | 498 | 185 | 345 | 491 |
| BARBADOS | 0 | 1 | 1 | 12 | 19 | 23 | 12 | 18 | 22 |
| GUYANA | 0 | 8 | 0 | 41 | 42 | 31 | 41 | 34 | 31 |
| HAITI | 0 | 0 | 0 | 38 | 53 | 180 | 38 | 53 | 180 |
| JAMAICA | 1 | 1 | 0 | 87 | 178 | 184 | 86 | 177 | 184 |
| TRINIDAD ETC | 1 | 1 | 9 | 56 | 86 | 112 | 55 | 85 | 103 |
| CARIBBEAN | 2 | 11 | 10 | 234 | 378 | 530 | 232 | 367 | 520 |
| TROPICAL LATIN AMERICA | 7 | 67 | 37 | 3960 | 5732 | 10614 | 3953 | 5665 | 10577 |
| ARGENTINA | 2151 | 1729 | 4055 | 0 | 1 | 0 | -2151 | -1728 | -4055 |
| CHILE | 0 | 0 | 0 | 130 | 325 | 992 | 130 | 325 | 992 |
| URUGUAY | 1 | 51 | 81 | 98 | 119 | 46 | 97 | 66 | -39 |
| TEMPERATE SOUTH AMERICA | 2152 | 1780 | 4136 | 228 | 445 | 1038 | -1924 | -1335 | -3098 |
| LATIN AMERICA | 2159 | 1847 | 4173 | 4188 | 6177 | 11652 | 2029 | 4330 | 7479 |

[CIAT] WHEAT

PRODUCTION, TRADE AND APPARENT CONSUMPTION

| COUNTRY | 1970/72 | | | | | 1980/82 | | | | |
|-------------------------|-------------------|--------------------|-------------------------|---------------------------------------|------------------------------|-------------------|--------------------|-------------------------|---------------------------------------|------------------------------|
| | PRODUCTION | +IMPORT -EXPORT | APPARENT CONSUMPTION | APPARENT PER CAPITA CONSUMPTION | SELF SUFFICIENCY INDEX | PRODUCTION | +IMPORT -EXPORT | APPARENT CONSUMPTION | APPARENT PER CAPITA CONSUMPTION | SELF SUFFICIENCY INDEX |
| | -----1000 MT----- | | | | | -----1000 MT----- | | | | |
| BRAZIL | 1613 | 1848 | 3461 | 42 | 46.60 | 2253 | 4448 | 6701 | 62 | 33.63 |
| MEXICO | 2105 | 225 | 2331 | 55 | 90.34 | 3481 | 771 | 4252 | 71 | 81.86 |
| | 3718 | 2073 | 5792 | 47 | 64.20 | 5734 | 5219 | 10953 | 65 | 52.35 |
| BOLIVIA | 48 | 198 | 246 | 59 | 19.63 | 64 | 284 | 348 | 71 | 18.48 |
| COLOMBIA | 59 | 368 | 427 | 24 | 13.76 | 59 | 514 | 573 | 25 | 10.29 |
| CUBA | 0 | 839 | 839 | 108 | 0.00 | 0 | 1378 | 1378 | 148 | 0.00 |
| DOMINICAN RP | 0 | 45 | 45 | 12 | 0.00 | 0 | 160 | 160 | 31 | 0.00 |
| ECUADOR | 67 | 84 | 150 | 30 | 44.35 | 37 | 267 | 304 | 44 | 12.18 |
| PARAGUAY | 35 | 63 | 98 | 49 | 35.70 | 60 | 60 | 120 | 45 | 49.91 |
| PERU | 123 | 612 | 734 | 63 | 16.70 | 99 | 828 | 927 | 60 | 10.68 |
| VENEZUELA | 1 | 668 | 669 | 75 | 0.09 | 0 | 853 | 853 | 65 | 0.05 |
| TROPICAL SOUTH AMERICA | 332 | 2876 | 3208 | 52 | 10.35 | 320 | 4344 | 4664 | 58 | 6.86 |
| COSTA RICA | 0 | 70 | 70 | 47 | 0.00 | 0 | 95 | 95 | 48 | 0.00 |
| EL SALVADOR | 0 | 63 | 63 | 21 | 0.00 | 0 | 123 | 123 | 30 | 0.00 |
| GUATEMALA | 40 | 79 | 119 | 26 | 33.82 | 50 | 107 | 156 | 25 | 31.76 |
| HONDURAS | 1 | 48 | 48 | 21 | 1.44 | 1 | 70 | 71 | 23 | 1.40 |
| NICARAGUA | 0 | 39 | 39 | 24 | 0.00 | 0 | 43 | 43 | 18 | 0.00 |
| PANAMA | 0 | 48 | 48 | 38 | 0.00 | 0 | 55 | 55 | 32 | 0.00 |
| CENTRAL AMERICA, PANAMA | 41 | 347 | 388 | 31 | 10.54 | 51 | 492 | 543 | 31 | 9.33 |
| BARBADOS | 0 | 18 | 18 | 75 | 0.00 | 0 | 23 | 23 | 93 | 0.00 |
| GUYANA | 0 | 34 | 34 | 54 | 0.00 | 0 | 30 | 30 | 38 | 0.00 |
| HAITI | 0 | 52 | 52 | 13 | 0.00 | 0 | 180 | 180 | 35 | 0.00 |
| JAMAICA | 0 | 177 | 177 | 101 | 0.00 | 0 | 183 | 183 | 90 | 0.00 |
| TRINIDAD ETC | 0 | 86 | 86 | 88 | 0.00 | 0 | 103 | 103 | 95 | 0.00 |
| CARIBBEAN | 0 | 367 | 367 | 48 | 0.00 | 0 | 519 | 519 | 56 | 0.00 |
| TROPICAL LATIN AMERICA | 4091 | 5665 | 9756 | 47 | 41.94 | 6104 | 10575 | 16679 | 60 | 36.60 |
| ARGENTINA | 6167 | -1729 | 4438 | 200 | 138.95 | 10403 | -4055 | 6349 | 250 | 163.87 |
| CHILE | 1290 | 325 | 1615 | 190 | 79.88 | 767 | 991 | 1758 | 172 | 43.64 |
| URUGUAY | 292 | 68 | 360 | 133 | 81.04 | 337 | -34 | 303 | 107 | 111.23 |
| TEMPERATE SOUTH AMERIC | 7749 | -1335 | 6413 | 192 | 120.82 | 11508 | -3098 | 8410 | 219 | 136.83 |
| LATIN AMERICA | 11840 | 4329 | 16169 | 67 | 73.23 | 17612 | 7477 | 25089 | 79 | 70.20 |

| COUNTRY | P R O D U C T I O N | | | PERCENTAGE PER CAPITA | |
|-------------------------|---------------------|---------|---------|-----------------------|------------|
| | -----1000 MT----- | | | OF TOTAL | PRODUCTION |
| | 1960/62 | 1970/72 | 1980/82 | % | KG |
| | 1960/62 | 1970/72 | 1980/82 | 1980/82 | 1980/82 |
| BRAZIL | 5248 | 6969 | 9251 | 56.815 | 85 |
| MEXICO | 317 | 393 | 567 | 3.480 | 9 |
| | 5565 | 7362 | 9818 | 60.295 | 58 |
| BOLIVIA | 32 | 78 | 94 | 0.577 | 19 |
| COLOMBIA | 503 | 851 | 1889 | 11.601 | 82 |
| CUBA | 255 | 346 | 436 | 2.987 | 52 |
| DOMINICAN RP | 114 | 212 | 415 | 2.549 | 79 |
| ECUADOR | 161 | 206 | 400 | 2.455 | 58 |
| PARAGUAY | 17 | 44 | 68 | 0.416 | 25 |
| PERU | 355 | 551 | 632 | 3.883 | 41 |
| VENEZUELA | 85 | 181 | 657 | 4.033 | 50 |
| TROPICAL SOUTH AMERICA | 1522 | 2469 | 4641 | 28.501 | 57 |
| COSTA RICA | 58 | 87 | 174 | 1.071 | 89 |
| EL SALVADOR | 24 | 45 | 49 | 0.299 | 12 |
| GUATEMALA | 14 | 30 | 44 | 0.270 | 7 |
| HONDURAS | 15 | 16 | 37 | 0.227 | 12 |
| NICARAGUA | 37 | 79 | 146 | 0.895 | 63 |
| PANAMA | 105 | 131 | 181 | 1.110 | 105 |
| CENTRAL AMERICA, PANAMA | 252 | 387 | 630 | 3.871 | 32 |
| GUYANA | 231 | 184 | 287 | 1.763 | 363 |
| HAITI | 55 | 84 | 95 | 0.583 | 18 |
| JAMAICA | 4 | 0 | 2 | 0.010 | 1 |
| TRINIDAD TOB | 11 | 11 | 28 | 0.170 | 26 |
| CARIBBEAN | 301 | 280 | 411 | 2.526 | 44 |
| TROPICAL LATIN AMERICA | 7640 | 10498 | 15500 | 95.193 | 98 |
| ARGENTINA | 174 | 330 | 328 | 2.016 | 13 |
| CHILE | 98 | 77 | 109 | 0.667 | 11 |
| URUGUAY | 58 | 130 | 346 | 2.123 | 122 |
| TEMPERATE SOUTH AMERICA | 330 | 536 | 783 | 4.807 | 20 |
| LATIN AMERICA | 7970 | 11034 | 16283 | 100.000 | 89 |

COLUMNS MAY NOT ADD EXACTLY DUE TO ROUNDING

| COUNTRY | PRODUCTION | | | AREA | | | YIELD | | |
|-------------------------|------------|---------|---------|----------|---------|---------|---------|---------|---------|
| | 1960/70 | 1971/82 | 1960/82 | 1960/70 | 1971/82 | 1960/82 | 1960/70 | 1971/82 | 1960/82 |
| BRAZIL | 3.4*** | 3.0*** | 2.4*** | 4.7*** | 2.8*** | 3.0*** | -1.3** | 0.2 | -0.5*** |
| MEXICO | 3.0** | 2.9* | 3.1*** | 1.0 | -0.4 | 0.8* | 2.0** | 3.2*** | 2.2*** |
| | 3.4*** | 3.0*** | 2.5*** | 4.6*** | 2.7*** | 2.9*** | -1.2** | 0.3 | -0.4** |
| BOLIVIA | 10.6*** | 1.3 | 5.4*** | 8.4*** | 1.6 | 4.6*** | 0.9 | -0.3 | 0.1 |
| COLOMBIA | 4.7*** | 6.8*** | 7.2*** | 1.2 | 5.4*** | 2.4*** | 3.5** | 1.3*** | 4.8*** |
| CUBA | -2.3 | 3.6*** | 7.0*** | -3.2 | -1.5** | 3.1* | 0.8 | 5.1*** | 3.8*** |
| DOMINICAN RP | 6.7*** | 7.3*** | 6.2*** | 5.1*** | 5.0*** | 2.9*** | 2.3*** | 2.3 | 3.4*** |
| ECUADOR | 4.6** | 6.1*** | 4.2*** | -0.3 | 5.0** | 0.7 | 5.0** | 1.1 | 3.5*** |
| PARAGUAY | 6.5* | 4.5*** | 8.1*** | 6.2* | 4.5*** | 9.1*** | 0.3 | -0.0 | -0.9** |
| PERU | 3.6 | 2.0 | 3.3** | 3.7** | 1.1 | 2.8*** | -0.1 | 0.7*** | 0.5*** |
| VENEZUELA | 12.7*** | 13.9*** | 9.0*** | 10.1*** | 10.0*** | 5.4*** | 2.6** | 4.0** | 3.6*** |
| TROPICAL SOUTH AMERICA | 4.7*** | 6.2*** | 6.1*** | 3.1*** | 4.1*** | 3.0*** | 1.7** | 2.0*** | 3.1*** |
| COSTA RICA | 5.9*** | 6.5*** | 6.0*** | 0.5 | 5.5** | 2.4*** | 5.4*** | 1.0 | 3.6*** |
| SALVADOR | 10.6** | 1.4 | 2.6** | 5.4 | 1.3 | 0.4 | 5.2*** | 0.0 | 2.2*** |
| GUATEMALA | 3.8* | 3.4 | 5.4*** | 0.8 | -0.0 | 2.2*** | 3.0* | 3.4 | 3.1*** |
| HONDURAS | -0.7 | 7.8*** | 5.9*** | 0.3 | 5.6*** | 4.5*** | -1.0 | 2.2** | 1.4*** |
| NICARAGUA | 9.2*** | 4.7 | 4.6*** | 2.3** | 4.1* | 1.9*** | 6.9*** | 0.6 | 2.7*** |
| PANAMA | 4.6*** | 2.4** | 2.4*** | 2.2 | -0.9 | -0.4 | 2.4*** | 3.3*** | 2.8*** |
| CENTRAL AMERICA, PANAMA | 6.1*** | 4.4*** | 4.2*** | 1.9 | 1.9** | 1.1*** | 4.2*** | 2.4** | 3.1*** |
| GUYANA | -1.3 | 4.9** | 1.1 | 3.3* | -0.5 | -0.1 | -4.6*** | 5.5*** | 1.3* |
| HAITI | 4.8*** | 0.3 | 3.3*** | -5.1** | 2.7*** | -0.2 | 9.3*** | -2.5 | 3.3*** |
| JAMAICA | -24.6*** | 18.1** | -4.5 | -23.5*** | 14.5* | -6.5** | -1.1 | 3.6*** | 2.0*** |
| TRINIDAD ETC | -0.0 | 8.7*** | 5.7*** | -3.5*** | 8.6*** | 4.0*** | 3.5*** | 0.1 | 1.7*** |
| CARIBBEAN | 0.2 | 5.8** | 1.8*** | 3.1 | 0.9 | 0.5 | -2.9 | 2.9*** | 1.4** |
| TROPICAL LATIN AMERICA | 3.7*** | 3.9*** | 3.4*** | 4.2*** | 2.8*** | 2.8*** | -0.5 | 1.1*** | 0.6*** |
| ARGENTINA | 8.0*** | 1.4 | 3.2*** | 6.0*** | 2.0** | 3.3*** | 1.9*** | -0.7 | -0.1 |
| CHILE | -5.0* | 7.7** | 1.3 | -4.5* | 6.3** | 0.1 | -0.4 | 1.4 | 1.2** |
| URUGUAY | 10.0*** | 10.5*** | 8.6*** | 9.5*** | 7.9*** | 6.7*** | 0.5 | 2.6** | 1.9*** |
| TEMPERATE SOUTH AMERICA | 5.9*** | 5.5*** | 4.4*** | 4.2*** | 4.5*** | 3.3*** | 1.7** | 1.0 | 1.0*** |
| LATIN AMERICA | 3.8*** | 4.0*** | 3.4*** | 4.2*** | 2.9*** | 2.8*** | -0.4 | 1.2*** | 0.6*** |

LEVEL OF SIGNIFICANCE IS REPRESENTED AS FOLLOWS

*** P<0.005 ** P<0.01 * P<0.05

{CIAT } RICE, PADDY TRENDS IN AREA LEVEL BY COUNTRY 1960/82

| COUNTRY | ANNUAL GROWTH | AVERAGE AREA | AVERAGE AREA | AVERAGE AREA |
|-------------------------|------------------------------|-------------------|--------------|--------------|
| | RATE IN AREA 1960/82 % | 1960/62 | 1970/72 | 1980/82 |
| | | -----1000 HA----- | | |
| BRASIL | 2.970 *** | 3163.3 | 4758.7 | 6108.3 |
| MEXICO | 0.843 * | 141.0 | 153.2 | 162.3 |
| | 2.903 *** | 3304.3 | 4911.9 | 6270.7 |
| BOLIVIA | 4.628 *** | 25.5 | 54.2 | 61.0 |
| COLOMBIA | 2.429 *** | 254.0 | 252.4 | 436.7 |
| CUBA | 3.108 * | 158.0 | 171.8 | 146.0 |
| DOMINICAN RP | 2.938 *** | 58.0 | 74.6 | 109.7 |
| ECUADOR | 0.731 | 99.3 | 78.2 | 130.0 |
| PARAGUAY | 9.084 *** | 7.7 | 22.4 | 33.3 |
| PERU | 2.784 *** | 85.0 | 132.8 | 137.7 |
| VENEZUELA | 5.402 *** | 56.3 | 102.7 | 222.3 |
| TROPICAL SOUTH AMERICA | 3.000 *** | 716.0 | 689.3 | 1276.7 |
| COSTA RICA | 2.376 *** | 49.0 | 37.0 | 72.3 |
| EL SALVADOR | 0.370 | 10.7 | 12.5 | 14.0 |
| GUATEMALA | 2.243 *** | 9.7 | 12.0 | 14.0 |
| HONDURAS | 4.542 *** | 10.7 | 11.8 | 21.3 |
| NICARAGUA | 1.879 *** | 22.7 | 25.9 | 43.3 |
| PANAMA | -0.434 | 96.3 | 98.0 | 95.7 |
| CENTRAL AMERICA, PANAMA | 1.091 *** | 199.0 | 197.1 | 260.7 |
| GUYANA | -0.129 | 91.7 | 97.6 | 92.0 |
| HAITI | -0.202 | 51.0 | 39.3 | 50.0 |
| JAMAICA | -6.458 ** | 2.7 | 0.3 | 0.8 |
| TRINIDAD ETC | 3.965 *** | 5.0 | 4.0 | 10.0 |
| CARIBBEAN | 0.474 | 131.7 | 141.2 | 152.8 |
| TROPICAL LATIN AMERICA | 2.782 *** | 4351.0 | 6139.5 | 7960.8 |
| ARGENTINA | 3.295 *** | 51.7 | 87.4 | 92.7 |
| CHILE | 0.084 | 35.3 | 26.1 | 36.3 |
| URUGUAY | 6.709 *** | 16.3 | 32.7 | 66.0 |
| TEMPERATE SOUTH AMERICA | 3.348 *** | 103.3 | 146.2 | 195.0 |
| LATIN AMERICA | 2.795 *** | 4454.3 | 6285.7 | 8155.8 |

LEVEL OF SIGNIFICANCE IS REPRESENTED AS FOLLOWS

*** P<0.005 ** P<0.01 * P<0.05

| (CIAT) | RICE, PADDY | TRENDS IN YIELD LEVEL BY COUNTRY 1960/82 | | | |
|-------------------------|-------------------------------|--|---------------|---------------|--|
| COUNTRY | ANNUAL GROWTH | AVERAGE YIELD | AVERAGE YIELD | AVERAGE YIELD | |
| | RATE IN YIELD 1960/82 % | 1960/62 | 1970/72 | 1980/82 | |
| | | -----KG/HA----- | | | |
| BRAZIL | -0.532 *** | 1658.1 | 1464.1 | 1514.3 | |
| MEXICO | 2.241 *** | 2243.7 | 2563.0 | 3487.0 | |
| | -0.425 ** | 1683.4 | 1498.4 | 1565.7 | |
| BOLIVIA | 0.146 . | . | 1433.6 | 1545.1 | |
| COLOMBIA | 4.754 *** | 1981.8 | 3371.9 | 4327.2 | |
| CUBA | 3.846 *** | 1613.7 | 2018.0 | 3332.1 | |
| DOMINICAN RP | 3.402 *** | . | 2865.9 | 3864.7 | |
| ECUADOR | 3.491 *** | 1612.0 | 2748.3 | 3074.0 | |
| PARAGUAY | -0.939 *** | 2227.5 | 1947.2 | 2038.2 | |
| PERU | 0.525 *** | 4170.9 | 4147.7 | 4567.5 | |
| VENEZUELA | 3.583 *** | 1534.5 | 1872.1 | 2962.2 | |
| TROPICAL SOUTH AMERICA | 3.121 *** | 2146.5 | 2786.5 | 3631.2 | |
| COSTA RICA | 3.632 *** | 1181.9 | 2397.4 | 2452.2 | |
| SALVADOR | 2.195 *** | 2204.5 | 3568.1 | 3447.2 | |
| GUATEMALA | 3.146 *** | 1481.5 | 2512.9 | 3146.8 | |
| HONDURAS | 1.378 *** | 1382.9 | 1327.6 | 1738.0 | |
| NICARAGUA | 2.678 *** | 1617.6 | 3054.3 | 3361.9 | |
| PANAMA | 2.796 *** | 1089.6 | 1341.1 | 1887.1 | |
| CENTRAL AMERICA, PANAMA | 3.059 *** | 1267.8 | 1965.4 | 2418.0 | |
| GUYANA | 1.255 * | 2543.0 | 1895.5 | 3120.9 | |
| HAITI | 3.252 *** | . | 2142.4 | 1900.0 | |
| JAMAICA | 2.004 *** | 1611.1 | 1545.0 | 2261.8 | |
| TRINIDAD ETC | 1.725 *** | 2100.0 | 2785.4 | 2766.7 | |
| CARIBBEAN | 1.375 ** | 2431.9 | 1989.0 | 2693.1 | |
| TROPICAL LATIN AMERICA | 0.620 *** | 1756.6 | 1710.3 | 1947.1 | |
| ARGENTINA | -0.091 | 3355.3 | 3754.2 | 3505.4 | |
| CHILE | 1.183 ** | 2774.6 | 2947.2 | 3027.8 | |
| URUGUAY | 1.938 *** | 3587.6 | 3960.8 | 5231.2 | |
| TEMPERATE SOUTH AMERICA | 1.013 *** | 3193.1 | 3654.7 | 3990.2 | |
| LATIN AMERICA | 0.649 *** | 1790.1 | 1755.6 | 1996.3 | |

LEVEL OF SIGNIFICANCE IS REPRESENTED AS FOLLOWS
 *** P<0.005 ** P<0.01 *P<0.05

[CIAT] RICE

SUMMARY OF LATIN AMERICA TRADE (THOUSAND TONS)

| REGION | EXPORT | | | IMPORT | | | +IMPORT-EXPORT | | |
|-------------------------|---------|---------|---------|---------|---------|---------|----------------|---------|---------|
| | 1960/62 | 1970/72 | 1980/82 | 1960/62 | 1970/72 | 1980/82 | 1960/62 | 1970/72 | 1980/82 |
| BRAZIL | 65 | 82 | 22 | 0 | 4 | 173 | -65 | -78 | 151 |
| MEXICO | 23 | 12 | 0 | 8 | 6 | 65 | -15 | -6 | 65 |
| | 88 | 94 | 22 | 8 | 10 | 238 | -80 | -84 | 216 |
| BOLIVIA | 0 | 1 | 0 | 5 | 0 | 2 | 5 | -1 | 2 |
| COLOMBIA | 5 | 3 | 25 | 14 | 1 | 2 | 9 | -2 | -23 |
| CUBA | 0 | 0 | 0 | 181 | 245 | 208 | 181 | 245 | 208 |
| DOMINICAN RP | 10 | 0 | 1 | 0 | 5 | 33 | -10 | 5 | 32 |
| ECUADOR | 18 | 0 | 10 | 0 | 1 | 13 | -18 | 1 | 3 |
| PARAGUAY | 0 | 1 | 1 | 0 | 0 | 0 | 0 | -1 | -1 |
| PERU | 0 | 1 | 0 | 12 | 1 | 127 | 12 | 0 | 127 |
| VENEZUELA | 0 | 61 | 20 | 15 | 4 | 1 | 15 | -57 | -19 |
| TROPICAL SOUTH AMERICA | 33 | 67 | 57 | 227 | 257 | 386 | 194 | 190 | 329 |
| COSTA RICA | 1 | 1 | 34 | 1 | 8 | 1 | 0 | 7 | -33 |
| EL SALVADOR | 2 | 4 | 1 | 4 | 2 | 4 | 2 | -2 | 3 |
| GUATEMALA | 2 | 2 | 1 | 1 | 4 | 4 | -1 | 2 | 3 |
| HONDURAS | 1 | 1 | 0 | 2 | 6 | 4 | 1 | 5 | 4 |
| NICARAGUA | 2 | 11 | 1 | 5 | 1 | 22 | 3 | -10 | 21 |
| PANAMA | 0 | 1 | 0 | 3 | 10 | 1 | 3 | 9 | 1 |
| CENTRAL AMERICA, PANAMA | 8 | 20 | 37 | 16 | 31 | 36 | 8 | 11 | -1 |
| BARBADOS | 0 | 1 | 0 | 9 | 8 | 8 | 9 | 7 | 8 |
| GUYANA | 79 | 69 | 66 | 0 | 0 | 0 | -79 | -69 | -66 |
| HAITI | 0 | 0 | 0 | 1 | 1 | 24 | 1 | 1 | 24 |
| JAMAICA | 1 | 1 | 1 | 20 | 36 | 51 | 19 | 35 | 50 |
| TRINIDAD ETC | 1 | 1 | 1 | 29 | 31 | 44 | 28 | 30 | 43 |
| CARIBBEAN | 81 | 72 | 68 | 59 | 76 | 127 | -22 | 4 | 59 |
| TROPICAL LATIN AMERICA | 210 | 253 | 184 | 310 | 374 | 787 | 100 | 121 | 603 |
| ARGENTINA | 18 | 72 | 100 | 1 | 1 | 5 | -17 | -71 | -95 |
| CHILE | 12 | 0 | 4 | 11 | 25 | 29 | -1 | 25 | 25 |
| URUGUAY | 17 | 51 | 194 | 0 | 0 | 0 | -17 | -51 | -194 |
| TEMPERATE SOUTH AMERICA | 47 | 123 | 298 | 12 | 26 | 34 | -35 | -97 | -264 |
| LATIN AMERICA | 257 | 376 | 482 | 322 | 400 | 821 | 65 | 24 | 339 |

(CIAT) RICE, PADDY

PRODUCTION, TRADE AND APPARENT CONSUMPTION

| COUNTRY | 1970/72 | | | | | 1980/82 | | | | |
|-------------------------|-------------------|--------------------|-------------------------|---------------------------------------|------------------------------|-------------------|--------------------|-------------------------|---------------------------------------|------------------------------|
| | PRODUCTION | +IMPORT -EXPORT | APPARENT CONSUMPTION | APPARENT PER CAPITA CONSUMPTION | SELF SUFFICIENCY INDEX | PRODUCTION | +IMPORT -EXPORT | APPARENT CONSUMPTION | APPARENT PER CAPITA CONSUMPTION | SELF SUFFICIENCY INDEX |
| | -----1000 MT----- | | | -----KG----- | | -----1000 MT----- | | | -----KG----- | |
| BRAZIL | 6969 | -78 | 6891 | 85 | 101.14 | 9251 | 151 | 9402 | 87 | 98.39 |
| MEXICO | 393 | -6 | 387 | 9 | 101.52 | 567 | 65 | 631 | 11 | 89.74 |
| | 7362 | -84 | 7277 | 59 | 101.16 | 9818 | 216 | 10034 | 60 | 97.84 |
| BOLIVIA | 78 | -1 | 77 | 18 | 101.08 | 94 | 1 | 95 | 19 | 98.91 |
| COLOMBIA | 851 | -2 | 848 | 47 | 100.28 | 1889 | -23 | 1866 | 81 | 101.24 |
| CUBA | 346 | 245 | 591 | 76 | 58.52 | 486 | 208 | 694 | 74 | 70.08 |
| DOMINICAN RP | 212 | 5 | 217 | 60 | 97.83 | 415 | 33 | 448 | 86 | 92.70 |
| ECUADOR | 206 | 1 | 207 | 41 | 99.56 | 400 | 2 | 402 | 58 | 99.49 |
| PARAGUAY | 44 | -0 | 43 | 22 | 100.78 | 68 | -0 | 68 | 25 | 100.15 |
| PERU | 551 | -0 | 551 | 47 | 100.04 | 632 | 127 | 759 | 49 | 83.30 |
| VENEZUELA | 181 | -57 | 125 | 14 | 145.51 | 657 | -19 | 638 | 49 | 102.99 |
| TROPICAL SOUTH AMERICA | 2469 | 190 | 2659 | 43 | 92.85 | 4641 | 328 | 4969 | 62 | 93.40 |
| COSTA RICA | 87 | 8 | 95 | 64 | 91.71 | 174 | -33 | 141 | 72 | 123.36 |
| EL SALVADOR | 45 | -2 | 43 | 15 | 103.84 | 49 | 3 | 52 | 12 | 94.05 |
| GUATEMALA | 30 | 2 | 33 | 7 | 92.53 | 44 | 4 | 48 | 8 | 91.86 |
| HONDURAS | 16 | 6 | 21 | 9 | 72.90 | 37 | 4 | 41 | 13 | 90.98 |
| NICARAGUA | 79 | -11 | 68 | 41 | 115.85 | 146 | 22 | 167 | 72 | 87.11 |
| PANAMA | 131 | 10 | 140 | 112 | 93.21 | 181 | 0 | 181 | 105 | 99.89 |
| CENTRAL AMERICA, PANAMA | 387 | 13 | 401 | 32 | 96.71 | 630 | -1 | 630 | 36 | 100.19 |
| BARBADOS | 0 | 7 | 7 | 29 | 0.00 | 0 | 7 | 7 | 29 | 0.00 |
| GUYANA | 184 | -68 | 116 | 182 | 158.59 | 287 | -66 | 221 | 279 | 129.82 |
| HAITI | 84 | 0 | 84 | 21 | 99.90 | 95 | 24 | 119 | 23 | 79.85 |
| JAMAICA | 0 | 36 | 36 | 21 | 1.16 | 2 | 50 | 52 | 25 | 3.21 |
| TRINIDAD ETC | 11 | 31 | 42 | 43 | 26.59 | 28 | 44 | 71 | 66 | 38.85 |
| CARIBBEAN | 280 | 5 | 286 | 38 | 98.14 | 411 | 59 | 470 | 50 | 87.48 |
| TROPICAL LATIN AMERICA | 10498 | 124 | 10622 | 51 | 98.83 | 15500 | 602 | 16102 | 59 | 96.26 |
| ARGENTINA | 330 | -72 | 258 | 12 | 127.71 | 328 | -95 | 233 | 9 | 140.97 |
| CHILE | 77 | 24 | 101 | 12 | 76.05 | 109 | 24 | 133 | 13 | 81.70 |
| URUGUAY | 130 | -50 | 79 | 29 | 163.05 | 346 | -193 | 152 | 54 | 226.79 |
| TEMPERATE SOUTH AMERICA | 536 | -96 | 438 | 13 | 122.25 | 783 | -264 | 518 | 13 | 151.00 |
| LATIN AMERICA | 11034 | 27 | 11060 | 46 | 99.76 | 16283 | 338 | 16621 | 53 | 97.97 |

MAIZE

PRODUCTION, RELATIVE IMPORTANCE IN THE REGION
AND PER CAPITA PRODUCTION LEVELS

[CIAT]

| COUNTRY | P R O D U C T I O N | | | PERCENTAGE PER CAPITA | |
|-------------------------|---------------------|---------|---------|-----------------------|------------|
| | -----1000 MT----- | | | OF TOTAL | PRODUCTION |
| | 1960/62 | 1970/72 | 1980/82 | X | KG |
| | 1960/62 | 1970/72 | 1980/82 | 1980/82 | 1980/82 |
| BRAZIL | 9098 | 14412 | 21112 | 42.615 | 195 |
| MEXICO | 5990 | 9296 | 12426 | 25.083 | 207 |
| | 15088 | 23708 | 33538 | 67.698 | 199 |
| BOLIVIA | 257 | 284 | 446 | 0.900 | 91 |
| COLOMBIA | 793 | 834 | 876 | 1.769 | 38 |
| CUBA | 175 | 87 | 95 | 0.192 | 10 |
| DOMINICAN RP | 66 | 48 | 35 | 0.070 | 7 |
| ECUADOR | 150 | 254 | 282 | 0.570 | 41 |
| PARAGUAY | 126 | 220 | 545 | 1.100 | 203 |
| PERU | 417 | 620 | 555 | 1.120 | 36 |
| VENEZUELA | 466 | 643 | 509 | 1.028 | 39 |
| TROPICAL SOUTH AMERICA | 2450 | 2990 | 3344 | 6.749 | 41 |
| COSTA RICA | 56 | 57 | 68 | 0.138 | 35 |
| EL SALVADOR | 189 | 326 | 481 | 0.971 | 116 |
| GUATEMALA | 528 | 778 | 1000 | 2.018 | 160 |
| HONDURAS | 267 | 340 | 459 | 0.927 | 148 |
| NICARAGUA | 136 | 203 | 181 | 0.366 | 78 |
| PANAMA | 70 | 52 | 58 | 0.116 | 34 |
| CENTRAL AMERICA, PANAMA | 1246 | 1756 | 2247 | 4.536 | 115 |
| BARBADOS | 1 | 2 | 2 | 0.004 | 8 |
| GUYANA | 1 | 2 | 1 | 0.003 | 2 |
| HAITI | 228 | 250 | 182 | 0.367 | 35 |
| JAMAICA | 4 | 5 | 4 | 0.007 | 2 |
| TRINIDAD TOB | 3 | 3 | 3 | 0.006 | 3 |
| CARIBBEAN | 236 | 261 | 192 | 0.387 | 21 |
| TROPICAL LATIN AMERICA | 19020 | 28716 | 39320 | 79.370 | 161 |
| ARGENTINA | 4726 | 8383 | 9633 | 19.446 | 380 |
| CHILE | 163 | 260 | 449 | 0.907 | 44 |
| URUGUAY | 152 | 166 | 137 | 0.277 | 48 |
| TEMPERATE SOUTH AMERICA | 5042 | 8809 | 10220 | 20.630 | 266 |
| LATIN AMERICA | 24061 | 37525 | 49540 | 100.000 | 174 |

COLUMNS MAY NOT ADD EXACTLY DUE TO ROUNDING

(CIAT)

MAIZE

ANNUAL GROWTH RATES

| COUNTRY | PRODUCTION | | | AREA | | | YIELD | | |
|-------------------------|------------|---------|---------|----------|---------|---------|---------|---------|---------|
| | 1960/70 | 1971/82 | 1960/82 | 1960/70 | 1971/82 | 1960/82 | 1960/70 | 1971/82 | 1960/82 |
| BRAZIL | 4.8*** | 3.5*** | 3.8*** | 4.1*** | 1.5*** | 2.5*** | 0.8 | 2.0** | 1.3*** |
| MEXICO | 4.8*** | 2.9* | 2.4*** | 2.7** | -1.3 | -0.0 | 2.2*** | 4.2*** | 2.4*** |
| | 4.8*** | 3.3*** | 3.3*** | 3.4*** | 0.4 | 1.5*** | 1.4*** | 2.9*** | 1.8*** |
| BOLIVIA | 1.6 | 5.0*** | 2.4*** | 0.6* | 3.4*** | 1.5*** | 1.0 | 1.6** | 0.9*** |
| COLOMBIA | 1.0 | 1.3** | 0.1 | 0.5 | 0.3 | -1.2*** | 0.6 | 1.0*** | 1.3*** |
| CUBA | -9.2*** | 0.8*** | -2.4*** | -7.1*** | -3.8*** | -3.6*** | -2.1*** | 4.6*** | 1.3** |
| DOMINICAN RP | -5.1** | -3.5 | -1.0 | -2.8** | -0.4 | -0.7 | 1.2 | -3.1 | 0.5 |
| ECUADOR | 4.5** | 0.4 | 2.7*** | 3.5** | -4.2*** | -0.5 | 1.0 | 4.6*** | 3.2*** |
| PARAGUAY | 5.1** | 9.5*** | 7.0*** | 5.8*** | 7.9*** | 6.2*** | -0.7 | 1.6** | 0.8*** |
| PERU | 4.5*** | -0.9 | 1.6*** | 2.2** | -1.6* | 0.4 | 2.3*** | 0.8* | 1.2*** |
| VENEZUELA | 5.3*** | 0.0 | 1.1 | 5.0*** | -3.7** | -0.8 | 0.3 | 3.7*** | 1.9*** |
| TROPICAL SOUTH AMERICA | 2.4*** | 1.9*** | 1.6*** | 2.0*** | -0.2 | 0.1 | 0.5 | 2.1*** | 1.5*** |
| COSTA RICA | -0.5 | 0.2 | 0.5 | -0.8 | -3.2** | -2.1*** | 0.3 | 3.4** | 2.5*** |
| SALVADOR | 5.7*** | 4.2** | 5.1*** | 1.2* | 2.9*** | 2.1*** | 4.6*** | 1.3 | 3.0*** |
| GUATEMALA | 3.7*** | 2.7*** | 3.1*** | 0.6* | 1.0 | -0.3 | 3.1*** | 1.7 | 3.4*** |
| HONDURAS | 3.0*** | 3.3*** | 2.3*** | 0.1 | 2.4 | 1.6*** | 2.9** | 0.9 | 0.6 |
| NICARAGUA | 6.7*** | -0.4 | 1.3** | 6.3*** | -3.6** | 0.5 | 0.4** | 3.2** | 0.8** |
| PANAMA | 0.8 | 1.5 | -1.4** | 0.4 | -1.8 | -2.4*** | 0.4 | 3.2*** | 1.0*** |
| CENTRAL AMERICA, PANAMA | 4.2*** | 2.7*** | 2.9*** | 1.5*** | 0.7 | 0.4** | 2.8*** | 2.0** | 2.5*** |
| BARBADOS | 6.0** | 1.3 | 4.4*** | 3.5 | 3.5*** | 3.7*** | 2.4* | -2.2** | 0.7 |
| GUYANA | 6.2*** | -9.1** | 3.9** | 1.4 | -3.7 | 2.6** | 5.8*** | -5.4** | 1.2 |
| HAITI | 0.5 | -2.9*** | -1.6*** | -4.1*** | 0.7 | -1.4*** | 4.6*** | -3.6*** | -0.3 |
| JAMAICA | 0.8 | -3.5 | 2.3* | -6.1*** | -5.3* | -1.7* | 6.9*** | 1.8 | 4.0** |
| TRINIDAD ETC | -6.7** | -1.2 | 3.3*** | -15.0*** | 1.2 | 2.1 | 8.3*** | -2.4** | 1.2 |
| CARIBBEAN | 0.6* | -2.9*** | -1.3*** | 15.0 | 0.6 | 3.1 | -14.4 | -3.5*** | -4.4* |
| TROPICAL LATIN AMERICA | 4.4*** | 3.1*** | 3.0*** | 3.1*** | 0.4 | 1.2*** | 1.4*** | 2.7*** | 1.8*** |
| ARGENTINA | 7.1*** | 1.5 | 3.3*** | 4.4*** | -2.2* | 0.1 | 2.7** | 3.6** | 3.2*** |
| CHILE | 5.1* | 5.0** | 4.1*** | -1.1 | 4.0*** | 1.9*** | 6.2*** | 1.0 | 2.2*** |
| URUGUAY | -0.6 | -4.8 | 0.5 | -3.5* | -5.7*** | -3.5*** | 2.9 | 1.0 | 4.0*** |
| TEMPERATE SOUTH AMERICA | 6.9*** | 1.5 | 3.3*** | 3.7*** | -2.1* | -0.0 | 3.1*** | 3.6** | 3.3*** |
| LATIN AMERICA | 5.0*** | 2.7*** | 3.1*** | 3.2*** | 0.1 | 1.0*** | 1.8*** | 2.7*** | 2.1*** |

LEVEL OF SIGNIFICANCE IS REPRESENTED AS FOLLOWS

*** P<0.005 ** P<0.01 * P<0.05

| COUNTRY | TRENDS IN AREA LEVEL BY COUNTRY 1960/82 | | | |
|-------------------------|---|----------------------|----------------------|----------------------|
| | ANNUAL GROWTH RATE IN AREA 1960/82 | AVERAGE AREA 1960/62 | AVERAGE AREA 1970/72 | AVERAGE AREA 1980/82 |
| | X | -----1000 HA----- | | |
| BRASIL | 2.491 *** | 6971.7 | 10315.8 | 11848.3 |
| MEXICO | -0.030 | 6025.0 | 7474.5 | 6916.0 |
| | 1.457 *** | 12996.7 | 17790.4 | 18764.3 |
| BOLIVIA | 1.529 *** | 207.0 | 221.0 | 297.3 |
| COLOMBIA | -1.197 *** | 707.7 | 650.8 | 627.3 |
| CUBA | -3.611 *** | 168.0 | 111.5 | 77.0 |
| DUMINICAN RP | -0.667 | 33.5 | 26.0 | 28.3 |
| ECUADOR | -0.474 | 216.3 | 331.8 | 229.0 |
| PARAGUAY | 6.236 *** | 99.0 | 180.5 | 382.3 |
| PERU | 0.415 | 304.0 | 379.6 | 312.7 |
| VENEZUELA | -0.818 | 423.3 | 547.0 | 337.0 |
| TROPICAL SOUTH AMERICA | 0.077 | 2147.7 | 2448.3 | 2291.0 |
| COSTA RICA | -2.053 *** | 52.0 | 50.0 | 41.0 |
| EL SALVADOR | 2.052 *** | 189.0 | 207.0 | 269.0 |
| GUATEMALA | -0.330 | 638.7 | 664.6 | 667.0 |
| HONDURAS | 1.646 *** | 276.0 | 283.3 | 339.0 |
| NICARAGUA | 0.483 | 156.7 | 245.2 | 175.3 |
| PANAMA | -2.398 *** | 84.7 | 64.6 | 55.7 |
| CENTRAL AMERICA, PANAMA | 0.431 ** | 1379.7 | 1514.0 | 1547.0 |
| BARBADOS | 3.709 *** | 0.5 | 0.7 | 1.0 |
| GUYANA | 2.610 ** | 1.0 | 1.4 | 1.0 |
| HAITI | -1.387 *** | 300.0 | 231.3 | 233.3 |
| JAMAICA | -1.664 * | 5.3 | 3.7 | 2.7 |
| TRINIDAD ETC | 2.119 | 1.0 | 0.7 | 1.0 |
| CARIBBEAN | 3.070 | 207.0 | 237.9 | 239.0 |
| TROPICAL LATIN AMERICA | 1.207 *** | 16731.0 | 21991.4 | 22841.3 |
| ARGENTINA | 0.127 | 2638.7 | 3743.5 | 3018.0 |
| CHILE | 1.939 *** | 81.0 | 78.4 | 119.0 |
| URUGUAY | -3.535 *** | 270.0 | 196.1 | 124.3 |
| TEMPERATE SOUTH AMERICA | -0.028 | 2989.7 | 4018.0 | 3261.3 |
| LATIN AMERICA | 1.044 *** | 19720.6 | 26009.4 | 26102.7 |

LEVEL OF SIGNIFICANCE IS REPRESENTED AS FOLLOWS
 *** P<0.005 ** P<0.01 * P<0.05

| (CIAT) | MAIZE | TRENDS IN YIELD LEVEL BY COUNTRY 1960/82 | | |
|-------------------------|-------------------------------|--|------------------|---------------|
| COUNTRY | ANNUAL GROWTH | AVERAGE YIELD | AVERAGE YIELD | AVERAGE YIELD |
| | RATE IN YIELD 1960/82 X | 1960/62 | 1970/72 KG/HA | 1980/82 |
| BRAZIL | 1.318 *** | 1305.0 | 1398.1 | 1783.3 |
| MEXICO | 2.434 *** | 994.2 | 1243.5 | 1795.7 |
| | 1.826 *** | 1161.0 | 1332.8 | 1786.3 |
| BOLIVIA | 0.909 *** | 1243.2 | 1282.6 | 1496.9 |
| COLOMBIA | 1.290 *** | 1119.7 | 1281.6 | 1396.9 |
| CUBA | 1.252 ** | 1034.5 | 788.1 | 1238.1 |
| DOMINICAN RP | 0.500 | . | 1846.2 | 1249.0 |
| ECUADOR | 3.175 *** | 695.8 | 773.2 | 1238.5 |
| PARAGUAY | 0.767 *** | 1267.0 | 1221.6 | 1426.0 |
| PERU | 1.185 *** | 1367.9 | 1632.7 | 1768.7 |
| VENEZUELA | 1.933 *** | 1100.2 | 1169.9 | 1516.9 |
| TROPICAL SOUTH AMERICA | 1.483 *** | 1141.7 | 1221.1 | 1459.7 |
| COSTA RICA | 2.549 *** | 1076.3 | 1142.2 | 1648.1 |
| SALVADOR | 3.022 *** | 1000.6 | 1570.9 | 1785.2 |
| GUATEMALA | 3.425 *** | 826.6 | 1170.6 | 1498.4 |
| HONDURAS | 0.639 | 1003.8 | 1198.8 | 1353.6 |
| NICARAGUA | 0.804 ** | 872.4 | 815.4 | 1037.8 |
| PANAMA | 1.048 *** | 823.1 | 800.2 | 1035.7 |
| CENTRAL AMERICA, PANAMA | 2.466 *** | 889.7 | 1158.5 | 1453.0 |
| BARBADOS | 0.741 | 2197.9 | 2495.1 | 2000.0 |
| GUYANA | 1.164 | . | 1705.4 | 1333.3 |
| HAITI | -0.338 | . | 1079.3 | 778.6 |
| JAMAICA | 3.984 *** | 688.9 | 1236.1 | 1388.9 |
| TRINIDAD ETC | 1.186 | 2500.0 | 4110.8 | 3000.0 |
| CARIBBEAN | -4.384 * | 15913.1 | 1098.4 | 802.1 |
| TROPICAL LATIN AMERICA | 1.834 *** | 1136.1 | 1306.0 | 1720.7 |
| ARGENTINA | 3.199 *** | 1787.3 | 2211.4 | 3133.2 |
| CHILE | 2.170 *** | 2013.3 | 3313.6 | 3766.0 |
| URUGUAY | 4.011 *** | 556.8 | 845.2 | 1088.3 |
| TEMPERATE SOUTH AMERICA | 3.325 *** | 1682.1 | 2167.8 | 3079.0 |
| LATIN AMERICA | 2.068 *** | 1218.9 | 1442.1 | 1894.5 |

LEVEL OF SIGNIFICANCE IS REPRESENTED AS FOLLOWS

*** P<0.005 ** P<0.01 * P<0.05

(CIAT) MAIZE

SUMMARY OF LATIN AMERICA TRADE (THOUSAND TONS)

| REGION | EXPORT | | | IMPORT | | | +IMPORT-EXPORT | | |
|-------------------------|---------|---------|---------|---------|---------|---------|----------------|---------|---------|
| | 1960/62 | 1970/72 | 1980/82 | 1960/62 | 1970/72 | 1980/82 | 1960/62 | 1970/72 | 1980/82 |
| BRAZIL | 8 | 975 | 186 | 6 | 2 | 833 | -2 | -973 | 647 |
| MEXICO | 231 | 234 | 2 | 33 | 326 | 2359 | -198 | 92 | 2357 |
| | 239 | 1209 | 188 | 39 | 328 | 3192 | -200 | -881 | 3004 |
| BOLIVIA | 0 | 1 | 0 | 0 | 2 | 1 | 0 | 1 | 1 |
| COLOMBIA | 0 | 14 | 0 | 40 | 19 | 121 | 40 | 5 | 121 |
| CUBA | 0 | 0 | 0 | 54 | 165 | 515 | 54 | 165 | 515 |
| DOMINICAN RP | 17 | 1 | 0 | 2 | 5 | 169 | -15 | 4 | 169 |
| ECUADOR | 1 | 1 | 1 | 0 | 0 | 9 | -1 | -1 | 8 |
| PARAGUAY | 14 | 14 | 12 | 0 | 0 | 0 | -14 | -14 | -12 |
| PERU | 1 | 1 | 3 | 11 | 2 | 365 | 10 | 1 | 362 |
| VENEZUELA | 1 | 0 | 1 | 21 | 72 | 1072 | 20 | 72 | 1071 |
| TROPICAL SOUTH AMERICA | 34 | 32 | 17 | 128 | 265 | 2252 | 94 | 233 | 2235 |
| COSTA RICA | 0 | 1 | 0 | 1 | 27 | 52 | 1 | 26 | 52 |
| EL SALVADOR | 5 | 26 | 11 | 23 | 1 | 18 | 18 | -25 | 7 |
| GUATEMALA | 1 | 2 | 9 | 9 | 16 | 47 | 8 | 14 | 38 |
| HONDURAS | 23 | 13 | 4 | 1 | 1 | 31 | -22 | -12 | 27 |
| NICARAGUA | 2 | 9 | 1 | 2 | 17 | 38 | 0 | 8 | 37 |
| PANAMA | 0 | 0 | 0 | 3 | 12 | 40 | 3 | 12 | 40 |
| CENTRAL AMERICA, PANAMA | 31 | 51 | 25 | 39 | 74 | 226 | 8 | 23 | 201 |
| BARBADOS | 0 | 1 | 1 | 1 | 4 | 26 | 1 | 3 | 25 |
| GUYANA | 1 | 0 | 0 | 1 | 4 | 6 | 0 | 4 | 6 |
| HAITI | 0 | 1 | 0 | 0 | 1 | 7 | 0 | 0 | 7 |
| JAMAICA | 0 | 1 | 0 | 14 | 98 | 208 | 14 | 97 | 208 |
| TRINIDAD ETC | 0 | 1 | 1 | 9 | 51 | 129 | 9 | 50 | 128 |
| CARIBBEAN | 1 | 4 | 2 | 25 | 158 | 376 | 24 | 154 | 374 |
| TROPICAL LATIN AMERICA | 305 | 1296 | 232 | 231 | 825 | 6047 | -74 | -471 | 5814 |
| ARGENTINA | 2411 | 4789 | 5957 | 0 | 1 | 1 | -2411 | -4788 | -5956 |
| CHILE | 0 | 1 | 1 | 10 | 118 | 355 | 10 | 117 | 354 |
| URUGUAY | 0 | 0 | 5 | 44 | 1 | 12 | 44 | 1 | 7 |
| TEMPERATE SOUTH AMERICA | 2411 | 4790 | 5963 | 54 | 120 | 368 | -2357 | -4670 | -5595 |
| LATIN AMERICA | 2716 | 6086 | 6195 | 285 | 945 | 6414 | -2431 | -5141 | 219 |

(CIAT) MAIZE

PRODUCTION, TRADE AND APPARENT CONSUMPTION

| COUNTRY | 1970/72 | | | | | 1980/82 | | | | |
|------------------------------|--------------------|--------------------|-------------------------|---------------------------------------|------------------------------|--------------------|--------------------|-------------------------|---------------------------------------|------------------------------|
| | PRODUCTION | +IMPORT -EXPORT | APPARENT CONSUMPTION | APPARENT PER CAPITA CONSUMPTION | SELF SUFFICIENCY INDEX | PRODUCTION | +IMPORT -EXPORT | APPARENT CONSUMPTION | APPARENT PER CAPITA CONSUMPTION | SELF SUFFICIENCY INDEX |
| | -----1 000 MT----- | | | | | -----1 000 MT----- | | | | |
| | -----KG----- | | | | | -----KG----- | | | | |
| BRAZIL | 14412 | -972 | 13440 | 165 | 107.23 | 21112 | 646 | 21758 | 201 | 97.03 |
| MEXICO | 9296 | 92 | 9388 | 223 | 99.02 | 12426 | 2357 | 14783 | 246 | 84.06 |
| | 23708 | -881 | 22828 | 185 | 103.86 | 33538 | 3004 | 36541 | 217 | 91.78 |
| BOLIVIA | 284 | 1 | 285 | 68 | 99.60 | 446 | 0 | 446 | 91 | 99.96 |
| COLOMBIA | 834 | 5 | 839 | 47 | 99.38 | 876 | 121 | 997 | 43 | 87.89 |
| CUBA | 87 | 165 | 252 | 32 | 34.62 | 95 | 515 | 610 | 65 | 15.63 |
| DOMINICAN RP | 48 | 5 | 53 | 15 | 90.88 | 35 | 168 | 203 | 39 | 17.07 |
| ECUADOR | 254 | -0 | 254 | 50 | 100.00 | 282 | 8 | 290 | 42 | 97.24 |
| PARAGUAY | 220 | -13 | 207 | 102 | 106.41 | 545 | -11 | 534 | 198 | 102.15 |
| PERU | 620 | 1 | 621 | 53 | 99.86 | 555 | 362 | 917 | 60 | 60.51 |
| VENEZUELA | 643 | 72 | 715 | 81 | 89.98 | 509 | 1071 | 1581 | 121 | 32.22 |
| TROPICAL SOUTH AMERICA 2990 | 235 | | 3225 | 53 | 92.71 | 3344 | 2234 | 5578 | 69 | 59.95 |
| COSTA RICA | 57 | 26 | 83 | 56 | 69.06 | 68 | 51 | 120 | 61 | 57.08 |
| EL SALVADOR | 326 | -26 | 300 | 102 | 108.51 | 481 | 8 | 489 | 118 | 98.39 |
| GUATEMALA | 778 | 13 | 792 | 176 | 98.30 | 1000 | 38 | 1038 | 166 | 96.30 |
| HONDURAS | 340 | -12 | 328 | 142 | 103.61 | 459 | 28 | 487 | 157 | 94.30 |
| NICARAGUA | 203 | 8 | 211 | 128 | 96.19 | 181 | 37 | 219 | 94 | 82.91 |
| PANAMA | 52 | 12 | 63 | 50 | 81.37 | 58 | 39 | 97 | 56 | 59.57 |
| CENTRAL AMERICA, PANAMA 1756 | 22 | | 1777 | 140 | 98.79 | 2247 | 202 | 2449 | 140 | 91.75 |
| BARBADOS | 2 | 3 | 5 | 21 | 32.95 | 2 | 25 | 27 | 111 | 7.37 |
| GUYANA | 2 | 4 | 6 | 9 | 38.99 | 1 | 6 | 7 | 9 | 18.51 |
| HAITI | 250 | -0 | 250 | 62 | 100.01 | 182 | 7 | 189 | 36 | 96.46 |
| JAMAICA | 5 | 98 | 102 | 58 | 4.51 | 4 | 207 | 211 | 103 | 1.74 |
| TRINIDAD ETC | 3 | 50 | 53 | 55 | 5.62 | 3 | 128 | 131 | 121 | 2.29 |
| CARIBBEAN | 261 | 155 | 416 | 55 | 62.80 | 192 | 373 | 564 | 61 | 33.97 |
| TROPICAL LATIN AMERICA 28716 | -469 | | 28247 | 137 | 101.66 | 39320 | 5812 | 45132 | 163 | 87.12 |
| ARGENTINA | 8383 | -4789 | 3595 | 162 | 233.21 | 9633 | -5956 | 3677 | 145 | 261.98 |
| CHILE | 260 | 118 | 378 | 44 | 68.80 | 449 | 354 | 804 | 79 | 55.91 |
| URUGUAY | 166 | 0 | 166 | 61 | 99.90 | 137 | 7 | 144 | 51 | 95.06 |
| TEMPERATE SOUTH AMERIC 8809 | -4670 | | 4139 | 124 | 212.85 | 10220 | -5595 | 4625 | 120 | 220.96 |
| LATIN AMERICA | 37525 | -5139 | 32385 | 135 | 115.87 | 49540 | 217 | 49757 | 157 | 99.56 |

SORGHUM

PRODUCTION, RELATIVE IMPORTANCE IN THE REGION
AND PER CAPITA PRODUCTION LEVELS

[CIAT]

| COUNTRY | P R O D U C T I O N -----1000 MT----- | | | PERCENTAGE OF TOTAL X | PER CAPITA PRODUCTION KG |
|-------------------------|--|---------|---------|--------------------------|--------------------------------|
| | 1960/62 | 1970/72 | 1980/82 | 1980/82 | 1980/82 |
| BRAZIL | 0 | 2 | 201 | 1.515 | 2 |
| MEXICO | 265 | 2625 | 5275 | 39.758 | 88 |
| | 265 | 2627 | 5476 | 41.273 | 33 |
| BOLIVIA | 0 | 0 | 21 | 0.156 | 4 |
| COLOMBIA | 5 | 189 | 493 | 3.718 | 21 |
| CUBA | 29 | 2 | 1 | 0.008 | 0 |
| DOMINICAN RP | 0 | 15 | 15 | 0.116 | 3 |
| ECUADOR | 0 | 0 | 1 | 0.011 | 0 |
| PARAGUAY | 4 | 5 | 9 | 0.070 | 3 |
| PERU | 2 | 19 | 39 | 0.294 | 3 |
| VENEZUELA | 0 | 5 | 346 | 2.605 | 26 |
| TROPICAL SOUTH AMERICA | 41 | 236 | 926 | 6.977 | 11 |
| COSTA RICA | 9 | 12 | 38 | 0.284 | 19 |
| EL SALVADOR | 85 | 150 | 133 | 1.005 | 32 |
| GUATEMALA | 16 | 41 | 80 | 0.605 | 13 |
| HONDURAS | 50 | 48 | 56 | 0.422 | 18 |
| NICARAGUA | 46 | 51 | 87 | 0.656 | 37 |
| CENTRAL AMERICA, PANAMA | 205 | 301 | 394 | 2.972 | 20 |
| HAITI | 0 | 212 | 110 | 0.829 | 21 |
| CARIBBEAN | 0 | 212 | 110 | 0.829 | 12 |
| TROPICAL LATIN AMERICA | 511 | 3377 | 6906 | 52.052 | 36 |
| ARGENTINA | 1302 | 3780 | 6229 | 46.946 | 245 |
| URUGUAY | 15 | 55 | 133 | 1.002 | 47 |
| TEMPERATE SOUTH AMERICA | 1317 | 3835 | 6362 | 47.948 | 166 |
| LATIN AMERICA | 1828 | 7212 | 13268 | 100.000 | 52 |

COLUMNS MAY NOT ADD EXACTLY DUE TO ROUNDING

[CIAT]

SORGHUM

ANNUAL GROWTH RATES

| COUNTRY | PRODUCTION | | | | AREA | | | YIELD | |
|-------------------------|------------|---------|----------|----------|---------|----------|---------|---------|---------|
| | 1960/70 | 1971/82 | 1960/82 | 1960/70 | 1971/82 | 1960/82 | 1960/70 | 1971/82 | 1960/82 |
| BRAZIL | 0.0 | 30.2** | 39.6*** | 0.0 | 31.2** | 40.2*** | 0.0 | 0.0 | -0.6 |
| MEXICO | 28.3*** | 6.5*** | 14.2*** | 25.2*** | 3.8*** | 12.0*** | 3.1** | 2.8*** | 2.2*** |
| | 28.3*** | 6.7*** | 14.5*** | 25.2*** | 4.0*** | 12.5*** | 3.1** | 2.6*** | 2.0*** |
| BOLIVIA | 0.0 | -3.5 | -3.5 | 0.0 | -8.4 | -8.4 | 0.0 | 4.9 | 4.9 |
| COLOMBIA | 36.3*** | 8.1*** | 19.9*** | 37.0*** | 8.4*** | 19.9*** | -0.7 | -0.3 | 0.1 |
| CUBA | -23.1*** | -5.4*** | -18.6*** | -21.4*** | -4.8** | -17.9*** | -1.8** | -0.6 | -0.7*** |
| DOMINICAN RP | 13.5*** | 1.4 | 3.8*** | 11.1*** | 4.5** | 5.1*** | 2.4* | -3.1*** | -1.3** |
| ECUADOR | 0.0 | 1.7 | 1.7 | 0.0 | 1.3 | 1.3 | 0.0 | 0.4 | 0.4 |
| PARAGUAY | 4.0** | 4.9*** | 5.0*** | 2.9** | 4.1*** | 4.6*** | 1.1 | 0.8** | 0.4 |
| PERU | 11.9* | 7.4** | 19.2*** | 8.1 | 8.1*** | 16.1*** | 3.8 | -0.7 | 3.2*** |
| VENEZUELA | 17.5 | 46.7*** | 30.4*** | 21.2 | 42.6*** | 31.2*** | -3.6 | 4.1** | -0.9 |
| TROPICAL SOUTH AMERICA | 17.1*** | 13.4*** | 16.9*** | 11.0*** | 14.9*** | 15.0*** | 6.0*** | -1.5** | 2.0*** |
| COSTA RICA | 2.5 | 13.5*** | 9.5*** | 3.1 | 13.4*** | 8.9*** | -0.6 | 0.1 | 0.7 |
| SALVADOR | 5.7*** | -1.1 | 2.8*** | 3.0*** | -0.4 | 1.7*** | 2.6*** | -0.2 | 1.1*** |
| GUATEMALA | 12.7*** | 7.0*** | 6.6*** | 6.4*** | -0.4 | 0.2 | 6.3*** | 7.3*** | 6.5*** |
| HONDURAS | -1.9** | 1.5 | 0.3 | -4.7** | 4.3*** | 2.3*** | 2.8** | -2.9 | -2.1*** |
| NICARAGUA | 3.4*** | 6.5*** | 2.5*** | 1.0 | -0.1 | -0.2 | 2.4*** | 6.5*** | 2.7*** |
| CENTRAL AMERICA, PANAMA | 5.0*** | 3.1*** | 3.5*** | 2.4*** | 1.2* | 1.7*** | 2.5*** | 1.9*** | 1.8*** |
| HAITI | 3.3** | -5.7*** | -4.8*** | 2.0** | -1.8 | -2.3*** | 1.3** | -3.8*** | -2.5*** |
| CARIBBEAN | 3.3** | -5.7*** | -4.8*** | 2.0** | -1.8 | -2.3*** | 1.3** | -3.8*** | -2.5*** |
| TROPICAL LATIN AMERICA | 23.3*** | 6.8*** | 12.9*** | 17.5*** | 4.4*** | 9.7*** | 5.8*** | 2.4*** | 3.2*** |
| ARGENTINA | 11.0*** | 4.7 | 9.4*** | 9.5*** | -0.2 | 5.6*** | 1.5 | 5.0*** | 3.8*** |
| URUGUAY | 12.7*** | 2.3 | 12.8*** | 1.2 | -1.0 | 4.3*** | 11.5*** | 3.2* | 8.5*** |
| TEMPERATE SOUTH AMERICA | 11.1*** | 4.7 | 9.5*** | 9.4*** | -0.2 | 5.6*** | 1.6 | 4.9*** | 3.8*** |
| LATIN AMERICA | 16.1*** | 5.8*** | 10.9*** | 12.7*** | 2.1** | 7.4*** | 3.4*** | 3.7*** | 3.4*** |

LEVEL OF SIGNIFICANCE IS REPRESENTED AS FOLLOWS

*** P<0.005 ** P<0.01 * P<0.05

| COUNTRY | TRENDS IN AREA LEVEL BY COUNTRY 1960/82 | | | |
|-------------------------|---|-------------------------|-------------------------|-------------------------|
| | ANNUAL GROWTH RATE IN AREA 1960/82 % | AVERAGE AREA 1960/62 | AVERAGE AREA 1970/72 | AVERAGE AREA 1980/82 |
| | | -----1000 HA----- | | |
| BRASIL | 40.198 *** | 0.0 | 0.9 | 95.0 |
| MEXICO | 12.042 *** | 117.0 | 1005.2 | 1540.3 |
| | 12.504 *** | 117.0 | 1006.1 | 1635.3 |
| BOLIVIA | -8.406 | 0.0 | 0.0 | 5.3 |
| COLOMBIA | 19.853 *** | 2.5 | 76.6 | 211.7 |
| CUBA | -17.855 *** | 23.0 | 2.3 | 1.0 |
| DOMINICAN RP | 5.131 *** | 0.0 | 4.2 | 5.7 |
| ECUADOR | 1.306 | 0.0 | 0.0 | 0.5 |
| PARAGUAY | 4.592 *** | 3.3 | 4.5 | 7.0 |
| PERU | 16.056 *** | 1.0 | 5.6 | 12.7 |
| VENEZUELA | 31.206 *** | 0.0 | 3.5 | 209.0 |
| TROPICAL SOUTH AMERICA | 14.960 *** | 28.7 | 96.6 | 452.8 |
| COSTA RICA | 8.858 *** | 5.0 | 7.2 | 21.3 |
| EL SALVADOR | 1.669 *** | 92.7 | 126.9 | 117.7 |
| GUATEMALA | 0.158 | 27.0 | 47.0 | 39.7 |
| HONDURAS | 2.318 *** | 49.0 | 37.8 | 60.0 |
| NICARAGUA | -0.210 | 54.0 | 50.0 | 47.7 |
| CENTRAL AMERICA, PANAMA | 1.675 *** | 217.0 | 268.9 | 286.3 |
| HAITI | -2.348 *** | 0.0 | 216.3 | 159.3 |
| CARIBBEAN | -2.348 *** | 0.0 | 216.3 | 159.3 |
| TROPICAL LATIN AMERICA | 9.663 *** | 362.7 | 1588.0 | 2533.8 |
| ARGENTINA | 5.634 *** | 752.7 | 2020.2 | 1995.3 |
| URUGUAY | 4.300 *** | 33.0 | 42.6 | 60.3 |
| TEMPERATE SOUTH AMERICA | 5.644 *** | 774.7 | 2062.8 | 2055.7 |
| LATIN AMERICA | 7.429 *** | 1137.3 | 3650.8 | 4589.5 |

LEVEL OF SIGNIFICANCE IS REPRESENTED AS FOLLOWS .
 *** P<0.005 ** P<0.01 * P<0.05

| (CIAT) | SORGHUM | TRENDS IN YIELD LEVEL BY COUNTRY 1960/82 | | | |
|-------------------------|-------------------------------|--|---------------|---------------|--|
| COUNTRY | ANNUAL GROWTH | AVERAGE YIELD | AVERAGE YIELD | AVERAGE YIELD | |
| | RATE IN YIELD 1960/82 % | 1960/62 | 1970/72 | 1980/82 | |
| | | -----KG/HA----- | | | |
| BRAZIL | -0.553 | 0.0 | 2407.4 | 2148.9 | |
| MEXICO | 2.187 *** | 2265.8 | 2624.3 | 3436.7 | |
| | 2.042 *** | 2265.8 | 2624.1 | 3352.9 | |
| BOLIVIA | 4.909 | 0.0 | 0.0 | 3805.6 | |
| COLOMBIA | 0.053 | 2333.3 | 2434.3 | 2335.5 | |
| CUBA | -0.722 *** | 1254.4 | 1055.6 | 1000.0 | |
| DOMINICAN RP | -1.299 ** | 0.0 | 3565.0 | 2734.1 | |
| ECUADOR | 0.433 | 0.0 | 0.0 | 3178.6 | |
| PARAGUAY | 0.444 | 1222.2 | 1179.7 | 1333.3 | |
| PERU | 3.185 *** | 2000.0 | 3407.2 | 3075.4 | |
| VENEZUELA | -0.855 | 0.0 | 1537.2 | 1664.1 | |
| TROPICAL SOUTH AMERICA | 1.973 *** | 1328.3 | 2419.3 | 2051.8 | |
| COSTA RICA | 0.678 | 1708.3 | 1655.8 | 1782.6 | |
| SALVADOR | 1.146 *** | 915.3 | 1181.4 | 1133.7 | |
| GUATEMALA | 6.483 *** | 592.6 | 876.3 | 2080.3 | |
| HONDURAS | -2.064 *** | 1060.3 | 1261.3 | 935.1 | |
| NICARAGUA | 2.736 *** | 849.6 | 1022.9 | 1858.8 | |
| CENTRAL AMERICA, PANAMA | 1.809 *** | 906.2 | 1120.1 | 1377.3 | |
| HAITI | -2.492 *** | 0.0 | 980.0 | 690.7 | |
| CARIBBEAN | -2.492 *** | 0.0 | 980.0 | 690.7 | |
| TROPICAL LATIN AMERICA | 3.236 *** | 1375.7 | 2130.6 | 2726.5 | |
| ARGENTINA | 3.756 *** | 1698.3 | 1840.2 | 3008.9 | |
| URUGUAY | 8.545 *** | 454.5 | 1276.1 | 2144.2 | |
| TEMPERATE SOUTH AMERICA | 3.822 *** | 1662.0 | 1829.3 | 2983.4 | |
| LATIN AMERICA | 3.448 *** | 1572.4 | 1967.0 | 2858.0 | |

LEVEL OF SIGNIFICANCE IS REPRESENTED AS FOLLOWS
 *** P<0.005 ** P<0.01 *P<0.05

(CIAT) SORGHUM

SUMMARY OF LATIN AMERICA TRADE (THOUSAND TONS)

| REGION | EXPORT | | | IMPORT | | | +IMPORT-EXPORT | | |
|-------------------------|---------|---------|---------|---------|---------|---------|----------------|---------|---------|
| | 1960/62 | 1970/72 | 1980/82 | 1960/62 | 1970/72 | 1980/82 | 1960/62 | 1970/72 | 1980/82 |
| BRAZIL | 1 | 9 | 48 | 9 | 22 | 27 | 8 | 13 | -21 |
| MEXICO | 1 | 34 | 2 | 24 | 97 | 2206 | 23 | 63 | 2204 |
| | 2 | 43 | 50 | 33 | 119 | 2233 | 31 | 76 | 2183 |
| BOLIVIA | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 0 | 0 |
| COLOMBIA | 0 | 0 | 1 | 6 | 13 | 110 | 6 | 13 | 109 |
| CUBA | 0 | 0 | 0 | 2 | 0 | 12 | 2 | 0 | 12 |
| DOMINICAN RP | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 1 |
| ECUADOR | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 |
| PARAGUAY | 0 | 2 | 0 | 0 | 0 | 0 | 0 | -2 | 0 |
| PERU | 0 | 0 | 0 | 0 | 6 | 1 | 0 | 6 | 1 |
| VENEZUELA | 0 | 0 | 0 | 1 | 288 | 649 | 1 | 288 | 649 |
| TROPICAL SOUTH AMERICA | 0 | 3 | 2 | 9 | 310 | 774 | 9 | 307 | 772 |
| COSTA RICA | 0 | 1 | 1 | 1 | 5 | 26 | 1 | 4 | 25 |
| EL SALVADOR | 2 | 6 | 1 | 2 | 1 | 4 | 0 | -5 | 3 |
| GUATEMALA | 2 | 1 | 1 | 1 | 5 | 1 | -1 | 4 | 0 |
| HONDURAS | 1 | 1 | 0 | 2 | 1 | 1 | 1 | 0 | 1 |
| NICARAGUA | 1 | 4 | 0 | 0 | 3 | 5 | -1 | -1 | 5 |
| PANAMA | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 1 |
| CENTRAL AMERICA, PANAMA | 6 | 13 | 3 | 6 | 16 | 38 | 0 | 3 | 35 |
| BARBADOS | 0 | 0 | 0 | 0 | 2 | 1 | 0 | 2 | 1 |
| GUYANA | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 |
| HAITI | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 |
| JAMAICA | 0 | 0 | 0 | 0 | 2 | 2 | 0 | 2 | 2 |
| TRINIDAD ETC | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 |
| CARIBBEAN | 0 | 0 | 0 | 1 | 6 | 5 | 1 | 6 | 5 |
| TROPICAL LATIN AMERICA | 8 | 59 | 55 | 49 | 451 | 3050 | 41 | 392 | 2995 |
| ARGENTINA | 416 | 1763 | 4082 | 0 | 1 | 2 | -416 | -1762 | -4080 |
| CHILE | 0 | 0 | 0 | 1 | 5 | 1 | 1 | 5 | 1 |
| URUGUAY | 1 | 1 | 51 | 0 | 1 | 1 | -1 | 0 | -50 |
| TEMPERATE SOUTH AMERICA | 417 | 1764 | 4133 | 1 | 7 | 4 | -416 | -1757 | -4129 |
| LATIN AMERICA | 425 | 1823 | 4188 | 50 | 458 | 3054 | -375 | -1365 | -1134 |

[CIAT] SORGHUM

PRODUCTION, TRADE AND APPARENT CONSUMPTION

| COUNTRY | 1970/72 | | | | | 1980/82 | | | | |
|-------------------------|-------------------|--------------------|-------------------------|---------------------------------------|------------------------------|-------------------|--------------------|-------------------------|---------------------------------------|------------------------------|
| | PRODUCTION | +IMPORT -EXPORT | APPARENT CONSUMPTION | APPARENT PER CAPITA CONSUMPTION | SELF SUFFICIENCY INDEX | PRODUCTION | +IMPORT -EXPORT | APPARENT CONSUMPTION | APPARENT PER CAPITA CONSUMPTION | SELF SUFFICIENCY INDEX |
| | -----1000 MT----- | | | -----KG----- | | -----1000 MT----- | | | -----KG----- | |
| BRAZIL | 2 | 14 | 16 | 0 | 13.74 | 201 | -20 | 181 | 2 | 111.24 |
| MEXICO | 2625 | 63 | 2688 | 64 | 97.67 | 5275 | 2204 | 7479 | 124 | 70.53 |
| | 2627 | 76 | 2703 | 22 | 97.18 | 5476 | 2184 | 7660 | 45 | 71.49 |
| BOLIVIA | 0 | -0 | -0 | -0 | 0.00 | 21 | 0 | 21 | 4 | 99.73 |
| COLOMBIA | 189 | 12 | 201 | 11 | 94.03 | 493 | 110 | 603 | 26 | 81.78 |
| CUBA | 2 | 0 | 2 | 0 | 100.00 | 1 | 12 | 13 | 1 | 7.69 |
| DOMINICAN RP | 15 | 0 | 15 | 4 | 99.97 | 15 | 0 | 15 | 3 | 99.69 |
| ECUADOR | 0 | 0 | 0 | 0 | 0.00 | 1 | 0 | 1 | 0 | 100.00 |
| PARAGUAY | 5 | -1 | 4 | 2 | 132.03 | 9 | 0 | 9 | 3 | 100.00 |
| PERU | 19 | 5 | 24 | 2 | 78.21 | 39 | 0 | 39 | 3 | 98.92 |
| VENEZUELA | 5 | 288 | 293 | 33 | 1.83 | 346 | 648 | 994 | 76 | 34.78 |
| TROPICAL SOUTH AMERICA | 236 | 304 | 540 | 9 | 43.74 | 926 | 771 | 1696 | 21 | 54.57 |
| COSTA RICA | 12 | 4 | 16 | 11 | 74.19 | 38 | 26 | 64 | 32 | 59.20 |
| EL SALVADOR | 150 | -6 | 144 | 49 | 103.82 | 133 | 3 | 137 | 33 | 97.58 |
| GUATEMALA | 41 | 4 | 45 | 10 | 90.93 | 80 | 0 | 80 | 13 | 99.87 |
| HONDURAS | 48 | -0 | 47 | 21 | 100.63 | 56 | 0 | 56 | 18 | 99.87 |
| NICARAGUA | 51 | -0 | 51 | 31 | 100.58 | 87 | 4 | 91 | 39 | 95.32 |
| PANAMA | 0 | 0 | 0 | 0 | 0.00 | 0 | 0 | 0 | 0 | 0.00 |
| CENTRAL AMERICA, PANAMA | 301 | 2 | 303 | 24 | 99.27 | 394 | 34 | 428 | 24 | 92.04 |
| BARBADOS | 0 | 1 | 1 | 4 | 0.00 | 0 | 1 | 1 | 3 | 0.00 |
| GUYANA | 0 | 0 | 0 | 0 | 0.00 | 0 | 0 | 0 | 0 | . |
| HAITI | 212 | 0 | 212 | 53 | 100.00 | 110 | 0 | 110 | 21 | 99.91 |
| JAMAICA | 0 | 2 | 2 | 1 | 0.00 | 0 | 2 | 2 | 1 | 0.00 |
| TRINIDAD ETC | 0 | 0 | 0 | 0 | 0.00 | 0 | 0 | 0 | 0 | 0.00 |
| CARIBBEAN | 212 | 3 | 215 | 28 | 98.60 | 110 | 3 | 113 | 12 | 97.46 |
| TROPICAL LATIN AMERICA | 3377 | 386 | 3762 | 19 | 89.75 | 6906 | 2991 | 9897 | 36 | 69.78 |
| ARGENTINA | 3780 | -1762 | 2018 | 91 | 187.32 | 6229 | -4080 | 2149 | 85 | 289.83 |
| CHILE | 0 | 5 | 5 | 1 | 0.00 | 0 | 1 | 1 | 0 | 0.00 |
| URUGUAY | 55 | -0 | 55 | 20 | 100.09 | 133 | -49 | 84 | 29 | 159.09 |
| TEMPERATE SOUTH AMERIC | 3835 | -1757 | 2078 | 62 | 184.56 | 6362 | -4128 | 2233 | 58 | 284.84 |
| LATIN AMERICA | 7212 | -1372 | 5840 | 24 | 123.49 | 13268 | -1137 | 12131 | 38 | 109.37 |

POTATOES PRODUCTION, RELATIVE IMPORTANCE IN THE REGION
AND PER CAPITA PRODUCTION LEVELS (CIAT)

| COUNTRY | P R O D U C T I O N -----1000 MT----- | | | PERCENTAGE OF TOTAL % | PER CAPITA PRODUCTION KG |
|-------------------------|--|---------|---------|--------------------------|--------------------------------|
| | 1960/62 | 1970/72 | 1980/82 | 1980/82 | 1980/82 |
| BRAZIL | 1109 | 1584 | 1999 | 17.739 | 18 |
| MEXICO | 326 | 528 | 948 | 8.413 | 16 |
| | 1435 | 2112 | 2947 | 26.152 | 17 |
| BOLIVIA | 584 | 686 | 851 | 7.552 | 174 |
| COLOMBIA | 674 | 868 | 1942 | 17.237 | 84 |
| CUBA | 103 | 76 | 257 | 2.278 | 28 |
| DOMINICAN RP | 4 | 24 | 10 | 0.089 | 2 |
| ECUADOR | 260 | 565 | 377 | 3.346 | 55 |
| PARAGUAY | 4 | 4 | 9 | 0.080 | 3 |
| PERU | 1268 | 1830 | 1627 | 14.438 | 106 |
| VENEZUELA | 110 | 117 | 196 | 1.736 | 15 |
| TROPICAL SOUTH AMERICA | 3007 | 4170 | 5269 | 46.755 | 65 |
| COSTA RICA | 16 | 25 | 27 | 0.237 | 14 |
| EL SALVADOR | 4 | 4 | 6 | 0.053 | 1 |
| GUATEMALA | 14 | 26 | 34 | 0.302 | 5 |
| HONDURAS | 2 | 4 | 8 | 0.071 | 3 |
| NICARAGUA | 1 | 1 | 2 | 0.018 | 1 |
| PANAMA | 7 | 10 | 18 | 0.160 | 10 |
| CENTRAL AMERICA, PANAMA | 44 | 70 | 95 | 0.840 | 5 |
| HAITI | 3 | 7 | 9 | 0.080 | 2 |
| JAMAICA | 9 | 13 | 9 | 0.083 | 5 |
| CARIBBEAN | 12 | 20 | 18 | 0.163 | 2 |
| TROPICAL LATIN AMERICA | 4498 | 6372 | 8329 | 73.910 | 32 |
| ARGENTINA | 1705 | 1878 | 1877 | 16.660 | 74 |
| CHILE | 747 | 751 | 917 | 8.141 | 90 |
| URUGUAY | 78 | 125 | 145 | 1.290 | 51 |
| TEMPERATE SOUTH AMERICA | 2530 | 2754 | 2940 | 26.090 | 77 |
| LATIN AMERICA | 7028 | 9126 | 11269 | 100.000 | 37 |

COLUMNS MAY NOT ADD EXACTLY DUE TO ROUNDING

(CIAT) . . . POTATOES ANNUAL GROWTH RATES

| COUNTRY | PRODUCTION | | | AREA | | | YIELD | | |
|-------------------------|------------|----------|---------|----------|---------|---------|---------|---------|---------|
| | 1960/70 | 1971/82 | 1960/82 | 1960/70 | 1971/82 | 1960/82 | 1960/70 | 1971/82 | 1960/82 |
| BRAZIL | 4.2*** | 3.3*** | 3.0*** | 1.4*** | -0.9* | -0.4** | 2.9*** | 4.3*** | 3.4*** |
| MEXICO | 4.2*** | 5.4*** | 5.3*** | -0.3 | 3.4*** | 2.2*** | 4.5*** | 2.0*** | 3.1*** |
| | 4.2*** | 3.9*** | 3.6*** | 1.1*** | 0.1 | 0.2 | 3.1*** | 3.8*** | 3.4*** |
| BOLIVIA | 0.6 | 1.6** | 2.1*** | -2.8** | 4.8*** | 2.4*** | 5.0*** | -3.2*** | 0.1 |
| COLOMBIA | 3.8** | 9.0*** | 5.9*** | 1.9** | 6.1*** | 4.5*** | 0.3 | 2.9*** | 1.4*** |
| CUBA | -0.7 | 14.3*** | 4.3*** | -3.0 | 7.3*** | 0.7 | 2.3 | 7.0*** | 3.6*** |
| DOMINICAN RP | 26.8*** | -11.6*** | 4.5* | 8.2*** | -9.1*** | -0.0 | 5.3 | -2.5* | -0.6 |
| ECUADOR | 8.5*** | 75.4*** | 1.5 | 4.8*** | -4.1*** | -0.9 | 2.9** | -1.3* | 1.8*** |
| PARAGUAY | 7.3* | 11.5*** | 1.0 | 2.3 | 5.8** | -3.4** | 5.0 | 5.8*** | 4.3*** |
| PERU | 4.4*** | -0.7 | 1.0*** | 2.1*** | -3.0*** | -0.6* | 2.3*** | 2.3*** | 1.6*** |
| VENEZUELA | 2.3 | 6.1*** | 3.0*** | 1.4 | 2.9*** | 0.5 | 0.9* | 3.2*** | 2.5*** |
| TROPICAL SOUTH AMERICA | 3.8*** | 2.7*** | 2.8*** | 5.8** | 1.1*** | 2.1*** | -2.0 | 1.6*** | 0.7 |
| COSTA RICA | 7.7*** | 1.7*** | 1.4** | 0.5 | 3.2*** | -1.0* | 2.9*** | -1.5* | 1.3*** |
| SALVADOR | -3.7* | -1.4 | 1.2 | -13.0*** | -4.8 | -6.8*** | 9.3*** | 3.4 | 8.1*** |
| GUATEMALA | 3.2*** | 3.6 | 5.9*** | 5.1*** | 2.6 | 4.9*** | 3.1*** | 1.0 | 0.9*** |
| HONDURAS | 7.1*** | 7.1*** | 5.6*** | -7.7*** | 5.6*** | 0.3 | 14.5*** | 1.5 | 5.1*** |
| NICARAGUA | 2.9*** | 4.5*** | 3.8*** | 2.0 | 4.8*** | 3.2*** | 0.9 | -0.3 | 0.6** |
| PANAMA | -0.4 | 2.7 | 4.2*** | -5.9*** | 2.6 | 2.4** | 5.5*** | 0.1 | 1.7** |
| CENTRAL AMERICA, PANAMA | 11.3*** | 2.8** | 5.3*** | 6.9*** | 2.9 | 4.0*** | 4.4** | -0.1 | 1.3** |
| HAITI | 9.4*** | 3.0*** | 3.8*** | 10.6*** | 7.3*** | 6.3*** | -1.2* | -4.3*** | -2.5*** |
| JAMAICA | 0.4 | -3.9 | 0.2 | -0.5 | -3.9** | 0.6 | 0.9 | 0.0 | -0.4 |
| CARIBBEAN | 6.2** | -0.9 | 2.5*** | 3.6** | 0.1 | 2.8*** | 2.6* | -1.1 | -0.3 |
| TROPICAL LATIN AMERICA | 4.0*** | 3.1*** | 3.1*** | 3.9*** | 0.8*** | 1.5*** | 0.1 | 2.3*** | 1.7*** |
| ARGENTINA | 3.2 | 1.2 | 0.1 | 0.2 | -2.9** | -3.3*** | 3.0** | 4.0** | 3.3*** |
| CHILE | -1.4 | 1.9 | 0.8 | -2.2*** | 1.0 | -0.3 | 0.8 | 0.9 | 1.0*** |
| URUGUAY | 3.5 | 0.9 | 2.4*** | 1.3 | -3.1** | 0.1 | 2.2 | 4.0** | 2.3*** |
| TEMPERATE SOUTH AMERICA | 2.0 | 1.4 | 0.3 | -0.4 | -1.5* | -2.0*** | 2.4*** | 2.9** | 2.3*** |
| LATIN AMERICA | 3.3*** | 2.6*** | 2.3*** | 2.6*** | 0.3 | 0.6** | 0.7 | 2.3*** | 1.7*** |

LEVEL OF SIGNIFICANCE IS REPRESENTED AS FOLLOWS

*** P<0.005 ** P<0.01 * P<0.05

| (CIAT 1) | POTATOES | TRENDS IN AREA | LEVEL BY COUNTRY | 1960/82 |
|-------------------------|---|-------------------------|-------------------------|-------------------------|
| COUNTRY | ANNUAL GROWTH RATE IN AREA 1960/82 % | AVERAGE AREA 1960/62 | AVERAGE AREA 1970/72 | AVERAGE AREA 1980/82 |
| | | -----1000 HA----- | | |
| BRASIL | -0.408 ** | 195.3 | 208.2 | 178.0 |
| MEXICO | 2.197 *** | 45.3 | 48.5 | 71.7 |
| | | 0.165 | 240.7 | 256.7 |
| BOLIVIA | 2.367 *** | 109.0 | 101.3 | 173.3 |
| COLOMBIA | 4.539 *** | 75.0 | 87.3 | 154.0 |
| CUBA | 0.704 | 10.7 | 7.3 | 14.0 |
| DOMINICAN RP | -0.049 | 1.0 | 2.0 | 1.0 |
| ECUADOR | -0.933 | 32.5 | 46.1 | 32.3 |
| PARAGUAY | -3.384 ** | 1.0 | 0.9 | 1.0 |
| PERU | -0.611 * | 240.3 | 281.9 | 204.3 |
| VENEZUELA | 0.503 | 14.3 | 13.7 | 17.0 |
| TROPICAL SOUTH AMERICA | 2.138 *** | 349.7 | 540.5 | 597.0 |
| COSTA RICA | -1.009 * | 3.0 | 2.5 | 3.0 |
| EL SALVADOR | -6.849 *** | 1.0 | 0.4 | 0.3 |
| GUATEMALA | 4.929 *** | 4.3 | 6.3 | 7.7 |
| HONDURAS | 0.301 | 1.0 | 0.5 | 1.0 |
| NICARAGUA | 3.173 *** | 0.3 | 0.3 | 0.5 |
| PANAMA | 2.430 ** | 1.0 | 1.0 | 1.7 |
| CENTRAL AMERICA, PANAMA | 4.029 *** | 6.8 | 11.0 | 14.1 |
| HAITI | 6.281 *** | 0.2 | 0.5 | 1.0 |
| JAMAICA | 0.579 | 1.0 | 1.3 | 1.0 |
| CARIBBEAN | 2.806 *** | 1.1 | 1.8 | 2.0 |
| TROPICAL LATIN AMERICA | 1.461 *** | 598.2 | 810.0 | 862.8 |
| ARGENTINA | -3.252 *** | 187.0 | 171.8 | 110.3 |
| CHILE | -0.267 | 89.3 | 77.0 | 85.3 |
| URUGUAY | 0.064 | 17.7 | 22.7 | 18.3 |
| TEMPERATE SOUTH AMERICA | -1.965 *** | 294.0 | 271.5 | 214.0 |
| LATIN AMERICA | 0.572 ** | 892.2 | 1081.5 | 1076.8 |

LEVEL OF SIGNIFICANCE IS REPRESENTED AS FOLLOWS

*** P<0.005 ** P<0.01 * P<0.05

| [CIAT] POTATOES | | TRENDS IN YIELD LEVEL BY COUNTRY 1960/82 | | |
|-------------------------|-------------------------------|--|---------------|---------------|
| COUNTRY | ANNUAL GROWTH | AVERAGE YIELD | AVERAGE YIELD | AVERAGE YIELD |
| | RATE IN YIELD 1960/82 % | 1960/62 | 1970/72 | 1980/82 |
| | | -KG/HA- | | |
| BRAZIL | 3.430 *** | 5677.7 | 7613.8 | 11228.3 |
| MEXICO | 3.072 *** | 7176.5 | 10889.0 | 13230.0 |
| | 3.448 *** | 5960.6 | 8231.4 | 11805.2 |
| BOLIVIA | 0.149 | . | 6791.8 | 4907.2 |
| COLOMBIA | 1.370 *** | . | 9965.9 | 12595.7 |
| CUBA | 3.643 *** | 10700.9 | 10981.5 | 18423.8 |
| DOMINICAN RP | -0.646 | . | 12023.1 | 10000.0 |
| ECUADOR | 1.781 *** | . | 12251.8 | 11634.1 |
| PARAGUAY | 4.336 *** | 4000.0 | 4428.4 | 9000.0 |
| PERU | 1.647 *** | 5268.2 | 6489.1 | 7943.5 |
| VENEZUELA | 2.483 *** | 7743.1 | 8488.0 | 11502.6 |
| TROPICAL SOUTH AMERICA | 0.691 | 9157.8 | 7711.2 | 8811.8 |
| COSTA RICA | 1.343 *** | . | 9816.7 | 8898.9 |
| SALVADOR | 8.088 *** | 4000.0 | 10286.1 | 19653.5 |
| GUATEMALA | 0.922 *** | 3233.3 | 4175.7 | 4507.9 |
| HONDURAS | 5.127 *** | . | 7175.1 | 8000.0 |
| NICARAGUA | 0.643 ** | 3584.2 | 4111.1 | 4252.3 |
| PANAMA | 1.726 ** | 7000.0 | 10361.1 | 12333.3 |
| CENTRAL AMERICA, PANAMA | 1.297 ** | 4396.2 | 6400.4 | 6787.6 |
| HAITI | -2.502 *** | 16666.7 | 14750.0 | 9000.0 |
| JAMAICA | -0.355 | 8666.7 | 9567.6 | 9333.3 |
| CARIBBEAN | -0.305 | 9107.3 | 10975.7 | 9166.7 |
| TROPICAL LATIN AMERICA | 1.655 *** | 7643.5 | 7865.9 | 9648.5 |
| ARGENTINA | 3.313 *** | 9045.9 | 10796.8 | 17006.3 |
| CHILE | 1.035 *** | 8346.0 | 9748.1 | 10756.7 |
| URUGUAY | 2.346 *** | 4440.2 | 5487.4 | 7995.1 |
| TEMPERATE SOUTH AMERICA | 2.297 *** | 8572.3 | 10089.6 | 13716.3 |
| LATIN AMERICA | 1.694 *** | 7927.2 | 8431.7 | 10460.3 |

LEVEL OF SIGNIFICANCE IS REPRESENTED AS FOLLOWS

*** P<0.005 ** P<0.01 *P<0.05

[CIAT] POTATOES

SUMMARY OF LATIN AMERICA TRADE (THOUSAND TONS)

| REGION | EXPORT | | | IMPORT | | | +IMPORT-EXPORT | | |
|-------------------------|---------|---------|---------|---------|---------|---------|----------------|---------|---------|
| | 1960/62 | 1970/72 | 1980/82 | 1960/62 | 1970/72 | 1980/82 | 1960/62 | 1970/72 | 1980/82 |
| BRAZIL | 1 | 7 | 0 | 6 | 12 | 19 | 5 | 5 | 15 |
| MEXICO | 0 | 2 | 2 | 1 | 5 | 5 | 1 | 3 | 0 |
| | 1 | 9 | 2 | 7 | 17 | 24 | 6 | 8 | 20 |
| BOLIVIA | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 1 |
| COLOMBIA | 2 | 1 | 1 | 1 | 1 | 1 | -1 | 0 | 0 |
| CUBA | 0 | 0 | 15 | 36 | 39 | 42 | 36 | 39 | 27 |
| DOMINICAN RP | 0 | 0 | 0 | 2 | 1 | 0 | 2 | 1 | 0 |
| PARAGUAY | 0 | 0 | 0 | 3 | 0 | 0 | 3 | 0 | 0 |
| PERU | 1 | 1 | 0 | 0 | 2 | 2 | -1 | 1 | 0 |
| VENEZUELA | 0 | 1 | 1 | 16 | 16 | 24 | 16 | 15 | 20 |
| TROPICAL SOUTH AMERICA | 3 | 4 | 17 | 58 | 60 | 70 | 55 | 56 | 50 |
| COSTA RICA | 1 | 1 | 0 | 1 | 3 | 2 | 0 | 2 | 0 |
| EL SALVADOR | 2 | 1 | 0 | 4 | 9 | 20 | 2 | 8 | 2 |
| GUATEMALA | 4 | 16 | 29 | 1 | 1 | 1 | -3 | -15 | -20 |
| HONDURAS | 1 | 1 | 0 | 2 | 2 | 2 | 1 | 1 | 0 |
| NICARAGUA | 1 | 1 | 1 | 1 | 5 | 9 | 0 | 4 | 8 |
| PANAMA | 0 | 1 | 1 | 2 | 2 | 2 | 2 | 1 | 1 |
| CENTRAL AMERICA, PANAMA | 9 | 21 | 31 | 11 | 22 | 36 | 2 | 1 | 5 |
| BARBADOS | 1 | 1 | 1 | 5 | 6 | 9 | 4 | 5 | 8 |
| GUYANA | 1 | 1 | 0 | 8 | 9 | 1 | 7 | 8 | 1 |
| HAITI | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 |
| JAMAICA | 1 | 2 | 1 | 5 | 4 | 2 | 4 | 2 | 1 |
| TRINIDAD ETC | 1 | 1 | 1 | 12 | 14 | 23 | 11 | 13 | 22 |
| CARIBBEAN | 4 | 5 | 3 | 30 | 34 | 35 | 26 | 29 | 32 |
| TROPICAL LATIN AMERICA | 17 | 39 | 53 | 106 | 133 | 165 | 89 | 94 | 112 |
| ARGENTINA | 51 | 43 | 1 | 37 | 103 | 40 | -14 | 60 | 39 |
| CHILE | 11 | 0 | 0 | 6 | 11 | 0 | -5 | 11 | 0 |
| URUGUAY | 0 | 0 | 1 | 63 | 16 | 18 | 63 | 16 | 17 |
| TEMPERATE SOUTH AMERICA | 62 | 43 | 2 | 106 | 130 | 58 | 44 | 87 | 56 |
| LATIN AMERICA | 79 | 82 | 55 | 212 | 263 | 223 | 133 | 181 | 168 |

[CIAT] POTATOES

PRODUCTION, TRADE AND APPARENT CONSUMPTION

| COUNTRY | 1970/72 | | | | | 1980/82 | | | | |
|-------------------------|------------|--------------------|-------------------------|---------------------------------------|------------------------------|------------|--------------------|-------------------------|---------------------------------------|------------------------------|
| | PRODUCTION | +IMPORT -EXPORT | APPARENT CONSUMPTION | APPARENT PER CAPITA CONSUMPTION | SELF SUFFICIENCY INDEX | PRODUCTION | +IMPORT -EXPORT | APPARENT CONSUMPTION | APPARENT PER CAPITA CONSUMPTION | SELF SUFFICIENCY INDEX |
| | | | | | | | | | | |
| BRAZIL | 1584 | 5 | 1590 | 20 | 99.67 | 1999 | 18 | 2017 | 19 | 99.11 |
| MEXICO | 528 | 3 | 531 | 13 | 99.47 | 948 | 3 | 951 | 16 | 99.66 |
| | 2112 | 8 | 2120 | 17 | 99.62 | 2947 | 21 | 2968 | 18 | 99.28 |
| BOLIVIA | 686 | -0 | 685 | 165 | 100.01 | 851 | 0 | 851 | 174 | 99.94 |
| COLOMBIA | 868 | -0 | 868 | 48 | 100.01 | 1942 | -1 | 1941 | 84 | 100.05 |
| CUBA | 76 | 39 | 115 | 15 | 66.37 | 257 | 26 | 283 | 30 | 90.73 |
| DOMINICAN RP | 24 | 1 | 25 | 7 | 96.91 | 10 | 0 | 10 | 2 | 100.00 |
| ECUADOR | 565 | 0 | 565 | 111 | 100.00 | 377 | 0 | 377 | 55 | 100.00 |
| PARAGUAY | 4 | 0 | 4 | 2 | 100.00 | 9 | 0 | 9 | 3 | 100.00 |
| PERU | 1830 | 1 | 1831 | 157 | 99.93 | 1627 | 1 | 1628 | 106 | 99.94 |
| VENEZUELA | 117 | 15 | 132 | 15 | 88.35 | 196 | 23 | 219 | 17 | 89.38 |
| TROPICAL SOUTH AMERICA | 4170 | 56 | 4225 | 69 | 98.68 | 5269 | 50 | 5319 | 66 | 99.06 |
| COSTA RICA | 25 | 3 | 27 | 18 | 90.49 | 27 | 1 | 28 | 14 | 95.07 |
| EL SALVADOR | 4 | 8 | 12 | 4 | 31.98 | 6 | 19 | 25 | 6 | 23.99 |
| GUATEMALA | 26 | -15 | 11 | 2 | 242.77 | 34 | -29 | 5 | 1 | 640.18 |
| HONDURAS | 4 | 1 | 5 | 2 | 74.05 | 8 | 1 | 9 | 3 | 86.07 |
| NICARAGUA | 1 | 4 | 6 | 3 | 22.18 | 2 | 9 | 11 | 5 | 18.64 |
| PANAMA | 10 | 2 | 12 | 10 | 85.22 | 18 | 1 | 19 | 11 | 94.46 |
| CENTRAL AMERICA, PANAMA | 70 | 3 | 73 | 6 | 96.12 | 95 | 3 | 97 | 6 | 97.15 |
| BARBADOS | 0 | 6 | 6 | 24 | 0.00 | 0 | 9 | 9 | 35 | 0.00 |
| GUYANA | 0 | 9 | 9 | 13 | 0.00 | 0 | 0 | 0 | 0 | 0.00 |
| HAITI | 7 | 0 | 7 | 2 | 99.45 | 9 | 0 | 9 | 2 | 100.00 |
| JAMAICA | 13 | 2 | 14 | 8 | 87.72 | 9 | 2 | 11 | 5 | 84.74 |
| TRINIDAD ETC | 0 | 14 | 14 | 14 | 0.00 | 0 | 22 | 22 | 21 | 0.00 |
| CARIBBEAN | 20 | 30 | 49 | 7 | 39.45 | 18 | 33 | 51 | 5 | 35.96 |
| TROPICAL LATIN AMERICA | 6372 | 97 | 6469 | 31 | 98.51 | 8329 | 107 | 8435 | 31 | 98.73 |
| ARGENTINA | 1878 | 61 | 1939 | 87 | 96.87 | 1877 | 39 | 1917 | 76 | 97.95 |
| CHILE | 751 | 11 | 762 | 90 | 98.60 | 917 | 0 | 917 | 90 | 100.00 |
| URUGUAY | 125 | 16 | 140 | 52 | 88.85 | 145 | 17 | 163 | 57 | 89.33 |
| TEMPERATE SOUTH AMERIC | 2754 | 87 | 2841 | 85 | 96.94 | 2940 | 57 | 2997 | 78 | 98.11 |
| LATIN AMERICA | 9126 | 184 | 9309 | 39 | 98.03 | 11269 | 163 | 11432 | 36 | 98.57 |

CASSAVA

PRODUCTION, RELATIVE IMPORTANCE IN THE REGION
AND PER CAPITA PRODUCTION LEVELS

(CIAT)

| COUNTRY | P R O D U C T I O N -----1000 MT----- | | | PERCENTAGE OF TOTAL % 1980/82 | PER CAPITA PRODUCTION KG 1980/82 |
|-------------------------|--|---------|---------|-------------------------------------|---|
| | 1960/62 | 1970/72 | 1980/82 | | |
| BRAZIL | 18505 | 29841 | 24093 | 79.101 | 222 |
| MEXICO | 0 | 46 | 31 | 0.102 | 1 |
| | 18505 | 29887 | 24124 | 79.203 | 143 |
| BOLIVIA | 114 | 232 | 227 | 0.745 | 46 |
| COLOMBIA | 758 | 1734 | 2158 | 7.085 | 93 |
| CUBA | 162 | 217 | 330 | 1.083 | 35 |
| DOMINICAN RP | 147 | 183 | 81 | 0.266 | 15 |
| ECUADOR | 225 | 377 | 217 | 0.711 | 31 |
| PARAGUAY | 990 | 1328 | 2044 | 6.710 | 760 |
| PERU | 368 | 475 | 341 | 1.118 | 22 |
| VENEZUELA | 321 | 319 | 327 | 1.074 | 25 |
| TROPICAL SOUTH AMERICA | 3085 | 4866 | 5724 | 18.793 | 71 |
| COSTA RICA | 9 | 10 | 19 | 0.061 | 9 |
| EL SALVADOR | 9 | 13 | 23 | 0.074 | 5 |
| GUATEMALA | 5 | 7 | 8 | 0.027 | 1 |
| HONDURAS | 17 | 27 | 7 | 0.023 | 2 |
| NICARAGUA | 12 | 18 | 26 | 0.086 | 11 |
| PANAMA | 12 | 37 | 34 | 0.113 | 20 |
| CENTRAL AMERICA, PANAMA | 64 | 112 | 117 | 0.385 | 6 |
| BARBADOS | 1 | 1 | 1 | 0.003 | 4 |
| GUYANA | 10 | 0 | 0 | 0.000 | 0 |
| HAITI | 110 | 215 | 255 | 0.837 | 49 |
| JAMAICA | 11 | 20 | 21 | 0.068 | 10 |
| TRINIDAD TDB | 4 | 4 | 4 | 0.012 | 3 |
| CARIBBEAN | 136 | 239 | 280 | 0.920 | 30 |
| TROPICAL LATIN AMERICA | 21789 | 35103 | 30245 | 99.302 | 138 |
| ARGENTINA | 248 | 277 | 213 | 0.698 | 8 |
| TEMPERATE SOUTH AMERICA | 248 | 277 | 213 | 0.698 | 6 |
| LATIN AMERICA | 22037 | 35380 | 30458 | 100.000 | 122 |

COLUMNS MAY NOT ADD EXACTLY DUE TO ROUNDING

(CIAT)

CASSAVA

ANNUAL GROWTH RATES

| COUNTRY | PRODUCTION | | | AREA | | | YIELD | | |
|-------------------------|------------|----------|---------|----------|---------|---------|---------|---------|---------|
| | 1960/70 | 1971/82 | 1960/82 | 1960/70 | 1971/82 | 1960/82 | 1960/70 | 1971/82 | 1960/82 |
| BRAZIL | 5.6*** | -1.9*** | 0.9* | 4.4*** | 0.2 | 1.8*** | 1.2*** | -2.0*** | -0.9*** |
| MEXICO | 7.2 | 0.0 | -3.1 | 7.2 | 0.0 | -0.2 | 0.0 | 0.0 | -2.9** |
| | 5.6*** | -1.8*** | 0.9* | 4.4*** | 0.2 | 1.8*** | 1.2*** | -2.0*** | -0.9*** |
| BOLIVIA | 8.8*** | -1.3 | 3.9*** | 6.5*** | -0.4 | 2.8*** | -0.6 | -0.9 | 0.2 |
| COLOMBIA | 3.7*** | 0.6 | 6.3*** | 1.7** | -2.1*** | 3.1*** | 2.9** | 2.7*** | 3.4*** |
| CUBA | 4.1*** | 4.7*** | 3.5*** | 4.2*** | 4.3*** | 3.5*** | -0.1 | 0.4** | 0.0 |
| DOMINICAN RP | 1.3*** | -9.1*** | -1.5* | -0.9 | -1.9 | 0.5 | 2.4*** | -7.3*** | -2.5*** |
| ECUADOR | 5.4*** | -8.1*** | -0.1 | 2.9** | -7.6*** | 0.1 | 2.5** | -0.4 | -0.2 |
| PARAGUAY | 5.6*** | 6.1*** | 2.8*** | 4.8*** | 4.3*** | 2.5*** | 0.8*** | 1.2** | 0.3* |
| PERU | 2.7** | -3.4*** | -0.7 | 3.2 | -1.9*** | -0.4 | -0.6 | -1.6*** | -0.3 |
| VENEZUELA | -0.2 | 1.1* | 0.1 | 0.4 | -0.3 | 0.3 | -0.5 | 1.9** | -0.7 |
| TROPICAL SOUTH AMERICA | 4.5*** | 1.4*** | 3.2*** | 8.3*** | -0.3** | 3.7*** | -3.7* | 1.7** | -0.5 |
| COSTA RICA | 3.9*** | 7.0*** | 3.1*** | 3.3* | 1.6 | -0.6 | 0.6 | 5.4*** | 3.7*** |
| SALVADOR | 3.7*** | 5.1*** | 4.6*** | 5.8*** | 5.6*** | 3.0*** | -2.1* | -0.5 | 1.6*** |
| GUATEMALA | 3.6*** | 2.4*** | 2.9*** | 0.5 | 4.1*** | 3.0*** | 3.1*** | -1.8*** | -0.2 |
| HONDURAS | 7.0*** | -11.7*** | -6.0*** | 0.8 | -5.8*** | -3.0*** | 6.2*** | -5.8** | -3.0*** |
| NICARAGUA | 5.0*** | 3.6*** | 4.3*** | 4.8*** | 4.2*** | 4.8*** | 0.2 | -0.6** | -0.5*** |
| PANAMA | 12.0*** | -1.0* | 5.6*** | 7.0** | 1.3*** | 5.7*** | -0.2 | -2.2*** | -1.4*** |
| CENTRAL AMERICA, PANAMA | 15.9*** | 0.8** | 5.2*** | 13.3*** | 1.9*** | 4.8*** | 2.6** | -1.1*** | 0.4 |
| BARBADOS | -3.9** | 1.5** | 0.2 | -1.8 | 2.3*** | 1.5*** | -2.1*** | -0.8*** | -1.3*** |
| GUYANA | 0.0 | 0.0 | 0.0 | -0.0 | 0.0 | -0.0 | -0.0 | 0.0 | -0.0 |
| HAITI | 8.2*** | 1.8*** | 4.4*** | 7.3*** | 2.3*** | 3.7*** | 1.0*** | -0.4 | 0.7*** |
| JAMAICA | 3.1 | 2.8 | 4.9*** | -11.6*** | 0.4 | -1.8 | 14.8*** | 2.4** | 6.7** |
| TRINIDAD ETC | -2.0* | -0.7 | 0.8 | -2.1** | -2.7** | -1.4*** | 0.0 | 2.0** | 2.2*** |
| CARIBBEAN | 14.6** | 1.9*** | 6.3*** | 13.1** | 2.2*** | 5.3*** | 1.5*** | -0.3 | 1.0*** |
| TROPICAL LATIN AMERICA | 5.5*** | -1.2*** | 1.3*** | 5.1*** | 0.2 | 2.2*** | 0.5 | -1.4*** | -0.9*** |
| ARGENTINA | 2.1** | -2.7 | -1.2** | 3.3*** | -0.3 | 0.4 | -1.2*** | -2.4 | -1.6*** |
| TEMPERATE SOUTH AMERICA | 2.1** | -2.7 | -1.2** | 3.3*** | -0.3 | 0.4 | -1.2*** | -2.4 | -1.6*** |
| LATIN AMERICA | 5.5*** | -1.2*** | 1.3*** | 5.1*** | 0.2 | 2.2*** | 0.4 | -1.4*** | -0.9*** |

LEVEL OF SIGNIFICANCE IS REPRESENTED AS FOLLOWS

*** P<0.005

** P<0.01

* P<0.05

| (CIAT) | CASSAVA | TRENDS IN AREA LEVEL BY COUNTRY 1960/82 | | | |
|-------------------------|------------------------------|---|--------------|--------------|--|
| COUNTRY | ANNUAL GROWTH | AVERAGE AREA | AVERAGE AREA | AVERAGE AREA | |
| | RATE IN AREA 1960/82 % | 1960/62 | 1970/72 | 1980/82 | |
| | | -----1000 HA----- | | | |
| BRASIL | 1.801 *** | 1399.7 | 2049.5 | 2080.0 | |
| MEXICO | -0.186 | 0.0 | 2.3 | 2.0 | |
| | 1.809 *** | 1399.7 | 2051.8 | 2082.0 | |
| BOLIVIA | 2.769 *** | 10.5 | 18.0 | 19.0 | |
| COLOMBIA | 3.065 *** | 138.0 | 216.7 | 208.0 | |
| CUBA | 3.463 *** | 24.0 | 33.0 | 48.0 | |
| DOMINICAN RP | 0.497 | 15.0 | 16.0 | 15.7 | |
| ECUADOR | 0.145 | 25.0 | 37.5 | 23.7 | |
| PARAGUAY | 2.542 *** | 69.7 | 97.0 | 137.0 | |
| PERU | -0.377 | 29.3 | 36.9 | 30.7 | |
| VENEZUELA | 0.831 | 40.0 | 39.9 | 36.3 | |
| TROPICAL SOUTH AMERICA | 3.686 *** | 230.0 | 495.0 | 518.3 | |
| COSTA RICA | -0.642 | 2.0 | 2.9 | 3.0 | |
| EL SALVADOR | 3.008 *** | 1.0 | 1.2 | 2.0 | |
| GUATEMALA | 3.041 *** | 2.0 | 2.2 | 3.3 | |
| HONDURAS | -3.048 *** | 4.0 | 3.7 | 2.0 | |
| NICARAGUA | 4.769 *** | 3.0 | 4.4 | 7.0 | |
| PANAMA | 5.673 *** | 2.0 | 4.4 | 5.0 | |
| CENTRAL AMERICA, PANAMA | 4.843 *** | 7.3 | 18.8 | 22.3 | |
| BARBADOS | 1.510 *** | 0.0 | 0.0 | 0.0 | |
| GUYANA | -0.000 | 1.0 | 0.0 | 0.0 | |
| HAITI | 3.670 *** | 30.0 | 51.7 | 63.3 | |
| JAMAICA | -1.843 | 4.0 | 2.3 | 2.0 | |
| TRINIDAD ETC | -1.385 ** | 0.4 | 0.4 | 0.3 | |
| CARIBBEAN | 5.273 *** | 24.7 | 54.4 | 65.7 | |
| TROPICAL LATIN AMERICA | 2.167 *** | 1661.7 | 2620.0 | 2688.3 | |
| ARGENTINA | 0.401 | 19.7 | 25.2 | 23.0 | |
| TEMPERATE SOUTH AMERICA | 0.401 | 19.7 | 25.2 | 23.0 | |
| LATIN AMERICA | 2.151 *** | 1681.3 | 2645.2 | 2711.3 | |

LEVEL OF SIGNIFICANCE IS REPRESENTED AS FOLLOWS

*** P<0.005 ** P<0.01 * P<0.05

(CIAF) CASSAVA TRENDS IN YIELD LEVEL BY COUNTRY 1960/82

| COUNTRY | ANNUAL GROWTH | AVERAGE YIELD | AVERAGE YIELD | AVERAGE YIELD |
|-------------------------|---------------|---------------|---------------|---------------|
| | RATE IN YIELD | | | |
| | 1960/82 | | | |
| | % | | KG/HA | |
| BRAZIL | -0.933 *** | 13214.7 | 14559.9 | 11585.9 |
| MEXICO | -2.910 ** | 0.0 | 20000.0 | 15500.0 |
| | -0.930 *** | 13214.7 | 14506.0 | 11589.5 |
| BOLIVIA | 0.235 | . | 12936.8 | 11894.2 |
| COLOMBIA | 3.442 *** | . | 3000.0 | 10375.0 |
| CUBA | 0.021 | 6750.0 | 6565.7 | 6875.5 |
| DOMINICAN RP | -2.484 *** | . | 11434.6 | 5171.8 |
| ECUADOR | -0.235 | 9006.8 | 10093.1 | 9158.5 |
| PARAGUAY | 0.275 * | 14213.1 | 13633.3 | 14916.2 |
| PERU | -0.289 | 13061.1 | 12876.5 | 11088.6 |
| VENEZUELA | -0.728 | 9029.3 | 8011.6 | 9223.8 |
| TROPICAL SOUTH AMERICA | -0.453 | 14352.0 | 9877.1 | 11046.6 |
| COSTA RICA | 3.697 *** | 4500.0 | 3641.3 | 6222.2 |
| SALVADOR | 1.595 *** | 9000.0 | 10739.2 | 11333.3 |
| GUATEMALA | -0.185 | 2500.0 | 2986.9 | 2527.8 |
| HONDURAS | -2.979 *** | 4166.7 | 7215.2 | 3500.0 |
| NICARAGUA | -0.494 *** | 4000.0 | 4071.1 | 3761.9 |
| PANAMA | -1.439 *** | . | 8380.0 | 6866.7 |
| CENTRAL AMERICA, PANAMA | 0.399 | 4678.6 | 5927.3 | 5254.3 |
| BARBADOS | -1.335 *** | 32258.1 | 26597.2 | 25064.1 |
| GUYANA | -0.000 | 0.0 | 0.0 | 0.0 |
| HAITI | 0.733 *** | 3666.7 | 4160.4 | 4026.1 |
| JAMAICA | 6.733 *** | 2750.0 | 8639.6 | 10333.3 |
| TRINIDAD ETC | 2.224 *** | 8948.5 | 9308.3 | 12397.4 |
| CARIBBEAN | 1.003 *** | 3655.9 | 4397.0 | 4264.7 |
| TROPICAL LATIN AMERICA | -0.884 *** | 13047.7 | 13401.6 | 11251.5 |
| ARGENTINA | -1.584 *** | 12613.5 | 10949.5 | 9247.7 |
| TEMPERATE SOUTH AMERICA | -1.584 *** | 12613.5 | 10949.5 | 9247.7 |
| LATIN AMERICA | -0.887 *** | 13042.7 | 13378.3 | 11234.6 |

LEVEL OF SIGNIFICANCE IS REPRESENTED AS FOLLOWS
 *** P<0.005 ** P<0.01 *P<0.05

CASSAVA

PRODUCTION, RELATIVE IMPORTANCE IN THE REGION
AND PER CAPITA PRODUCTION LEVELS

(CIAT)

| COUNTRY | P R O D U C T I O N -----1000 MT----- | | | PERCENTAGE OF TOTAL % | PER CAPITA PRODUCTION KG |
|--------------|--|---------|---------|--------------------------|--------------------------------|
| | 1960/62 | 1970/72 | 1980/82 | 1980/82 | 1980/82 |
| BRUNEI | 2 | 3 | 3 | 0.006 | 13 |
| BURMA | 4 | 11 | 42 | 0.090 | 1 |
| CHINA | 203 | 2074 | 3787 | 8.091 | 4 |
| INDIA | 1937 | 5457 | 5668 | 12.109 | 8 |
| INDONESIA | 11317 | 10518 | 13400 | 28.625 | 89 |
| KAMPUCHEA DM | 13 | 22 | 119 | 0.253 | 17 |
| LAO | 11 | 17 | 70 | 0.150 | 18 |
| MALAYSIA | 0 | 278 | 355 | 0.758 | 25 |
| PHILIPPINES | 500 | 437 | 2277 | 4.865 | 45 |
| EAST TIMOR | 16 | 14 | 0 | 0.000 | 0 |
| SINGAPORE | 3 | 3 | 0 | 0.000 | 0 |
| SRI LANKA | 298 | 348 | 533 | 1.138 | 35 |
| THAILAND | 1675 | 3536 | 17518 | 37.422 | 364 |
| VIET NAM | 939 | 981 | 3040 | 6.494 | 55 |
| ASIA | 16917 | 23670 | 46812 | 100.000 | 22 |

(CIAT)

CASSAVA

ANNUAL GROWTH RATES

| COUNTRY | PRODUCTION | | | AREA | | | YIELD | | |
|--------------|------------|----------|----------|---------|---------|---------|---------|----------|----------|
| | 1960/70 | 1971/82 | 1960/82 | 1960/70 | 1971/82 | 1960/82 | 1960/70 | 1971/82 | 1960/82 |
| BRUNEI | 1.6 | 2.8* | 3.4*** | -1.1 | 11.2*** | 4.2* | 2.6*** | -8.5** | -0.8 |
| BURMA | 14.5** | 10.3*** | 10.5*** | 11.8** | 10.8*** | 10.4* | 2.7 | -0.5 | 0.0 |
| CHINA | 29.6*** | 5.5*** | 14.3*** | 30.3*** | 3.3*** | 14.0* | -0.7 | 2.2** | 0.3 |
| INDIA | 11.6*** | -0.4 | 5.8*** | 3.3** | -0.9 | 1.7* | 8.3*** | 0.5 | 4.0*** |
| INDONESIA | -0.7 | 2.2*** | 0.8*** | -0.1 | -0.6* | -0.6* | -0.6 | 2.8*** | 1.4*** |
| KAMPUCHEA DM | 12.0*** | 20.0*** | 11.9*** | 16.2*** | 26.1*** | 16.7* | -4.1* | -6.1*** | -4.8*** |
| LAO | 3.5** | 14.9*** | 10.9*** | -5.4 | 15.4*** | 7.5* | 8.9*** | -0.5 | 3.4*** |
| MALAYSIA | 4.0 | 2.6*** | 3.0*** | 4.1 | 4.0** | 2.2* | -0.1 | -1.4 | 0.9 |
| PHILIPPINES | -1.9 | 18.7*** | 7.5*** | -1.4** | 10.1*** | 4.3* | -0.5 | 8.6*** | 3.1*** |
| EAST TIMOR | 5.8 | 10.2 | 2.6 | 2.7 | 4.0 | 4.7* | 3.1 | 6.2 | -2.1 |
| SINGAPORE | 4.0*** | -33.4*** | -13.1*** | 5.6*** | 9.8 | 2.4 | -1.6** | -43.2*** | -15.5*** |
| SRI LANKA | 2.9** | 1.8 | 3.8*** | 6.6*** | -5.8 | 3.1* | -3.7*** | 7.7*** | 0.6 |
| THAILAND | 7.6*** | 16.3*** | 13.2*** | 8.7*** | 15.3*** | 14.1* | -1.1* | 1.0 | -0.9*** |
| VIET NAM | 0.4 | 13.4*** | 6.2*** | 1.9 | 14.4*** | 6.6* | -1.5** | -1.1 | -0.5* |
| ASIA | 3.6*** | 6.9*** | 5.3*** | 2.0*** | 4.6*** | 3.2* | 1.6*** | 2.4*** | 2.1*** |

| [CIAT] CASSAVA | | TRENDS IN YIELD LEVEL BY COUNTRY 1960/82 | | | |
|------------------|-------------------------------|--|---------------|---------------|--|
| COUNTRY | ANNUAL GROWTH | AVERAGE YIELD | AVERAGE YIELD | AVERAGE YIELD | |
| | RATE IN YIELD 1960/82 % | 1960/62 | 1970/72 | 1980/82 | |
| | | -----KG/HA----- | | | |
| BRUNEI | -0.807 | 5770.3 | 8000.3 | 3000.0 | |
| BURMA | 0.046 | 10526.3 | 10279.4 | 9644.4 | |
| CHINA | 0.328 | 12656.4 | 12165.5 | 15416.3 | |
| INDIA | 4.048 *** | 7163.7 | 15561.4 | 17318.8 | |
| INDONESIA | 1.391 *** | 7819.0 | 7390.8 | 9789.5 | |
| KAMPUCHEA DM | -4.846 *** | 13000.0 | 10815.2 | 5966.7 | |
| LAO | 3.371 *** | 7750.0 | 14395.9 | 14000.0 | |
| MALAYSIA | 0.891 | 0.0 | 9638.9 | 10437.5 | |
| PHILIPPINES | 3.131 *** | 5505.9 | 5208.2 | 10933.8 | |
| EAST TIMOR | -2.079 | 2666.7 | 1983.7 | 0.0 | |
| SINGAPORE | -15.457 *** | 13095.2 | 9625.1 | 91.0 | |
| SRI LANKA | 0.612 | 7871.1 | 5598.3 | 9629.7 | |
| THAILAND | -0.862 *** | 17223.4 | 13863.0 | 14834.7 | |
| VIET NAM | -0.470 * | 8099.9 | 7208.6 | 6569.8 | |
| ASIA | 2.087 *** | 8106.4 | 9373.5 | 11932.5 | |

BEANS, DRY

PRODUCTION, RELATIVE IMPORTANCE IN THE REGION
AND PER CAPITA PRODUCTION LEVELS

(CIAT)

| COUNTRY | P R O D U C T I O N | | | PERCENTAGE OF TOTAL % 1980/82 | PER CAPITA PRODUCTION KG 1980/82 |
|-------------------------|---------------------|---------|---------|-------------------------------------|---|
| | -----1000 MT----- | | | | |
| | 1966/68 | 1972/74 | 1980/82 | | |
| BRAZIL | 2372 | 2382 | 2404 | 53.105 | 22 |
| MEXICO | 950 | 950 | 1178 | 26.011 | 20 |
| | 3322 | 3332 | 3582 | 79.116 | 21 |
| BOLIVIA | 3 | 2 | 4 | 0.088 | 1 |
| COLOMBIA | 38 | 62 | 83 | 1.841 | 4 |
| CUBA | 22 | 24 | 26 | 0.582 | 3 |
| DOMINICAN RP | 24 | 36 | 53 | 1.171 | 10 |
| ECUADOR | 37 | 29 | 28 | 0.626 | 4 |
| PARAGUAY | 20 | 36 | 65 | 1.443 | 24 |
| PERU | 64 | 61 | 42 | 0.928 | 3 |
| VENEZUELA | 40 | 29 | 31 | 0.685 | 2 |
| TROPICAL SOUTH AMERICA | 248 | 278 | 333 | 7.362 | 4 |
| COSTA RICA | 16 | 12 | 12 | 0.272 | 6 |
| EL SALVADOR | 21 | 33 | 42 | 0.928 | 10 |
| GUATEMALA | 56 | 70 | 82 | 1.804 | 13 |
| HONDURAS | 50 | 35 | 42 | 0.920 | 13 |
| NICARAGUA | 54 | 41 | 45 | 0.987 | 19 |
| PANAMA | 7 | 3 | 2 | 0.052 | 1 |
| CENTRAL AMERICA, PANAMA | 205 | 194 | 225 | 4.962 | 12 |
| HAITI | 40 | 43 | 48 | 1.068 | 9 |
| JAMAICA | 0 | 0 | 0 | 0.004 | 0 |
| CARIBBEAN | 40 | 43 | 49 | 1.072 | 5 |
| TROPICAL LATIN AMERICA | 3815 | 3846 | 4189 | 92.512 | 20 |
| ARGENTINA | 27 | 82 | 208 | 4.594 | 8 |
| CHILE | 75 | 74 | 128 | 2.827 | 13 |
| URUGUAY | 2 | 2 | 3 | 0.066 | 1 |
| TEMPERATE SOUTH AMERICA | 103 | 158 | 339 | 7.488 | 9 |
| LATIN AMERICA | 3918 | 4005 | 4528 | 100.000 | 19 |

COLUMNS MAY NOT ADD EXACTLY DUE TO ROUNDING

| COUNTRY | ANNUAL GROWTH RATES | | |
|-------------------------|-----------------------|-----------------|------------------|
| | PRODUCTION 1966/82 | AREA 1966/82 | YIELD 1966/82 |
| BRAZIL | -0.2 | 2.6*** | -2.8*** |
| MEXICO | 0.4 | -1.3 | 1.7*** |
| | 0.1 | 1.5*** | -1.4*** |
| BOLIVIA | 3.7 | -3.0 | 6.7*** |
| COLOMBIA | 5.9*** | 4.5*** | 1.4*** |
| CUBA | 1.2*** | -0.0 | 1.2*** |
| DOMINICAN RP | 5.2*** | 3.6*** | 1.6** |
| ECUADOR | -2.7*** | -4.0*** | 1.3*** |
| PARAGUAY | 9.1*** | 7.4*** | 1.7*** |
| PERU | -2.7*** | -2.9*** | 0.3 |
| VENEZUELA | -1.1 | -3.6*** | 2.4*** |
| TROPICAL SOUTH AMERICA | 2.3*** | 0.5** | 1.8*** |
| COSTA RICA | -0.0 | -2.7 | 2.7** |
| SALVADOR | 4.8*** | 3.7*** | 1.0 |
| GUATEMALA | 2.7*** | 2.2*** | 0.6 |
| HONDURAS | -1.5* | 0.5 | -2.1** |
| NICARAGUA | -1.6 | 0.2 | -1.8*** |
| PANAMA | -6.4*** | -5.7*** | -0.6 |
| CENTRAL AMERICA, PANAMA | 0.8** | 0.8** | -0.0 |
| HAITI | 1.5*** | -0.3 | 1.8*** |
| JAMAICA | 9.0*** | 9.8*** | -0.9** |
| CARIBBEAN | 1.5*** | -0.3 | 1.8*** |
| TROPICAL LATIN AMERICA | 0.3 | 1.4*** | -1.1*** |
| ARGENTINA | 15.5*** | 14.2*** | 1.3 |
| CHILE | 4.7*** | 5.3*** | -0.6 |
| URUGUAY | 2.5*** | 1.9*** | 0.6 |
| TEMPERATE SOUTH AMERICA | 9.6*** | 9.6*** | 0.0 |
| LATIN AMERICA | 0.7 | 1.6*** | -0.9*** |

LEVEL OF SIGNIFICANCE IS REPRESENTED AS FOLLOWS

*** P<0.005 ** P<0.01 * P<0.05

| (CIAT) | BEANS, DRY | TRENDS IN AREA LEVEL BY COUNTRY 1966/82 | | | |
|-------------------------|------------------------------|---|--------------|--------------|--|
| COUNTRY | ANNUAL GROWTH | AVERAGE AREA | AVERAGE AREA | AVERAGE AREA | |
| | RATE IN AREA 1966/82 x | 1966/68 | 1972/74 | 1980/82 | |
| | | -----1000 HA----- | | | |
| BRASIL | 2.628 *** | 3546.2 | 4025.0 | 5201.0 | |
| MEXICO | -1.291 | 1986.9 | 1702.8 | 1875.0 | |
| | | 1.470 *** | 5533.0 | 5727.8 | |
| BOUVIA | -3.036 | 8.7 | 2.3 | 4.0 | |
| COLOMBIA | 4.458 *** | 67.7 | 87.4 | 115.3 | |
| CUBA | -0.000 | 35.0 | 35.0 | 35.0 | |
| DOMINICAN RP | 3.634 *** | 35.4 | 35.5 | 53.7 | |
| ECUADOR | -4.029 *** | 82.5 | 64.9 | 51.0 | |
| PARAGUAY | 7.398 *** | 31.5 | 48.5 | 83.3 | |
| PERU | -2.919 *** | 75.1 | 70.7 | 48.0 | |
| VENEZUELA | -3.566 *** | 95.1 | 76.8 | 59.0 | |
| TROPICAL SOUTH AMERICA | 0.466 ** | 430.9 | 421.2 | 449.3 | |
| COSTA RICA | -2.683 | 40.9 | 24.7 | 22.7 | |
| EL SALVADOR | 3.733 *** | 31.1 | 45.4 | 49.3 | |
| GUATEMALA | 2.151 *** | 86.6 | 101.4 | 110.7 | |
| HONDURAS | 0.532 | 72.0 | 64.9 | 73.7 | |
| NICARAGUA | 0.163 | 65.0 | 57.7 | 70.3 | |
| PANAMA | -5.745 *** | 20.7 | 11.5 | 7.3 | |
| CENTRAL AMERICA, PANAMA | 0.839 ** | 316.4 | 305.6 | 334.0 | |
| HAITI | -0.273 | 93.3 | 96.0 | 90.0 | |
| JAMAICA | 9.849 *** | 0.1 | 0.3 | 0.3 | |
| CARIBBEAN | -0.263 | 93.4 | 96.3 | 90.2 | |
| TROPICAL LATIN AMERICA | 1.360 *** | 6373.7 | 6550.8 | 7949.5 | |
| ARGENTINA | 14.200 *** | 31.8 | 83.0 | 215.3 | |
| CHILE | 5.290 *** | 62.2 | 73.6 | 117.0 | |
| URUGUAY | 1.911 *** | 3.7 | 4.1 | 5.0 | |
| TEMPERATE SOUTH AMERICA | 9.570 *** | 97.7 | 160.7 | 337.3 | |
| LATIN AMERICA | 1.581 *** | 6471.4 | 6711.5 | 8286.9 | |

LEVEL OF SIGNIFICANCE IS REPRESENTED AS FOLLOWS

*** P<0.005 ** P<0.01 * P<0.05

| COUNTRY | TRENDS IN YIELD LEVEL BY COUNTRY 1966/82 | | | |
|-------------------------|--|--------------------------|-----------------------------------|--------------------------|
| | ANNUAL GROWTH RATE IN YIELD 1966/82 % | AVERAGE YIELD 1966/68 | AVERAGE YIELD 1972/74 KG/HA | AVERAGE YIELD 1980/82 |
| BRAZIL | -2.797 *** | 688.2 | 593.6 | 459.6 |
| MEXICO | 1.708 *** | 479.6 | 560.4 | 624.2 |
| | -1.419 *** | 600.3 | 582.1 | 504.1 |
| BOLIVIA | 6.731 *** | 376.6 | 818.4 | 1000.0 |
| COLOMBIA | 1.405 *** | 560.7 | 705.3 | 721.2 |
| CUBA | 1.201 *** | 638.1 | 671.4 | 752.4 |
| DOMINICAN RP | 1.585 ** | 686.9 | 1006.9 | 986.9 |
| ECUADOR | 1.292 *** | 444.6 | 441.3 | 555.3 |
| PARAGUAY | 1.720 *** | 633.3 | 747.4 | 782.8 |
| PERU | 0.267 | 848.6 | 857.1 | 874.7 |
| VENEZUELA | 2.441 *** | 418.7 | 380.1 | 526.2 |
| TROPICAL SOUTH AMERICA | 1.802 *** | 575.4 | 658.9 | 741.6 |
| COSTA RICA | 2.651 ** | 394.2 | 547.1 | 545.5 |
| SALVADOR | 1.025 | 669.6 | 724.8 | 863.4 |
| GUATEMALA | 0.590 | 650.3 | 693.3 | 745.4 |
| HONDURAS | -2.065 ** | 702.1 | 539.8 | 564.1 |
| NICARAGUA | -1.764 *** | 837.5 | 717.6 | 624.2 |
| PANAMA | -0.631 | 332.4 | 289.2 | 317.5 |
| CENTRAL AMERICA, PANAMA | -0.043 | 648.5 | 633.4 | 673.0 |
| HAITI | 1.791 *** | 424.9 | 443.7 | 537.0 |
| JAMAICA | -0.885 ** | 681.2 | 707.8 | 636.9 |
| CARIBBEAN | 1.789 *** | 425.1 | 444.5 | 537.3 |
| TROPICAL LATIN AMERICA | -1.079 *** | 598.5 | 587.5 | 525.1 |
| ARGENTINA | 1.298 | 866.4 | 975.5 | 959.4 |
| CHILE | -0.578 | 1197.9 | 1005.9 | 1084.7 |
| URUGUAY | 0.630 | 552.7 | 504.1 | 600.0 |
| TEMPERATE SOUTH AMERICA | 0.013 | 1054.4 | 981.7 | 997.4 |
| LATIN AMERICA | -0.858 *** | 605.4 | 597.0 | 544.2 |

LEVEL OF SIGNIFICANCE IS REPRESENTED AS FOLLOWS

*** P<0.005 ** P<0.01 *P<0.05

(CIAT) PULSES

SUMMARY OF LATIN AMERICA TRADE (THOUSAND TONS)

| REGION | EXPORT | | | IMPORT | | | +IMPORT-EXPORT | | |
|-------------------------|---------|---------|---------|---------|---------|---------|----------------|---------|---------|
| | 1966/68 | 1972/74 | 1980/82 | 1966/68 | 1972/74 | 1980/82 | 1966/68 | 1972/74 | 1980/82 |
| BRAZIL | 16 | 3 | 3 | 21 | 19 | 35 | 5 | 16 | 32 |
| MEXICO | 86 | 68 | 64 | 1 | 21 | 381 | -85 | -47 | 317 |
| | 102 | 71 | 67 | 22 | 40 | 416 | -80 | -31 | 349 |
| BOLIVIA | 1 | 1 | 0 | 1 | 1 | 1 | 0 | 0 | 1 |
| COLOMBIA | 1 | 10 | 4 | 2 | 12 | 50 | 1 | 2 | 46 |
| CUBA | 0 | 0 | 1 | 73 | 99 | 104 | 73 | 99 | 103 |
| DOMINICAN RP | 1 | 1 | 3 | 3 | 6 | 2 | 2 | 5 | -1 |
| ECUADOR | 0 | 0 | 0 | 1 | 1 | 3 | 1 | 1 | 3 |
| PERU | 2 | 3 | 3 | 7 | 2 | 7 | 5 | -1 | 4 |
| VENEZUELA | 0 | 0 | 0 | 41 | 38 | 93 | 41 | 38 | 93 |
| TROPICAL SOUTH AMERICA | 5 | 15 | 11 | 128 | 159 | 260 | 123 | 144 | 249 |
| COSTA RICA | 1 | 1 | 1 | 9 | 18 | 13 | 8 | 17 | 12 |
| EL SALVADOR | 2 | 1 | 0 | 15 | 3 | 3 | 13 | 2 | 3 |
| GUATEMALA | 2 | 1 | 1 | 3 | 2 | 4 | 1 | 1 | 3 |
| HONDURAS | 19 | 6 | 1 | 1 | 1 | 2 | -18 | -5 | 1 |
| NICARAGUA | 4 | 4 | 0 | 2 | 4 | 12 | -2 | 0 | 12 |
| PANAMA | 0 | 0 | 0 | 4 | 4 | 6 | 4 | 4 | 6 |
| CENTRAL AMERICA, PANAMA | 28 | 13 | 3 | 34 | 32 | 40 | 6 | 19 | 37 |
| BARBADOS | 1 | 1 | 0 | 2 | 2 | 2 | 1 | 1 | 2 |
| GUYANA | 1 | 1 | 0 | 4 | 4 | 3 | 3 | 3 | 3 |
| HAITI | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 |
| JAMAICA | 1 | 0 | 0 | 2 | 3 | 1 | 1 | 3 | 1 |
| TRINIDAD ETC | 1 | 3 | 1 | 7 | 11 | 14 | 6 | 8 | 13 |
| CARIBBEAN | 4 | 5 | 1 | 16 | 21 | 21 | 12 | 16 | 20 |
| TROPICAL LATIN AMERICA | 139 | 104 | 82 | 200 | 252 | 737 | 61 | 148 | 655 |
| ARGENTINA | 25 | 52 | 155 | 1 | 1 | 1 | -24 | -51 | -154 |
| CHILE | 15 | 21 | 64 | 1 | 2 | 3 | -14 | -19 | -61 |
| URUGUAY | 0 | 0 | 0 | 1 | 1 | 2 | 1 | 1 | 2 |
| TEMPERATE SOUTH AMERICA | 40 | 73 | 219 | 3 | 4 | 6 | -37 | -69 | -213 |
| LATIN AMERICA | 179 | 177 | 301 | 203 | 256 | 743 | 24 | 79 | 442 |

BEEF and VEAL: stocks and production for selected regions, 1982

| Region and country | Production | | Stock | |
|----------------------------|---------------------|------------|------------------------|------------|
| | Total ('000 tm) | Percentage | Total ('000 heads) | Percentage |
| World | 45656 | 100.0 | 1226432 | 100.0 |
| United States | 10431 | 22.8 | 115690 | 9.4 |
| Europe | 10197 | 22.3 | 133248 | 10.9 |
| Latin America | 8091 | 17.7 | 276655 | 22.6 |
| Tropical Latin America | 4978 | 10.9 | 204101 | 16.6 |
| . Brazil | 2300 | 5.0 | 93000 | 7.6 |
| . Colombia | 627 | 1.4 | 24499 | 2.0 |
| . Venezuela | 384 | 0.8 | 11500 | 0.9 |
| Temperate Latin America | 3113 | 6.8 | 72554 | 5.9 |
| . Argentina | 2550 | 5.6 | 57882 | 4.7 |
| Asia | 4285 | 9.4 | 365578 | 29.8 |
| Africa | 2909 | 6.4 | 173387 | 14.1 |
| Oceania | 2103 | 4.6 | 33435 | 2.8 |

BEEF AND VEAL

PRODUCTION, RELATIVE IMPORTANCE IN THE REGION
AND PER CAPITA PRODUCTION LEVELS

| COUNTRY | P R O D U C T I O N | | | PERCENTAGE | PER CAPITA |
|-------------------------|---------------------|---------|---------|------------|------------|
| | -----1000 MT----- | | | OF TOTAL | PRODUCTION |
| | 1966/70 | 1976/80 | 1980/82 | X | KG |
| | 1966/70 | 1976/80 | 1980/82 | 1980/82 | 1980/82 |
| BRAZIL | 1665 | 2228 | 2195 | 27.030 | 18 |
| MEXICO | 442 | 579 | 621 | 7.644 | 9 |
| | 2106 | 2807 | 2815 | 34.674 | 15 |
| BOLIVIA | 48 | 79 | 89 | 1.096 | 16 |
| COLOMBIA | 381 | 569 | 606 | 7.468 | 23 |
| CUBA | 192 | 144 | 153 | 1.880 | 16 |
| DOMINICAN RP | 29 | 44 | 52 | 0.636 | 8 |
| ECUADOR | 52 | 81 | 94 | 1.154 | 11 |
| PARAGUAY | 122 | 112 | 116 | 1.429 | 35 |
| PERU | 90 | 87 | 88 | 1.088 | 5 |
| VENEZUELA | 191 | 308 | 346 | 4.261 | 21 |
| TROPICAL SOUTH AMERICA | 1104 | 1424 | 1544 | 19.012 | 16 |
| COSTA RICA | 36 | 79 | 78 | 0.961 | 34 |
| EL SALVADOR | 19 | 30 | 29 | 0.361 | 6 |
| GUATEMALA | 50 | 72 | 83 | 1.022 | 11 |
| HONDURAS | 26 | 52 | 59 | 0.727 | 15 |
| NICARAGUA | 48 | 73 | 51 | 0.624 | 18 |
| PANAMA | 32 | 44 | 49 | 0.599 | 25 |
| CENTRAL AMERICA PANAMA | 211 | 350 | 349 | 4.294 | 15 |
| BARBADOS | 0 | 0 | 0 | 0.005 | 2 |
| GUYANA | 4 | 4 | 4 | 0.049 | 4 |
| HAITI | 18 | 23 | 27 | 0.333 | 5 |
| JAMAICA | 11 | 12 | 13 | 0.160 | 6 |
| TRINIDAD TOB | 2 | 2 | 2 | 0.021 | 1 |
| CARIBBEAN | 35 | 41 | 46 | 0.567 | 4 |
| TROPICAL LATIN AMERICA | 3457 | 4621 | 4754 | 58.548 | 15 |
| ARGENTINA | 2582 | 2970 | 2782 | 34.268 | 102 |
| CHILE | 165 | 173 | 181 | 2.225 | 16 |
| URUGUAY | 314 | 347 | 403 | 4.959 | 137 |
| TEMPERATE SOUTH AMERICA | 3061 | 3490 | 3366 | 41.452 | 81 |
| LATIN AMERICA | 6517 | 8111 | 8119 | 100.000 | 23 |

COLUMNS MAY NOT ADD EXACTLY DUE TO ROUNDING

Area in annual and permanent crops and in permanent pastures,
1966/70 and 1976/80 ('000 ha)

| Region and Country | Permanent pastures | | Annual and permanent crops | |
|----------------------------|--------------------|---------------|----------------------------|---------------|
| | 1966/70 | 1976/80 | 1966/70 | 1976/80 |
| Tropical Latin America | 346409 | 367598 | 103878 | 117262 |
| Brazil | 137788 | 157000 | 52949 | 60928 |
| Mexico | 74499 | 74499 | 23272 | 23240 |
| | 212287 | 231499 | 76221 | 84168 |
| Tropical South America | 121566 | 123355 | 19942 | 24578 |
| Bolivia | 27820 | 27090 | 1970 | 3335 |
| Colombia | 30000 | 30000 | 5048 | 5551 |
| Cuba | 2570 | 2609 | 2155 | 3163 |
| Dominican Republic | 1270 | 1490 | 1100 | 1230 |
| Ecuador | 2230 | 2559 | 2541 | 2616 |
| Paraguay | 14300 | 15400 | 936 | 1644 |
| Peru | 27120 | 27120 | 2694 | 3371 |
| Venezuela | 16256 | 17087 | 3498 | 3668 |
| Central America and Panama | 10678 | 11003 | 6152 | 6800 |
| Costa Rica | 1239 | 1558 | 488 | 490 |
| El Salvador | 610 | 610 | 631 | 700 |
| Guatemala | 964 | 880 | 1530 | 1796 |
| Honduras | 3400 | 3400 | 1528 | 1737 |
| Nicaragua | 3384 | 3394 | 1426 | 1510 |
| Panama | 1081 | 1161 | 549 | 567 |
| Caribbean | 1878 | 1741 | 1563 | 1715 |
| Barbados | 4 | 4 | 33 | 33 |
| Guyana | 999 | 999 | 367 | 379 |
| Haiti | 625 | 517 | 780 | 880 |
| Jamaica | 241 | 210 | 246 | 265 |
| Trinidad & Tobago | 9 | 11 | 137 | 158 |
| Temperate South America | 169413 | 168862 | 38714 | 42457 |
| Argentina | 145078 | 143400 | 32138 | 35084 |
| Chile | 10670 | 11800 | 4748 | 5464 |
| Uruguay | 13665 | 13662 | 1828 | 1909 |
| Latin America | 515822 | 536460 | 142592 | 159719 |

BEEF AND VEAL

PRODUCTION PER CAPITA 1966/82

| COUNTRY | ANNUAL GROWTH RATE 1966/82 % | AVERAGE | AVERAGE | 1982 |
|-------------------------|------------------------------------|-----------|---------|--------|
| | | 1966/71 | 1976/81 | |
| | | -KG/YEAR- | | |
| BRAZIL | -0.034 | 18.95 | 18.76 | 18.60 |
| MEXICO | -0.45* | 9.13 | 8.77 | 8.46 |
| | -0.21 | 15.17 | 15.15 | 14.89 |
| BULIVIA | 2.37*** | 11.52 | 14.96 | 15.32 |
| COLOMBIA | 1.44*** | 19.74 | 23.16 | 22.13 |
| CUBA | -3.41*** | 22.97 | 15.07 | 15.53 |
| DOMINICAN RP | 1.61*** | 6.81 | 7.90 | 8.64 |
| ECUADOR | 1.82*** | 9.09 | 10.86 | 11.01 |
| PARAGUAY | -3.71*** | 55.65 | 37.44 | 35.01 |
| PERU | -2.88*** | 7.05 | 5.15 | 4.88 |
| VENEZUELA | 1.12*** | 18.70 | 21.10 | 20.83 |
| TROPICAL SOUTH AMERICA | 0.001 | 16.52 | 16.40 | 16.06 |
| COSTA RICA | 4.30*** | 22.93 | 37.28 | 33.20 |
| SALVADOR | 0.59 | 5.71 | 6.55 | 5.90 |
| GUATEMALA | 0.63 | 10.16 | 10.87 | 9.73 |
| HONDURAS | 3.39*** | 10.81 | 14.83 | 17.18 |
| NICARAGUA | -1.34 | 26.63 | 26.36 | 18.16 |
| PANAMA | 0.54 | 22.68 | 23.78 | 27.29 |
| CENTRAL AMERICA PANAMA | 1.33*** | 13.70 | 16.18 | 14.91 |
| BARBADOS | -4.93*** | 1.96 | 1.04 | . |
| GUYANA | -2.92*** | 0.06 | 4.36 | 4.33 |
| HAITI | 0.81*** | 3.99 | 4.20 | 4.95 |
| JAMAICA | -0.52 | 6.03 | 5.74 | 5.77 |
| TRINIDAD ETC | -1.27 | 1.52 | 1.45 | .83 |
| CARIBBEAN | -0.06 | 4.26 | 4.15 | 4.46 |
| TROPICAL LATIN AMERICA | -0.02 | 15.07 | 15.22 | 14.89 |
| ARGENTINA | 0.01 | 106.91 | 111.65 | 93.09 |
| CHILE | -0.53 | 17.84 | 16.19 | 16.97 |
| URUGUAY | 1.38* | 110.85 | 121.92 | 140.93 |
| TEMPERATE SOUTH AMERICA | 0.02 | 84.13 | 86.73 | 75.72 |
| LATIN AMERICA | -0.43 | 24.16 | 23.58 | 21.73 |

LEVEL OF SIGNIFICANCE IS REPRESENTED AS FOLLOWS

*** P<0.005 ** P<0.01 *P<0.05

BEEF CATTLE

PRODUCTION PER HEAD IN STOCK 1966/82

| COUNTRY | ANNUAL GROWTH RATE 1966/82 X | AVERAGE | | 1982 |
|-------------------------|------------------------------------|---------|---------|------|
| | | 1966/71 | 1976/81 | |
| | | KG/YEAR | | |
| BRAZIL | 0.33 | 23.4 | 24.3 | 25.6 |
| MEXICO | -0.20 | 18.7 | 18.9 | 17.3 |
| | 0.17 | 22.2 | 22.9 | 23.3 |
| BOLIVIA | -0.12 | 21.8 | 21.2 | 22.0 |
| COLOMBIA | 1.55*** | 20.6 | 24.0 | 24.3 |
| CUBA | -1.17** | 29.6 | 25.2 | 24.7 |
| DOMINICAN RP | -1.28** | 26.6 | 21.8 | 25.0 |
| ECUADOR | 2.92*** | 22.1 | 29.5 | 31.3 |
| PARAGUAY | -2.40*** | 27.7 | 20.5 | 21.4 |
| PERU | -0.35 | 23.7 | 21.7 | 25.3 |
| VENEZUELA | 2.11*** | 24.5 | 30.9 | 30.3 |
| TROPICAL SOUTH AMERICA | 0.65** | 23.6 | 24.8 | 25.5 |
| COSTA RICA | 3.03*** | 26.9 | 39.0 | 31.9 |
| SALVADOR | 3.13*** | 16.5 | 23.4 | 28.4 |
| GUATEMALA | 2.20*** | 37.4 | 49.7 | 39.9 |
| HONDURAS | 3.45*** | 17.8 | 24.4 | 28.8 |
| NICARAGUA | 0.62 | 23.4 | 25.9 | 24.2 |
| PANAMA | 0.79* | 29.0 | 32.0 | 32.7 |
| CENTRAL AMERICA PANAMA | 2.16*** | 25.0 | 31.9 | 30.9 |
| BARBADOS | -4.99** | 26.4 | 14.2 | . |
| GUYANA | -0.53 | 14.5 | 13.2 | 13.1 |
| HAITI | 0.41*** | 23.4 | 24.7 | 25.0 |
| JAMAICA | -0.51 | 44.2 | 42.5 | 41.9 |
| TRINIDAD ETC | -2.24** | 25.7 | 22.0 | 12.7 |
| CARIBBEAN | 0.01 | 25.4 | 25.6 | 25.1 |
| TROPICAL LATIN AMERICA | 0.45** | 22.9 | 24.0 | 24.4 |
| ARGENTINA | 0.18 | 50.1 | 51.8 | 44.6 |
| CHILE | -0.61 | 55.3 | 49.5 | 51.3 |
| URUGUAY | -0.14 | 36.0 | 33.4 | 38.4 |
| TEMPERATE SOUTH AMERICA | 0.08 | 48.4 | 48.9 | 44.0 |
| LATIN AMERICA | 0.13 | 30.1 | 30.7 | 29.6 |

LEVEL OF SIGNIFICANCE IS REPRESENTED AS FOLLOWS

*** P<0.005 ** P<0.01 *P<0.05

BEEF AND VEAL

(ANNUAL GROWTH RATES)

| COUNTRY | PRODUCTION | | | POPULATION | | | PRODUCTION PER CAP. | | |
|-------------------------|------------|---------|---------|------------|---------|---------|---------------------|---------|---------|
| | 1966/71 | 1976/81 | 1966/82 | 1966/71 | 1976/81 | 1966/82 | 1966/71 | 1976/81 | 1966/82 |
| BRAZIL | 5.0** | -2.0 | 2.5*** | 2.7*** | 2.4*** | 2.5* | 2.2 | -4.4*** | -0.0 |
| MEXICO | 0.9 | 2.6* | 2.7*** | 3.3*** | 2.9*** | 3.1* | -2.4*** | -0.4 | -0.5* |
| | 4.1** | -1.1 | 2.5*** | 2.9*** | 2.6*** | 2.7* | 1.2 | -3.7** | -0.2 |
| BOLIVIA | 3.3** | 5.0*** | 4.9*** | 2.4*** | 2.6*** | 2.5* | 1.0 | 2.4*** | 2.4*** |
| COLOMBIA | 4.9*** | 3.0*** | 3.7*** | 2.7*** | 2.1*** | 2.3* | 2.2* | 0.9 | 1.4*** |
| CUBA | 2.7 | 2.2*** | -2.1** | 1.8*** | 0.7*** | 1.4* | 0.9 | 1.5*** | -3.4*** |
| DOMINICAN RP | 6.3*** | 5.1*** | 4.4*** | 3.2** | 2.5*** | 2.8* | 3.1* | 2.6* | 1.6*** |
| ECUADOR | 4.7** | 6.8*** | 4.8*** | 3.0** | 3.1*** | 3.0* | 1.7 | 3.7** | 1.2** |
| PARAGUAY | 1.0 | 1.3 | -0.6 | 2.6*** | 3.3** | 3.1* | -1.5 | -2.0 | -3.7*** |
| PERU | 2.8** | 0.2 | -0.2 | 2.8*** | 2.7*** | 2.7* | 0.0 | -2.6** | -2.9*** |
| VENEZUELA | 3.8*** | 5.3*** | 4.7*** | 3.6*** | 3.5*** | 3.5* | 0.3 | 1.8 | 1.1** |
| TROPICAL SOUTH AMERICA | 3.7*** | 3.5*** | 2.6*** | 2.8*** | 2.5*** | 2.6* | 0.9** | 1.0** | 0.0 |
| COSTA RICA | 12.0*** | -0.2 | 6.8*** | 3.0*** | 2.4** | 2.5* | 9.1** | -2.6* | 4.3*** |
| SALVADOR | -0.2 | -0.9 | 3.6*** | 3.4*** | 2.9*** | 3.0* | -3.7** | -3.8* | 0.6 |
| GUATEMALA | 7.1*** | 6.4*** | 3.7** | 3.0*** | 3.0*** | 3.0* | 4.1** | 3.4* | 0.6 |
| HONDURAS | 11.8*** | 6.3 | 6.6*** | 2.7*** | 3.5*** | 3.2* | 9.1*** | 2.8 | 3.4*** |
| NICARAGUA | 10.8*** | -10.6* | 1.9 | 3.0*** | 3.3** | 3.2* | 7.8*** | -13.8** | -1.3 |
| PANAMA | 4.7*** | -1.2 | 3.1*** | 2.8*** | 2.2*** | 2.5* | 1.9** | -3.3 | 0.5 |
| CENTRAL AMERICA PANAMA | 8.3*** | 0.2 | 4.3*** | 3.0*** | 3.0*** | 3.0* | 5.3*** | -2.7** | 1.3*** |
| BARBADOS | 10.9** | 18.2** | -4.2* | 0.4*** | 1.6*** | 0.8* | 10.6** | 16.6** | -4.9** |
| GUYANA | 0.5 | 2.7 | -0.7 | 2.6*** | 2.2*** | 2.3* | -2.1 | 0.5 | -2.9*** |
| HAITI | 2.7*** | 4.2*** | 3.1** | 2.2*** | 2.4*** | 2.3* | 0.6 | 1.8* | 0.8*** |
| JAMAICA | -3.3** | 1.8** | 1.0*** | 1.3*** | 1.3** | 1.5* | -4.6*** | 0.5 | -0.5 |
| TRINIDAD ETC | -1.1 | 10.7*** | -0.1 | 0.9*** | 1.6** | 1.2* | -2.0 | 9.1** | -1.3 |
| CARIBBEAN | 0.5 | 3.7*** | 1.9*** | 1.8*** | 2.0*** | 2.0* | -1.3** | 1.6* | -0.1 |
| TROPICAL LATIN AMERICA | 4.2*** | 0.5 | 2.7*** | 2.8*** | 2.6*** | 2.7* | 1.4* | -2.1** | -0.0 |
| ARGENTINA | -1.4 | 0.3 | 1.3* | 1.4*** | 1.2*** | 1.3* | -2.8 | -1.0 | 0.0 |
| CHILE | 0.9 | -1.5 | 1.2 | 1.9*** | 1.7*** | 1.7* | -0.9 | -3.2 | -0.5 |
| URUGUAY | 5.4 | 0.3 | 1.8** | 0.8*** | 0.6*** | 0.4* | 4.6 | -0.3 | 1.4* |
| TEMPERATE SOUTH AMERICA | -0.6 | 0.2 | 1.4** | 1.4*** | 1.3** | 1.4* | -2.0 | -1.1 | 0.0 |
| LATIN AMERICA | 2.1 | 0.4 | 2.1*** | 2.7*** | 2.4*** | 2.5* | -0.5 | -2.1** | -0.4 |

LEVEL OF SIGNIFICANCE IS REPRESENTED AS FOLLOWS

*** P<0.005 ** P<0.01 * P<0.05

MEAT BOVINE FRESH SUMMARY OF LATIN AMERICA TRADE (THOUSAND TONS)

| REGION | EXPORT | | | IMPORT | | | +IMPORT-EXPORT | | |
|-------------------------|---------|---------|------|---------|---------|------|----------------|---------|------|
| | 1966/71 | 1976/81 | 1982 | 1966/71 | 1976/81 | 1982 | 1966/71 | 1976/81 | 1982 |
| BRAZIL | 57 | 18 | 95 | 3 | 163 | 21 | -54 | 145 | -74 |
| MEXICO | 32 | 18 | 7 | 1 | 2 | 9 | -31 | -16 | 2 |
| | 89 | 36 | 102 | 4 | 165 | 30 | -85 | 129 | -72 |
| BOLIVIA | 2 | 1 | 0 | 0 | 0 | 0 | -2 | -1 | 0 |
| COLOMBIA | 7 | 17 | 16 | 1 | 1 | 0 | -6 | -16 | -16 |
| CUBA | 5 | 0 | 0 | 0 | 3 | 0 | -5 | 3 | 0 |
| DOMINICAN RP | 4 | 3 | 5 | 1 | 1 | 1 | -3 | -2 | -4 |
| PARAGUAY | 5 | 3 | 2 | 0 | 0 | 0 | -5 | -3 | -2 |
| PERU | 0 | 0 | 0 | 9 | 6 | 23 | 9 | 6 | 23 |
| VENEZUELA | 0 | 0 | 0 | 1 | 16 | 15 | 1 | 16 | 15 |
| TROPICAL SOUTH AMERICA | 23 | 24 | 23 | 12 | 27 | 39 | -11 | 3 | 16 |
| COSTA RICA | 15 | 32 | 28 | 1 | 1 | 0 | -14 | -31 | -28 |
| EL SALVADOR | 1 | 4 | 3 | 1 | 1 | 1 | 0 | -3 | -2 |
| GUATEMALA | 11 | 14 | 14 | 1 | 1 | 1 | -10 | -13 | -13 |
| HONDURAS | 10 | 24 | 17 | 0 | 1 | 0 | -10 | -23 | -17 |
| NICARAGUA | 20 | 27 | 16 | 1 | 1 | 0 | -19 | -26 | -16 |
| PANAMA | 2 | 2 | 3 | 1 | 1 | 1 | -1 | -1 | -2 |
| CENTRAL AMERICA PANAMA | 59 | 103 | 81 | 5 | 6 | 3 | -54 | -97 | -78 |
| BARBADOS | 1 | 1 | 0 | 2 | 3 | 3 | 1 | 2 | 3 |
| GUYANA | 1 | 1 | 0 | 1 | 0 | 0 | 0 | -1 | 0 |
| HAITI | 1 | 2 | 1 | 1 | 1 | 1 | 0 | -1 | 0 |
| JAMAICA | 0 | 0 | 0 | 3 | 4 | 2 | 3 | 4 | 2 |
| TRINIDAD ETC | 1 | 1 | 1 | 3 | 7 | 9 | 2 | 6 | 8 |
| CARIBBEAN | 4 | 5 | 2 | 10 | 15 | 15 | 6 | 10 | 13 |
| TROPICAL LATIN AMERICA | 175 | 168 | 208 | 31 | 213 | 87 | -144 | 45 | -121 |
| ARGENTINA | 338 | 262 | 243 | 0 | 0 | 0 | -338 | -262 | -243 |
| CHILE | 1 | 1 | 0 | 15 | 6 | 6 | 14 | 5 | 6 |
| URUGUAY | 88 | 107 | 119 | 0 | 0 | 0 | -88 | -107 | -119 |
| TEMPERATE SOUTH AMERICA | 427 | 370 | 362 | 15 | 6 | 6 | -412 | -364 | -356 |
| LATIN AMERICA | 602 | 553 | 570 | 37 | 213 | 93 | -565 | -340 | -477 |

CANNED MEAT NES

SUMMARY OF LATIN AMERICA TRADE (THOUSAND TONS)

| REGION | EXPORT | | | IMPORT | | | *IMPORT-EXPORT | | |
|-------------------------|---------|---------|------|---------|---------|------|----------------|---------|------|
| | 1966/71 | 1976/81 | 1982 | 1966/71 | 1976/81 | 1982 | 1966/71 | 1976/81 | 1982 |
| | BRAZIL | 18 | 70 | 106 | 1 | 1 | 1 | -17 | -69 |
| MEXICO | 1 | 1 | 0 | 2 | 2 | 2 | 1 | 1 | 2 |
| | 19 | 71 | 106 | 3 | 3 | 3 | -16 | -68 | -104 |
| BOLIVIA | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 0 |
| COLOMBIA | 1 | 1 | 0 | 1 | 1 | 1 | 0 | 0 | 1 |
| CUBA | 0 | 0 | 0 | 22 | 31 | 31 | 22 | 31 | 31 |
| DOMINICAN RP | 0 | 1 | 0 | 1 | 1 | 1 | 1 | 0 | 1 |
| ECUADOR | 0 | 1 | 0 | 1 | 1 | 1 | 1 | 0 | 1 |
| PARAGUAY | 16 | 7 | 0 | 1 | 1 | 1 | -15 | -6 | 1 |
| PERU | 0 | 1 | 0 | 1 | 1 | 2 | 1 | 0 | 2 |
| VENEZUELA | 1 | 1 | 0 | 1 | 2 | 2 | 0 | 1 | 2 |
| TROPICAL SOUTH AMERICA | 18 | 12 | 1 | 29 | 39 | 40 | 11 | 27 | 39 |
| COSTA RICA | 1 | 2 | 3 | 1 | 2 | 2 | 0 | 0 | -1 |
| EL SALVADOR | 1 | 1 | 1 | 1 | 2 | 1 | 0 | 1 | 0 |
| GUATEMALA | 1 | 3 | 8 | 1 | 1 | 1 | 0 | -2 | -7 |
| HONDURAS | 1 | 1 | 0 | 1 | 1 | 1 | 0 | 0 | 1 |
| NICARAGUA | 1 | 1 | 0 | 1 | 1 | 1 | 0 | 0 | 1 |
| PANAMA | 0 | 1 | 0 | 2 | 3 | 3 | 2 | 2 | 3 |
| CENTRAL AMERICA PANAMA | 5 | 9 | 12 | 7 | 10 | 9 | 2 | 1 | -3 |
| BARBADOS | 1 | 1 | 1 | 2 | 2 | 2 | 1 | 1 | 1 |
| GUYANA | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 |
| HAITI | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 |
| JAMAICA | 1 | 1 | 1 | 3 | 3 | 3 | 2 | 2 | 2 |
| TRINIDAD ETC | 1 | 1 | 1 | 2 | 3 | 4 | 1 | 2 | 3 |
| CARIBBEAN | 3 | 3 | 3 | 9 | 10 | 11 | 6 | 7 | 8 |
| TROPICAL LATIN AMERICA | 45 | 95 | 122 | 48 | 62 | 63 | 3 | -33 | -68 |
| ARGENTINA | 108 | 121 | 92 | 1 | 2 | 0 | -107 | -115 | -92 |
| CHILE | 0 | 0 | 0 | 1 | 2 | 3 | 1 | 2 | 3 |
| URUGUAY | 3 | 4 | 3 | 0 | 1 | 3 | -3 | -3 | 0 |
| TEMPERATE SOUTH AMERICA | 111 | 125 | 95 | 2 | 5 | 6 | -109 | -120 | -89 |
| LATIN AMERICA | 156 | 222 | 217 | 53 | 62 | 69 | -103 | -160 | -157 |

Exports of fresh/chilled and frozen bovine meat as a percentage of world exports for selected countries and regions¹. Average 1970, 1970/74, 1978/81 and 1982

| Region and country | 1970 | 1970/74 | 1978/81 | 1982 |
|-------------------------|-------------|-------------|-------------|-------------|
| North America | 4.1 | 7.0 | 4.5 | 6.0 |
| Canada | 3.0 | 2.4 | 1.2 | |
| Latin America | 26.7 | 15.2 | 13.0 | 13.1 |
| Argentina | 12.7 | 7.6 | 6.8 | 5.7 |
| Brazil | 3.7 | 2.8 | 0.5 | 0.0 |
| Mexico | 2.2 | 0.9 | 0.4 | 0.2 |
| Uruguay | 3.8 | 1.8 | 1.3 | 2.1 |
| Other countries | 4.4 | 2.1 | | 5.1 |
| Western Europe | 35.0 | 42.1 | 51.5 | 52.3 |
| Eastern Europe and USSR | - | 7.2 | 3.2 | 5.2 |
| Oceania | 26.3 | 23.3 | 22.9 | 20.7 |
| Australia | 17.3 | 13.4 | 16.8 | 14.4 |
| Africa | 1.5 | 0.9 | 1.5 | 1.0 |
| Asia | 5.3 | 2.9 | 1.4 | 1.7 |

¹/ Participation in world trade is measured in terms of export values.

Source: Estimated from FAO Trade 1966/81 and Trade Yearbook 1982

BEEF AND VEAL

PRODUCTION, TRADE AND APPARENT CONSUMPTION

| COUNTRY | 1966/71 | | | | | 1971/82 | | | | |
|------------------------|------------|--------------------|-------------------------|---------------------------------------|------------------------------|------------|--------------------|-------------------------|---------------------------------------|------------------------------|
| | PRODUCTION | +IMPORT -EXPORT | APPARENT CONSUMPTION | APPARENT PER CAPITA CONSUMPTION | SELF SUFFICIENCY INDEX | PRODUCTION | +IMPORT -EXPORT | APPARENT CONSUMPTION | APPARENT PER CAPITA CONSUMPTION | SELF SUFFICIENCY INDEX |
| | 1000 MT | | | KG | | 1000 MT | | | KG | |
| BRAZIL | 1686 | -97.10 | 1589.2 | 17.37 | 106.11 | 2167.3 | -82.87 | 2084.4 | 18.50 | 103.98 |
| MEXICO | 444.6 | -28.53 | 416.03 | 8.53 | 106.86 | 543.72 | -14.91 | 528.81 | 8.38 | 102.82 |
| | 2131 | -125.6 | 2005.3 | 14.29 | 106.26 | 2711 | -97.78 | 2613.3 | 14.87 | 103.74 |
| BOLIVIA | 48.18 | 0.00 | 48.18 | 11.53 | 100.00 | 72.62 | 0.58 | 73.20 | 14.32 | 99.21 |
| COLOMBIA | 394.7 | -6.35 | 388.31 | 19.46 | 101.64 | 521.62 | -19.10 | 502.52 | 20.94 | 103.80 |
| CUBA | 191.8 | 53.10 | 244.89 | 29.35 | 78.32 | 151.22 | 78.25 | 229.47 | 24.43 | 65.90 |
| DOMINICAN RP | 29.52 | -2.69 | 26.82 | 6.21 | 110.04 | 42.63 | -3.24 | 39.39 | 7.23 | 108.22 |
| ECUADOR | 51.98 | 0.00 | 51.98 | 9.11 | 100.00 | 74.43 | 0.52 | 74.96 | 10.33 | 99.30 |
| PARAGUAY | 122.9 | -42.87 | 80.02 | 36.20 | 153.58 | 115.02 | -24.67 | 90.35 | 31.79 | 127.31 |
| PERU | 91.16 | 9.76 | 100.92 | 7.81 | 90.33 | 88.82 | 7.71 | 96.53 | 5.95 | 92.01 |
| VENEZUELA | 194.7 | 0.22 | 194.95 | 18.73 | 99.89 | 281.20 | 12.45 | 293.65 | 21.11 | 95.75 |
| TROPICAL SOUTH AMERICA | 1125 | 11.16 | 1136.1 | 16.70 | 99.02 | 1347.6 | 52.51 | 1400.1 | 16.65 | 96.25 |
| COSTA RICA | 38.30 | -13.86 | 24.44 | 14.75 | 156.71 | 68.36 | -29.02 | 39.35 | 19.27 | 173.75 |
| EL SALVADOR | 19.40 | 0.85 | 20.25 | 5.95 | 95.78 | 28.19 | -0.73 | 27.46 | 6.31 | 102.67 |
| GUATEMALA | 52.29 | -12.00 | 40.28 | 7.86 | 129.80 | 68.81 | -18.63 | 50.19 | 7.64 | 137.12 |
| HONDURAS | 27.66 | -8.64 | 19.02 | 7.49 | 145.41 | 47.96 | -18.26 | 29.70 | 9.02 | 161.50 |
| NICARAGUA | 50.66 | -18.59 | 32.08 | 16.98 | 157.94 | 64.06 | -22.74 | 41.32 | 16.84 | 155.04 |
| PANAMA | 32.76 | 2.48 | 35.24 | 24.44 | 92.95 | 43.64 | 5.22 | 48.85 | 27.42 | 89.32 |
| CENTRAL AMERICA PANAMA | 221.1 | -49.75 | 171.32 | 11.90 | 129.04 | 321.03 | -84.17 | 236.87 | 12.84 | 125.53 |
| BARBADOS | 0.47 | 5.05 | 5.52 | 23.21 | 8.46 | 0.33 | 6.04 | 6.37 | 25.42 | 5.18 |
| GUYANA | 4.13 | 1.78 | 5.91 | 8.66 | 69.90 | 3.94 | 0.29 | 4.23 | 5.16 | 93.17 |
| HAITI | 17.86 | 0.40 | 18.26 | 4.09 | 97.82 | 22.77 | -0.05 | 22.71 | 4.23 | 100.23 |
| JAMAICA | 11.06 | 9.42 | 20.48 | 11.15 | 54.02 | 11.80 | 10.11 | 21.91 | 10.52 | 53.84 |
| TRINIDAD ETC | 1.54 | 6.66 | 8.21 | 8.09 | 18.80 | 1.53 | 10.18 | 11.70 | 10.52 | 13.06 |
| CARIBBEAN | 35.06 | 23.30 | 58.37 | 7.09 | 60.07 | 40.36 | 26.56 | 66.92 | 6.95 | 60.31 |
| TROPICAL LATIN AMERICA | 3512 | -140.9 | 3371 | 14.49 | 104.18 | 4420 | -102.9 | 4317.1 | 14.88 | 102.38 |
| ARGENTINA | 2485 | -605.9 | 1879.4 | 80.77 | 132.24 | 2608.3 | -481.8 | 2126.4 | 82.17 | 122.66 |
| CHILE | 152.6 | 14.44 | 177.06 | 19.42 | 91.84 | 166.29 | 16.42 | 182.71 | 17.43 | 91.02 |
| URUGUAY | 309.4 | -94.78 | 214.66 | 77.00 | 144.15 | 340.36 | -104 | 236.31 | 82.11 | 144.03 |
| TEMPERATE SOUTH AMERIC | 2957 | -686.2 | 2271.2 | 64.57 | 130.22 | 3114.9 | -569.5 | 2545.5 | 64.87 | 122.37 |
| LATIN AMERICA | 6469 | -827.2 | 5642.2 | 21.07 | 114.66 | 7534.9 | -672.4 | 6862.6 | 20.85 | 109.80 |

BEEF: annual growth rates of domestic demand and production in Latin America by country, 1970/81 and 1981/82

| Region and Country | Annual growth rate | | | |
|----------------------------|---------------------|------------|-------------------|------------|
| | 1970 / 81 | | 1981 / 82 | |
| | Demand ^a | Production | Demand | Production |
| Tropical Latin America | 5.3 ^b | 2.2 | 0.9 ^b | 5.8 |
| Brazil | 6.1 | 1.5 | 1.6 | 9.0 |
| Mexico | 4.4 | 3.3 | 1.0 | 0.3 |
| Bolivia | 4.9 | 4.9 | -9.4 | 1.1 |
| Colombia | 4.9 | 3.5 | 1.5 | 8.9 |
| Ecuador | 8.9 | 5.3 | 1.3 | 5.9 |
| Paraguay | 4.4 | -1.1 | 2.0 | 0.9 |
| Peru | 3.0 | -1.3 | 0.9 | 2.2 |
| Venezuela | 4.2 | 5.4 | 1.9 | 2.4 |
| Cuba | 4.5 | -2.6 | 1.9 | 0.7 |
| Dominican Republic | 6.0 | 3.4 | 3.8 | 4.3 |
| Central America and Panama | 4.0 ^b | 3.3 | -2.1 ^b | 1.1 |
| Costa Rica | 4.8 | 6.3 | -0.6 | -3.7 |
| El Salvador | 3.9 | 3.4 | -4.7 | 6.7 |
| Guatemala | 5.2 | 3.9 | -2.4 | -21.8 |
| Honduras | 3.6 | 5.2 | -4.0 | 29.4 |
| Nicaragua | 1.6 | -1.1 | 0.1 | 2.1 |
| Panama | 3.5 | 1.3 | 4.6 | 12.2 |
| Caribbean | 3.2 ^b | 2.0 | -2.3 ^b | 6.5 |
| Guyana | 1.5 | -1.1 | -8.1 | 0.0 |
| Haiti | 4.5 | 2.7 | -2.2 | 11.1 |
| Jamaica | -0.6 | 2.0 | -0.2 | 0.0 |
| Trinidad & Tobago | 5.1 | 2.3 | n.d | 0.0 |
| Temperate Latin America | 1.7 ^b | 3.2 | -2.2 ^b | -11.4 |
| Argentina | 1.7 | 3.6 | 0.5 | -12.8 |
| Chile | 2.1 | 2.0 | -9.6 | -3.8 |
| Uruguay | 0.6 | 0.7 | 0.7 | -5.7 |
| Latin America | 5.0 ^b | 2.6 | 0.6 ^b | -1.6 |

a/ Estimating using $\dot{d} = \dot{P} + \epsilon_y \dot{Y} + \dot{Y}^2$

where: \dot{d} = annual growth rate of domestic demand

\dot{P} = annual growth rate of population

\dot{Y} = annual growth rate of income

ϵ_y = income elasticity of demand

b/ Average weighted by population

Source: Income and Population from World Bank (1982) and International Monetary Fund, International Financial Statistics, Feb. 1984

Income elasticities from FAO (1971) and Production from FAO tape Production 1966/81 and Production Yearbook 1982.

COW MILK WHOLE FRESH: stocks and production for
selected regions, 1982

| Region and country | Production | | Stock of milking cow | |
|----------------------------|---------------------|------------|------------------------|------------|
| | Total ('000 tm) | Percentage | Total ('000 heads) | Percentage |
| World | 437909 | 100.0 | 226354 | 100.0 |
| United States | 61553 | 14.1 | 10919 | 4.8 |
| Europe | 181573 | 41.5 | 50671 | 22.4 |
| Latin America | 34585 | 7.9 | 35481 | 15.7 |
| Tropical Latin America | 27427 | 6.3 | 31451 | 13.9 |
| . Brazil | 10700 | 2.4 | 14500 | 6.4 |
| . Colombia | 2957 | 0.7 | 2240 | 1.0 |
| . Venezuela | 1391 | 0.3 | 1126 | 0.5 |
| Temperate Latin America | 7158 | 1.6 | 4030 | 1.8 |
| . Argentina | 5200 | 1.2 | 2740 | 1.2 |
| Asia | 40321 | 9.2 | 57711 | 25.4 |
| Africa | 10269 | 2.3 | 21711 | 9.5 |
| Oceania | 11908 | 2.7 | 3934 | 1.7 |

COW MILK, WHOLE, PRODUCTION, RELATIVE IMPORTANCE IN THE REGION
AND PER CAPITA PRODUCTION LEVELS

| COUNTRY | P R O D U C T I O N | | | PERCENTAGE PER CAPITA | |
|-------------------------|---------------------|---------|---------|-----------------------|------------|
| | -----1000 MT----- | | | OF TOTAL | PRODUCTION |
| | 1966/70 | 1976/80 | 1980/82 | % | KG |
| BRAZIL | 7127 | 10276 | 10488 | 31.310 | 84 |
| MEXICO | 3601 | 6220 | 6855 | 20.464 | 95 |
| | 10728 | 16496 | 17343 | 51.774 | 88 |
| BOLIVIA | 33 | 58 | 72 | 0.215 | 13 |
| COLOMBIA | 2116 | 2351 | 2666 | 7.960 | 101 |
| CUBA | 594 | 1117 | 1189 | 3.550 | 121 |
| DOMINICAN RP | 245 | 375 | 440 | 1.314 | 72 |
| ECUADOR | 659 | 807 | 819 | 2.445 | 99 |
| PARAGUAY | 87 | 148 | 170 | 0.507 | 52 |
| PERU | 754 | 813 | 788 | 2.353 | 43 |
| VENEZUELA | 803 | 1270 | 1360 | 4.061 | 84 |
| TROPICAL SOUTH AMERICA | 5289 | 6940 | 7506 | 22.406 | 80 |
| COSTA RICA | 173 | 305 | 315 | 0.941 | 139 |
| EL SALVADOR | 161 | 269 | 296 | 0.863 | 60 |
| GUATEMALA | 238 | 316 | 324 | 0.968 | 43 |
| HONDURAS | 158 | 198 | 209 | 0.625 | 55 |
| NICARAGUA | 326 | 388 | 138 | 0.411 | 49 |
| PANAMA | 74 | 91 | 98 | 0.293 | 50 |
| CENTRAL AMERICA PANAMA | 1129 | 1566 | 1380 | 4.121 | 61 |
| BARBADOS | 5 | 7 | 7 | 0.022 | 28 |
| GUYANA | 20 | 13 | 14 | 0.043 | 16 |
| HAITI | 18 | 22 | 20 | 0.059 | 3 |
| JAMAICA | 38 | 48 | 51 | 0.151 | 23 |
| TRINIDAD TOB | 8 | 6 | 6 | 0.018 | 5 |
| CARIBBEAN | 88 | 96 | 98 | 0.293 | 9 |
| TROPICAL LATIN AMERICA | 17234 | 25099 | 26327 | 78.593 | 81 |
| ARGENTINA | 4505 | 5395 | 5221 | 15.585 | 191 |
| CHILE | 957 | 1032 | 1128 | 3.366 | 100 |
| URUGUAY | 713 | 770 | 823 | 2.456 | 279 |
| TEMPERATE SOUTH AMERICA | 6176 | 7197 | 7171 | 21.407 | 172 |
| LATIN AMERICA | 23410 | 32296 | 33498 | 100.000 | 91 |

COLUMNS MAY NOT ADD EXACTLY DUE TO ROUNDING

COW MILK, WHOLE, FRESH PRODUCTION PER CAPITA 1966/1982

| COUNTRY | ANNUAL GROWTH | AVERAGE | AVERAGE | 1982 |
|-------------------------|-------------------|---------|--------------------|--------|
| | RATE 1966/82 % | 1966/71 | 1976/81 KG/YEAR | |
| BRAZIL | 0.78** | 78.35 | 87.46 | 83.48 |
| MEXICO | 2.07*** | 75.32 | 94.56 | 93.74 |
| | 1.25*** | 77.31 | 90.04 | 87.24 |
| BOLIVIA | 3.06*** | 8.19 | 11.25 | 12.42 |
| COLOMBIA | -0.77** | 107.87 | 95.84 | 109.80 |
| CUBA | 4.50*** | 72.55 | 117.03 | 121.87 |
| DOMINICAN RP | 1.51*** | 58.72 | 67.24 | 72.03 |
| EQUADOR | -1.12*** | 117.09 | 107.80 | 91.72 |
| PARAGUAY | 2.20*** | 39.51 | 50.01 | 52.52 |
| PERU | -2.26*** | 60.12 | 47.88 | 42.93 |
| VENEZUELA | 0.74** | 79.88 | 86.54 | 83.27 |
| TROPICAL SOUTH AMERICA | 0.11 | 79.51 | 79.82 | 81.45 |
| COSTA RICA | 2.51*** | 107.01 | 142.81 | 137.99 |
| SALVADOR | 1.79*** | 47.91 | 59.46 | 59.62 |
| GUATEMALA | -0.46* | 47.30 | 45.75 | 42.57 |
| HONDURAS | -0.98*** | 62.87 | 57.12 | 54.08 |
| NICARAGUA | -6.61*** | 174.79 | 135.06 | 42.49 |
| PANAMA | -0.29 | 51.04 | 49.09 | 48.63 |
| CENTRAL AMERICA PANAMA | -0.69 | 71.42 | 71.08 | 57.80 |
| BARBADOS | 1.62*** | 23.34 | 28.46 | 26.02 |
| GUYANA | -5.14*** | 27.98 | 15.17 | 16.26 |
| HAITI | -0.90* | 3.97 | 3.83 | 3.27 |
| JAMAICA | 0.83 | 21.44 | 22.65 | 22.63 |
| TRINIDAD ETC | -2.93*** | 7.67 | 5.42 | 4.99 |
| CARIBBEAN | -1.03** | 10.86 | 9.65 | 9.21 |
| TROPICAL LATIN AMERICA | 0.81*** | 75.19 | 83.09 | 80.93 |
| ARGENTINA | -0.12 | 196.10 | 201.95 | 187.71 |
| CHILE | -0.44 | 105.06 | 97.29 | 99.24 |
| URUGUAY | 0.63** | 255.40 | 269.27 | 275.79 |
| TEMPERATE SOUTH AMERICA | -0.17 | 177.22 | 178.65 | 169.80 |
| LATIN AMERICA | 0.41*** | 88.61 | 94.26 | 90.91 |

LEVEL OF SIGNIFICANCE IS REPRESENTED AS FOLLOWS

*** P<0.005 ** P<0.01 *P<0.05

CDW MILK, WHOLE, PRODUCTION PER MILKING COW 1966/82

| COUNTRY | ANNUAL GROWTH | AVERAGE | AVERAGE | 1982 |
|-------------------------|-------------------------------|---------|--------------------|--------|
| | RATE IN YIELD 1966/82 % | 1966/71 | 1976/81 kg/year | |
| BRAZIL | -0.411030 | 772.0 | 739.4 | 737.9 |
| MEXICO | 2.744900*** | 554.9 | 743.3 | 770.0 |
| | 0.780299*** | 681.7 | 740.6 | 750.2 |
| BOLIVIA | 0.648178*** | 1266.7 | 1355.5 | 1403.8 |
| COLOMBIA | 2.866700*** | 901.1 | 1027.8 | 2384.7 |
| CUBA | 3.332300*** | 989.3 | 1368.9 | 1411.8 |
| DOMINICAN RP | 2.020800*** | 1337.4 | 1617.8 | 1821.9 |
| ECUADOR | -0.376895 | 1365.2 | 1358.5 | 1223.4 |
| PARAGUAY | 0.021284 | 1903.2 | 1908.3 | 1903.2 |
| PERU | -1.233100*** | 1289.0 | 1128.9 | 1134.8 |
| VENEZUELA | 1.915100*** | 978.6 | 1214.3 | 1235.3 |
| TROPICAL SOUTH AMERICA | 1.824000*** | 1036.4 | 1190.8 | 1581.1 |
| COSTA RICA | 0.921280*** | 946.7 | 1047.0 | 1066.7 |
| SALVADOR | 2.231700*** | 762.5 | 989.4 | 974.3 |
| GUATEMALA | -0.036738 | 906.1 | 899.1 | 911.1 |
| HONDURAS | 1.017600*** | 533.8 | 585.0 | 623.9 |
| NICARAGUA | -1.880500** | 1006.5 | 906.9 | 688.9 |
| PANAMA | 0.359247** | 963.8 | 986.4 | 1000.0 |
| CENTRAL AMERICA PANAMA | 0.475442** | 834.9 | 888.8 | 871.2 |
| BARBADOS | 1.432900*** | 1046.9 | 1239.1 | 1166.7 |
| GUYANA | -0.199277 | 773.3 | 749.6 | 789.5 |
| HAITI | 1.719100*** | 186.8 | 225.3 | 229.9 |
| JAMAICA | -0.000111 | 1000.0 | 1000.0 | 1000.0 |
| TRINIDAD ETC | 0.395316 | 1457.2 | 1647.1 | 1500.0 |
| CARIBBEAN | 0.870264*** | 525.8 | 566.0 | 592.8 |
| TROPICAL LATIN AMERICA | 0.863015*** | 771.4 | 835.9 | 891.9 |
| ARGENTINA | -0.190603 | 1898.2 | 1869.5 | 1897.8 |
| CHILE | 0.453423 | 1395.9 | 1440.6 | 1500.0 |
| URUGUAY | 0.236071 | 1565.6 | 1646.0 | 1543.4 |
| TEMPERATE SOUTH AMERICA | -0.021834 | 1757.5 | 1765.3 | 1776.2 |
| LATIN AMERICA | 0.485558*** | 905.0 | 946.0 | 996.0 |

LEVEL OF SIGNIFICANCE IS REPRESENTED AS FOLLOWS

*** P<0.005 ** P<0.01 *P<0.05

COW MILK, WHOLE, FRESH (ANNUAL GROWTH RATES)

| COUNTRY | PRODUCTION | | | POPULATION | | | PRODUCTION PER CAP. | | |
|-------------------------|------------|---------|---------|------------|---------|---------|---------------------|---------|---------|
| | 1966/71 | 1976/81 | 1966/82 | 1966/71 | 1976/81 | 1966/82 | 1966/71 | 1976/81 | 1966/82 |
| BRAZIL | 1.5*** | 0.2 | 3.3*** | 2.7*** | 2.4*** | 2.5* | -1.3** | -2.2* | 0.8** |
| MEXICO | 4.2*** | 5.2*** | 5.2*** | 3.3*** | 2.9*** | 3.1* | 1.0*** | 2.3 | 2.1*** |
| | 2.4*** | 2.1** | 4.0*** | 2.9*** | 2.6*** | 2.7* | -0.5** | -0.5 | 1.3*** |
| BOLIVIA | 4.3 | 6.2** | 5.6*** | 2.4*** | 2.6*** | 2.5* | 2.0 | 3.6 | 3.1*** |
| COLOMBIA | 2.9*** | 2.5*** | 1.5*** | 2.7*** | 2.1** | 2.3* | 0.2 | 0.3 | -0.8** |
| CUBA | 7.3*** | 3.4** | 5.9*** | 1.8*** | 0.7** | 1.4* | 5.5** | 2.6** | 4.5*** |
| DOMINICAN RP | 7.3*** | 5.5* | 4.3*** | 3.2*** | 2.5** | 2.8* | 4.1*** | 2.9 | 1.5*** |
| ECUADOR | 3.7*** | 0.4 | 1.8*** | 3.0*** | 3.1*** | 3.0* | 0.8 | -2.6 | -1.1*** |
| PARAGUAY | 0.7** | 5.8*** | 5.3*** | 2.6*** | 3.3*** | 3.1* | -1.9*** | 2.5** | 2.2*** |
| PERU | 4.3** | -1.1* | 0.5* | 2.8*** | 2.7** | 2.7* | 1.5 | -3.8*** | -2.3** |
| VENEZUELA | 8.3*** | 2.4*** | 4.3*** | 3.6*** | 3.5*** | 3.5* | 4.7*** | -1.0*** | 0.7** |
| TROPICAL SOUTH AMERICA | 4.7*** | 2.2*** | 2.7*** | 2.8*** | 2.5*** | 2.6* | 1.9*** | -0.3 | 0.1 |
| COSTA RICA | 6.2*** | 1.9* | 5.1*** | 3.0*** | 2.4*** | 2.5* | 3.2*** | -0.4 | 2.5*** |
| SALVADOR | 2.1*** | 1.6 | 4.8*** | 3.4*** | 2.9*** | 3.0* | -1.4** | -1.3 | 1.8*** |
| GUATEMALA | 5.0*** | 0.4 | 2.6*** | 3.0*** | 3.0** | 3.0* | 2.1** | -2.6*** | -0.5* |
| HONDURAS | 3.4* | 1.9*** | 2.3*** | 2.7*** | 3.5*** | 3.2* | 0.6 | -1.6*** | -1.0*** |
| NICARAGUA | 6.3** | -28.1** | -3.4 | 3.0*** | 3.3** | 3.2* | 3.3* | -31.4** | -6.6*** |
| PANAMA | 1.4 | 4.7** | 2.3*** | 2.8*** | 2.2** | 2.5* | -1.4 | 2.6 | -0.3 |
| CENTRAL AMERICA PANAMA | 4.7*** | -3.8** | 2.3*** | 3.0*** | 3.0*** | 3.0* | 1.7* | -6.8*** | -0.7 |
| BARBADOS | 1.8*** | 3.4 | 2.4*** | 0.4*** | 1.6** | 0.8* | 1.4*** | 1.8 | 1.6*** |
| GUYANA | 0.4 | 2.5 | -2.9*** | 2.6*** | 2.2** | 2.3* | -2.1 | 0.4 | -5.1*** |
| HAITI | 3.5*** | -4.3** | 1.4*** | 2.2*** | 2.4** | 2.3* | 1.3** | -6.7*** | -0.9* |
| JAMAICA | 9.7*** | 1.5*** | 2.4*** | 1.3** | 1.3** | 1.5* | 8.4*** | 0.2 | 0.8 |
| TRINIDAD ETC | 8.0 | -1.1 | -1.7* | 0.9*** | 1.6** | 1.2* | 7.1 | -2.6** | -2.9*** |
| CARIBBEAN | 5.9** | 0.3 | 0.9** | 1.8*** | 2.0*** | 2.0* | 4.1** | -1.7*** | -1.0** |
| TROPICAL LATIN AMERICA | 3.3*** | 1.8** | 3.5*** | 2.8*** | 2.6** | 2.7* | 0.4** | -0.8 | 0.8*** |
| ARGENTINA | -0.1 | -1.6 | 1.2*** | 1.4*** | 1.2** | 1.3* | -1.5 | -2.9** | -0.1 |
| CHILE | 4.0* | 1.7 | 1.3*** | 1.9*** | 1.7** | 1.7* | 2.2 | 0.0 | -0.4 |
| URUGUAY | 1.4 | 2.3** | 1.1*** | 0.8*** | 0.6** | 0.4* | 0.6 | 1.6* | 0.6** |
| TEMPERATE SOUTH AMERICA | 0.7 | -0.7 | 1.2*** | 1.4*** | 1.3*** | 1.4* | -0.7 | -2.0* | -0.2 |
| LATIN AMERICA | 2.6*** | 1.2** | 2.9*** | 2.7*** | 2.4*** | 2.5* | -0.1 | -1.2** | 0.4*** |

LEVEL OF SIGNIFICANCE IS REPRESENTED AS FOLLOWS

*** P<0.005 ** P<0.01 * P<0.05

MILK FRESH

SUMMARY OF LATIN AMERICA TRADE (THOUSAND TONS)

| REGION | EXPORT | | | IMPORT | | | +IMPORT-EXPORT | | |
|-------------------------|---------|---------|------|---------|---------|------|----------------|---------|------|
| | 1966/71 | 1976/81 | 1982 | 1966/71 | 1976/81 | 1982 | 1966/71 | 1976/81 | 1982 |
| BRAZIL | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 1 | 0 |
| MEXICO | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 1 | 0 |
| | 0 | 0 | 0 | 2 | 2 | 0 | 2 | 2 | 0 |
| BOLIVIA | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 1 | 0 |
| COLOMBIA | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| CUBA | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| DOMINICAN RP | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 1 | 0 |
| ECUADOR | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PARAGUAY | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PERU | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 |
| VENEZUELA | 1 | 0 | 0 | 1 | 3 | 2 | 0 | 3 | 2 |
| TROPICAL SOUTH AMERICA | 1 | 0 | 0 | 4 | 6 | 3 | 3 | 6 | 3 |
| COSTA RICA | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | -1 |
| EL SALVADOR | 1 | 1 | 0 | 2 | 1 | 1 | 1 | 0 | 1 |
| GUATEMALA | 2 | 1 | 1 | 1 | 1 | 0 | -1 | 0 | -1 |
| HONDURAS | 1 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 0 |
| NICARAGUA | 1 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 0 |
| PANAMA | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 1 | 0 |
| CENTRAL AMERICA PANAMA | 6 | 5 | 2 | 7 | 6 | 1 | 1 | 1 | -1 |
| BARBADOS | 1 | 1 | 0 | 1 | 1 | 1 | 0 | 0 | 1 |
| GUYANA | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 |
| HAITI | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 |
| JAMAICA | 0 | 1 | 1 | 1 | 1 | 0 | 1 | 0 | -1 |
| TRINIDAD ETC | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 |
| CARIBBEAN | 2 | 3 | 2 | 5 | 4 | 3 | 3 | 1 | 1 |
| TROPICAL LATIN AMERICA | 9 | 8 | 4 | 18 | 18 | 7 | 9 | 10 | 3 |
| ARGENTINA | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 0 |
| CHILE | 0 | 1 | 0 | 2 | 1 | 0 | 2 | 0 | 0 |
| URUGUAY | 0 | 1 | 1 | 0 | 0 | 0 | 0 | -1 | -1 |
| TEMPERATE SOUTH AMERICA | 1 | 2 | 1 | 3 | 2 | 0 | 2 | 0 | -1 |
| LATIN AMERICA | 10 | 13 | 5 | 20 | 18 | 7 | 10 | 5 | 2 |

COW MILK, WHOLE, FRESH

PRODUCTION, TRADE AND APPARENT CONSUMPTION

| COUNTRY | 1966/71 | | | | | 1971/82 | | | | |
|-------------------------|------------|--------------------|-------------------------|---------------------------------------|------------------------------|------------|--------------------|-------------------------|---------------------------------------|------------------------------|
| | PRODUCTION | +IMPORT -EXPORT | APPARENT CONSUMPTION | APPARENT PER CAPITA CONSUMPTION | SELF SUFFICIENCY INDEX | PRODUCTION | +IMPORT -EXPORT | APPARENT CONSUMPTION | APPARENT PER CAPITA CONSUMPTION | SELF SUFFICIENCY INDEX |
| | 1000 MT | | KG | | | 1000 MT | | KG | | |
| BRAZIL | 7163 | 0.04 | 7163.5 | 78.28 | 100.00 | 9500.6 | 0.01 | 9500.6 | 84.33 | 100.00 |
| MEXICO | 3679 | 0.00 | 3678.6 | 75.40 | 100.00 | 5575.1 | 0.67 | 5575.7 | 88.35 | 99.99 |
| | 10842 | 0.04 | 10842 | 77.28 | 100.00 | 15076 | 0.68 | 15076 | 85.79 | 100.00 |
| BOLIVIA | 34.31 | 0.02 | 34.33 | 8.22 | 99.95 | 56.09 | 0.03 | 56.11 | 10.98 | 99.95 |
| COLOMBIA | 2153 | 0.00 | 2153.3 | 107.90 | 100.00 | 2378.9 | 0.00 | 2378.9 | 99.15 | 100.00 |
| CUBA | 607.1 | 0.00 | 607.10 | 72.76 | 100.00 | 986.42 | 0.00 | 986.42 | 105.00 | 100.00 |
| DOMINICAN RP | 254.6 | 0.03 | 254.63 | 58.95 | 99.99 | 364.70 | 0.08 | 364.78 | 66.96 | 99.98 |
| ECUADOR | 668.6 | 0.00 | 668.63 | 117.17 | 100.00 | 791.22 | 0.00 | 791.22 | 109.00 | 100.00 |
| PARAGUAY | 87.23 | 0.00 | 87.23 | 39.46 | 100.00 | 132.71 | 0.00 | 132.71 | 46.69 | 100.00 |
| PERU | 777.6 | 0.07 | 777.65 | 60.21 | 99.99 | 816.29 | 0.11 | 816.40 | 50.65 | 99.99 |
| VENEZUELA | 835.5 | 0.03 | 835.57 | 80.27 | 100.00 | 1215.6 | 1.65 | 1217.3 | 87.52 | 99.66 |
| TROPICAL SOUTH AMERICA | 5418 | 0.14 | 5418.5 | 79.64 | 100.00 | 6741.9 | 1.87 | 6743.8 | 80.22 | 99.97 |
| COSTA RICA | 177.8 | -0.98 | 176.87 | 106.72 | 100.55 | 274.12 | -0.33 | 273.79 | 134.08 | 100.12 |
| EL SALVADOR | 162.9 | 1.22 | 164.15 | 48.20 | 99.26 | 242.15 | 0.42 | 242.57 | 55.70 | 99.83 |
| GUATEMALA | 242.9 | -1.47 | 241.47 | 47.10 | 100.61 | 306.81 | -0.22 | 306.59 | 46.70 | 100.07 |
| HONDURAS | 159.6 | 0.01 | 159.66 | 62.91 | 100.00 | 191.31 | -0.15 | 191.16 | 58.07 | 100.08 |
| NICARAGUA | 331.2 | 0.91 | 332.09 | 175.77 | 99.73 | 347.02 | 0.36 | 347.38 | 141.55 | 99.90 |
| PANAMA | 74.05 | 0.00 | 74.05 | 51.35 | 100.00 | 83.31 | 0.27 | 83.58 | 46.91 | 99.68 |
| CENTRAL AMERICA PANAMA | 1149 | -0.31 | 1148.3 | 79.73 | 100.03 | 1444.7 | 0.34 | 1445.1 | 78.33 | 99.98 |
| BARBADOS | 5.55 | 0.00 | 5.55 | 23.36 | 99.95 | 6.70 | 0.02 | 6.72 | 26.83 | 99.65 |
| GUYANA | 19.06 | 0.00 | 19.06 | 27.95 | 99.98 | 13.82 | 0.01 | 13.83 | 16.86 | 99.95 |
| HAITI | 17.75 | 0.00 | 17.75 | 3.98 | 99.99 | 20.86 | 0.10 | 20.96 | 3.90 | 99.51 |
| JAMAICA | 39.50 | 0.25 | 39.75 | 21.65 | 99.37 | 48.30 | 0.04 | 48.33 | 23.21 | 99.92 |
| TRINIDAD ETC | 7.80 | -0.09 | 7.71 | 7.60 | 101.15 | 7.11 | 0.25 | 7.36 | 6.62 | 96.56 |
| CARIBBEAN | 89.65 | 0.17 | 89.82 | 10.91 | 99.81 | 96.78 | 0.42 | 97.21 | 10.09 | 99.57 |
| TROPICAL LATIN AMERICA | 17499 | 0.04 | 17499 | 75.24 | 100.00 | 23359 | 3.32 | 23362 | 80.60 | 99.99 |
| ARGENTINA | 4560 | 0.46 | 4560.9 | 196.01 | 99.99 | 5309.6 | 0.48 | 5310.1 | 205.18 | 99.99 |
| CHILE | 959 | 1.66 | 960.63 | 105.38 | 99.83 | 1011.6 | 0.71 | 1012.3 | 96.57 | 99.93 |
| URUGUAY | 712.1 | 0.00 | 712.11 | 255.44 | 100.00 | 755.37 | -0.26 | 755.11 | 262.39 | 100.03 |
| TEMPERATE SOUTH AMERICA | 6232 | 2.12 | 6233.7 | 177.23 | 99.97 | 7076.5 | 0.93 | 7077.4 | 180.36 | 99.95 |
| LATIN AMERICA | 23730 | 2.16 | 23732 | 88.62 | 99.99 | 30436 | 4.25 | 30440 | 92.47 | 99.99 |

DRY MILK

SUMMARY OF LATIN AMERICA TRADE (THOUSAND TONS)

| REGION | EXPORT | | | IMPORT | | | *IMPORT-EXPORT | | |
|-------------------------|---------|---------|------|---------|---------|------|----------------|---------|------|
| | 1966/71 | 1976/81 | 1982 | 1966/71 | 1976/81 | 1982 | 1966/71 | 1976/81 | 1982 |
| | BRAZIL | 1 | 1 | 1 | 20 | 27 | 8 | 19 | 26 |
| MEXICO | 1 | 1 | 0 | 30 | 91 | 71 | 29 | 90 | 71 |
| | 2 | 2 | 1 | 50 | 118 | 79 | 48 | 116 | 78 |
| BOLIVIA | 0 | 0 | 0 | 3 | 7 | 3 | 3 | 7 | 3 |
| COLOMBIA | 1 | 0 | 0 | 10 | 15 | 9 | 9 | 15 | 9 |
| CUBA | 0 | 0 | 0 | 41 | 42 | 38 | 41 | 42 | 38 |
| DOMINICAN RP | 0 | 0 | 0 | 7 | 6 | 4 | 7 | 6 | 4 |
| ECUADOR | 0 | 0 | 0 | 2 | 6 | 2 | 2 | 6 | 2 |
| PARAGUAY | 0 | 0 | 0 | 1 | 1 | 2 | 1 | 1 | 2 |
| PERU | 0 | 0 | 0 | 16 | 24 | 30 | 16 | 24 | 30 |
| VENEZUELA | 0 | 0 | 0 | 21 | 92 | 90 | 21 | 92 | 90 |
| TROPICAL SOUTH AMERICA | 1 | 0 | 0 | 101 | 193 | 178 | 100 | 193 | 178 |
| COSTA RICA | 1 | 1 | 0 | 1 | 3 | 3 | 0 | 2 | 3 |
| EL SALVADOR | 1 | 1 | 0 | 6 | 11 | 9 | 5 | 10 | 9 |
| GUATEMALA | 1 | 1 | 0 | 3 | 6 | 8 | 2 | 5 | 8 |
| HONDURAS | 0 | 1 | 0 | 3 | 5 | 5 | 3 | 4 | 5 |
| NICARAGUA | 1 | 4 | 2 | 2 | 3 | 11 | 1 | -1 | 9 |
| PANAMA | 0 | 0 | 0 | 2 | 4 | 4 | 2 | 4 | 4 |
| CENTRAL AMERICA PANAMA | 4 | 8 | 2 | 17 | 32 | 40 | 13 | 24 | 38 |
| BARBADOS | 1 | 0 | 0 | 1 | 2 | 0 | 0 | 2 | 0 |
| GUYANA | 0 | 0 | 0 | 2 | 3 | 3 | 2 | 3 | 3 |
| HAITI | 0 | 0 | 0 | 1 | 3 | 5 | 1 | 3 | 5 |
| JAMAICA | 1 | 1 | 0 | 9 | 12 | 11 | 8 | 11 | 11 |
| TRINIDAD ETC | 1 | 1 | 1 | 8 | 11 | 12 | 7 | 10 | 11 |
| CARIBBEAN | 3 | 2 | 1 | 21 | 31 | 31 | 18 | 29 | 30 |
| TROPICAL LATIN AMERICA | 10 | 12 | 4 | 189 | 374 | 328 | 179 | 362 | 324 |
| ARGENTINA | 1 | 11 | 18 | 3 | 11 | 1 | 2 | 0 | -17 |
| CHILE | 1 | 1 | 0 | 10 | 12 | 12 | 9 | 11 | 12 |
| | 0 | 3 | 2 | 1 | 1 | 1 | 1 | -2 | -1 |
| TEMPERATE SOUTH AMERICA | 2 | 15 | 20 | 14 | 24 | 14 | 12 | 9 | -6 |
| LATIN AMERICA | 12 | 41 | 24 | 213 | 374 | 342 | 201 | 333 | 318 |

SWINE: stocks and production for selected regions, 1982

| Region and country | Production | | Stock | |
|----------------------------|--------------------|------------|--------------------|------------|
| | Total ('000 tm) | Percentage | Total ('000 tm) | Percentage |
| World | 55878 | 100.0 | 763813 | 100.0 |
| United States | 6461 | 11.6 | 58688 | 7.7 |
| Europe | 19350 | 34.6 | 177442 | 23.2 |
| Latin America | 2502 | 4.5 | 74279 | 9.7 |
| Tropical Latin America | 2171 | 3.9 | 68759 | 9.0 |
| . Brazil | 970 | 1.7 | 33500 | 4.4 |
| . Colombia | 120 | 0.2 | 2179 | 0.3 |
| . Venezuela | 89 | 0.1 | 2600 | 0.3 |
| Temperate Latin America | 331 | 0.6 | 5520 | 0.7 |
| . Argentina | 257 | 0.5 | 3900 | 0.5 |
| Asia | 20941 | 37.5 | 357617 | 46.8 |
| Africa | 388 | 0.7 | 10298 | 1.3 |
| Oceania | 296 | 0.5 | 4656 | 0.6 |

PIGMEAT

PRODUCTION, RELATIVE IMPORTANCE IN THE REGION
AND PER CAPITA PRODUCTION LEVELS

| COUNTRY | P R O D U C T I O N | | | PERCENTAGE OF TOTAL % | PER CAPITA PRODUCTION KG |
|-------------------------|---------------------|---------|---------|-----------------------------|--------------------------------|
| | 1966/70 | 1976/80 | 1980/82 | | |
| BRAZIL | 707 | 870 | 977 | 40.512 | 8 |
| MEXICO | 226 | 427 | 495 | 20.518 | 7 |
| | 933 | 1297 | 1471 | 61.030 | 8 |
| BOLIVIA | 14 | 29 | 32 | 1.327 | 6 |
| COLOMBIA | 69 | 99 | 100 | 4.148 | 4 |
| CUBA | 33 | 56 | 65 | 2.710 | 7 |
| DOMINICAN RP | 10 | 20 | 7 | 0.270 | 1 |
| ECUADOR | 29 | 52 | 69 | 2.876 | 8 |
| PARAGUAY | 39 | 69 | 83 | 3.429 | 25 |
| PERU | 57 | 70 | 75 | 3.097 | 4 |
| VENEZUELA | 38 | 81 | 81 | 3.346 | 5 |
| TROPICAL SOUTH AMERICA | 288 | 476 | 511 | 21.203 | 5 |
| COSTA RICA | 6 | 10 | 9 | 0.387 | 4 |
| EL SALVADOR | 11 | 15 | 14 | 0.581 | 3 |
| GUATEMALA | 12 | 14 | 18 | 0.733 | 2 |
| HONDURAS | 9 | 9 | 9 | 0.359 | 2 |
| NICARAGUA | 13 | 18 | 13 | 0.525 | 4 |
| PANAMA | 4 | 6 | 8 | 0.332 | 4 |
| CENTRAL AMERICA PANAMA | 56 | 72 | 70 | 2.917 | 3 |
| BARBADOS | 2 | 4 | 8 | 0.332 | 30 |
| GUYANA | 1 | 2 | 1 | 0.041 | 1 |
| HAITI | 22 | 28 | 17 | 0.705 | 3 |
| JAMAICA | 4 | 8 | 9 | 0.373 | 4 |
| TRINIDAD TOB | 2 | 3 | 3 | 0.138 | 3 |
| CARIBBEAN | 31 | 45 | 38 | 1.590 | 4 |
| TROPICAL LATIN AMERICA | 1309 | 1890 | 2091 | 86.740 | 6 |
| ARGENTINA | 210 | 247 | 248 | 10.273 | 9 |
| CHILE | 40 | 37 | 55 | 2.268 | 5 |
| URUGUAY | 23 | 22 | 17 | 0.719 | 6 |
| TEMPERATE SOUTH AMERICA | 272 | 306 | 320 | 13.260 | 8 |
| LATIN AMERICA | 1581 | 2196 | 2411 | 100.000 | 7 |

COLUMNS MAY NOT ADD EXACTLY DUE TO ROUNDING

PIGMEAT

PRODUCTION PER CAPITA 1966/82

| COUNTRY | ANNUAL GROWTH | AVERAGE | AVERAGE | 1982 |
|-------------------------|---------------|-------------------|---------|-------|
| | RATE 1966/82 | 1966/71 | 1976/81 | |
| | % | -----KG/YEAR----- | | |
| BRAZIL | -0.25 | 7.89 | 7.50 | 7.56 |
| MEXICO | 2.87*** | 4.71 | 6.53 | 6.72 |
| | 0.60*** | 6.79 | 7.15 | 7.25 |
| BOLIVIA | 4.03*** | 3.51 | 5.43 | 5.61 |
| COLOMBIA | 0.97** | 3.46 | 3.99 | 3.75 |
| CUBA | 3.87*** | 4.04 | 6.02 | 7.10 |
| DOMINICAN RP | -3.42 | 2.34 | 3.02 | |
| ECUADOR | 3.41*** | 5.14 | 7.06 | 8.90 |
| PARAGUAY | 2.76*** | 17.84 | 23.62 | 24.92 |
| PERU | -0.79*** | 4.58 | 4.23 | 4.08 |
| VENEZUELA | 3.13*** | 3.74 | 5.46 | 5.15 |
| TROPICAL SOUTH AMERICA | 2.03*** | 4.33 | 5.47 | 5.47 |
| COSTA RICA | 1.07 | 3.83 | 4.53 | 3.45 |
| SALVADOR | -1.18*** | 3.31 | 3.13 | 2.55 |
| GUATEMALA | -0.85 | 2.42 | 2.03 | 2.59 |
| HONDURAS | -3.90*** | 3.76 | 2.51 | 2.27 |
| NICARAGUA | -1.61 | 7.01 | 6.80 | 4.79 |
| PANAMA | 2.66*** | 2.81 | 3.58 | 3.97 |
| CENTRAL AMERICA PANAMA | -0.90*** | 3.54 | 3.30 | 3.00 |
| BARBADOS | 7.96*** | 9.66 | 20.22 | 33.45 |
| GUYANA | 0.57 | 1.52 | 2.03 | 1.08 |
| HAITI | -2.78** | 4.99 | 4.63 | 2.29 |
| JAMAICA | 4.93*** | 2.32 | 3.80 | 3.99 |
| TRINIDAD ETC | 1.87*** | 2.28 | 2.65 | 3.32 |
| CARIBBEAN | 0.39 | 3.91 | 4.39 | 3.44 |
| TROPICAL LATIN AMERICA | 0.89*** | 5.74 | 6.30 | 6.31 |
| ARGENTINA | -0.18 | 9.28 | 9.32 | 8.30 |
| CHILE | -0.59 | 4.46 | 3.72 | 5.05 |
| URUGUAY | -1.65** | 7.83 | 7.32 | 5.73 |
| TEMPERATE SOUTH AMERICA | -0.37 | 7.92 | 7.68 | 7.23 |
| LATIN AMERICA | 0.65*** | 6.03 | 6.46 | 6.42 |

LEVEL OF SIGNIFICANCE IS REPRESENTED AS FOLLOWS

*** P<0.005 ** P<0.01 *P<0.05

PIGS

PRODUCTION PER HEAD IN STOCK 1966/82

| COUNTRY | ANNUAL GROWTH | 1966/71 | 1976/81 | 1982 |
|-------------------------|---------------|-----------|---------|-------|
| | RATE 1966/82 | | | |
| | % | -KG/YEAR- | | |
| BRAZIL | 0.90** | 24.2 | 25.6 | 27.7 |
| MEXICO | 3.84*** | 23.0 | 35.1 | 37.9 |
| | 1.76*** | 23.9 | 28.1 | 30.5 |
| BOLIVIA | 1.45*** | 18.0 | 21.3 | 21.3 |
| COLOMBIA | 0.62* | 45.7 | 50.6 | 46.4 |
| CUBA | 3.87*** | 21.5 | 32.9 | 35.0 |
| DOMINICAN RP | 7.52*** | 14.2 | 32.9 | . |
| EQUADOR | 0.76* | 16.1 | 17.1 | 18.2 |
| PARAGUAY | 0.79 | 58.9 | 58.2 | 62.3 |
| PERU | 1.07*** | 31.9 | 34.8 | 38.0 |
| VENEZUELA | 3.71*** | 25.1 | 39.2 | 33.1 |
| TROPICAL SOUTH AMERICA | 1.77*** | 27.9 | 34.1 | 33.0 |
| COSTA RICA | 1.61** | 34.6 | 44.3 | 32.9 |
| SALVADOR | 1.06** | 27.1 | 31.1 | 28.9 |
| GUATEMALA | 1.13 | 18.0 | 20.0 | 24.0 |
| HONDURAS | -1.25*** | 18.3 | 16.4 | 15.3 |
| NICARAGUA | 1.12* | 23.4 | 27.3 | 26.9 |
| PANAMA | 3.95*** | 23.2 | 33.6 | 40.0 |
| CENTRAL AMERICA PANAMA | 1.18** | 22.2 | 25.8 | 25.4 |
| BARBADOS | 3.54*** | 79.2 | 108.8 | 140.6 |
| GUYANA | -2.22 | 13.5 | 13.0 | 7.1 |
| HAITI | 0.99 | 15.2 | 15.7 | 23.3 |
| JAMAICA | 2.67*** | 25.4 | 32.9 | 34.0 |
| TRINIDAD ETC | 1.12*** | 48.7 | 52.4 | 65.6 |
| CARIBBEAN | 2.36*** | 18.0 | 20.9 | 32.7 |
| TROPICAL LATIN AMERICA | 1.80*** | 24.4 | 29.0 | 30.9 |
| ARGENTINA | 1.74*** | 52.4 | 66.0 | 59.0 |
| CHILE | 0.73 | 39.8 | 39.7 | 48.7 |
| URUGUAY | -2.20** | 56.3 | 48.8 | 39.5 |
| TEMPERATE SOUTH AMERICA | 1.28*** | 50.3 | 59.5 | 55.3 |
| LATIN AMERICA | 1.57*** | 26.8 | 31.2 | 32.7 |

LEVEL OF SIGNIFICANCE IS REPRESENTED AS FOLLOWS

*** P<0.005 ** P<0.01 *P<0.05

PIGMEAT

(ANNUAL GROWTH RATES)

| COUNTRY | PRODUCTION | | | POPULATION | | | PRODUCTION PER CAP. | | |
|-------------------------|------------|---------|---------|------------|---------|---------|---------------------|---------|---------|
| | 1966/71 | 1976/81 | 1966/82 | 1966/71 | 1976/81 | 1966/82 | 1966/71 | 1976/81 | 1966/82 |
| BRAZIL | 3.9*** | 4.7*** | 2.3*** | 2.7*** | 2.4*** | 2.5* | 1.1* | 2.3*** | -0.3 |
| MEXICO | 3.0*** | 4.9** | 6.0*** | 3.3*** | 2.9*** | 3.1* | -0.3 | 1.9 | 2.9*** |
| | 3.7*** | 4.8*** | 3.4*** | 2.9** | 2.6*** | 2.7* | 0.7 | 2.2** | 0.6*** |
| BOLIVIA | 6.7*** | 4.2*** | 6.5*** | 2.4*** | 2.6*** | 2.5* | 4.3*** | 1.6*** | 4.0*** |
| COLOMBIA | 0.7 | -0.1 | 3.2*** | 2.7*** | 2.1*** | 2.3* | -2.0 | -2.2 | 1.0** |
| CUBA | 1.4 | 6.8* | 5.2*** | 1.8*** | 0.7*** | 1.4* | -0.5 | 6.1* | 3.9*** |
| DOMINICAN RP | 6.1*** | -48.8* | -0.6 | 3.2*** | 2.5*** | 2.8* | 3.0** | -51.4* | -3.4 |
| ECUADOR | 1.5*** | 10.2*** | 6.4*** | 3.0*** | 3.1*** | 3.0* | -1.5*** | 7.1*** | 3.4*** |
| PARAGUAY | 4.9*** | 7.6*** | 5.9*** | 2.6*** | 3.3*** | 3.1* | 2.3*** | 4.4*** | 2.8*** |
| PERU | 4.5** | 1.1 | 1.9** | 2.8*** | 2.7*** | 2.7* | 1.7 | -1.6 | -0.8*** |
| VENEZUELA | 9.0*** | -0.8 | 6.7*** | 3.6*** | 3.5*** | 3.5* | 5.4** | -4.3** | 3.1*** |
| TROPICAL SOUTH AMERICA | 3.7*** | 2.6*** | 4.6*** | 2.8*** | 2.5*** | 2.6* | 1.0* | 0.1 | 2.0*** |
| COSTA RICA | 7.3 | 2.3 | 3.6*** | 3.0*** | 2.4*** | 2.5* | 4.3 | -0.0 | 1.1 |
| SALVADOR | -1.6*** | 0.6 | 1.8*** | 3.4** | 2.9*** | 3.0* | -5.0*** | -2.3 | -1.2*** |
| GUATEMALA | 2.4** | 10.2** | 2.2*** | 3.0*** | 3.0*** | 3.0* | -0.6 | 7.2* | -0.9 |
| HONDURAS | 3.7*** | -1.3 | -0.7* | 2.7*** | 3.5*** | 3.2* | 0.9* | -4.8** | -3.9*** |
| NICARAGUA | 6.9** | -11.1* | 1.6 | 3.0*** | 3.3*** | 3.2* | 3.9 | -14.4** | -1.6 |
| PANAMA | 4.2* | 8.3*** | 5.2*** | 2.8*** | 2.2*** | 2.5* | 1.4 | 6.1*** | 2.7*** |
| CENTRAL AMERICA PANAMA | 3.6** | 0.6 | 2.1*** | 3.0*** | 3.0*** | 3.0* | 0.6 | -2.4 | -0.9*** |
| BARBADUS | 8.9*** | 15.9** | 8.7*** | 0.4*** | 1.6*** | 0.8* | 8.5*** | 14.3** | 8.0*** |
| GUYANA | 16.7*** | -18.1** | 2.8 | 2.6*** | 2.2*** | 2.3* | 14.1*** | -20.3** | 0.6 |
| HAITI | 5.1*** | -12.3** | -0.5 | 2.2*** | 2.4*** | 2.3* | 3.0*** | -14.7** | -2.8** |
| JAMAICA | 11.5* | 4.6*** | 6.5*** | 1.3*** | 1.3** | 1.5* | 10.3* | 3.3** | 4.9*** |
| TRINIDAD ETC | 6.5*** | 0.3 | 3.1*** | 0.9*** | 1.6*** | 1.2* | 5.6*** | -1.3 | 1.9*** |
| CARIBBEAN | 6.7*** | -4.2* | 2.3*** | 1.8*** | 2.0*** | 2.0* | 4.9*** | -6.2** | 0.4 |
| TROPICAL LATIN AMERICA | 3.7*** | 3.9*** | 3.6*** | 2.8*** | 2.6*** | 2.7* | 0.9** | 1.3** | 0.9*** |
| ARGENTINA | 0.9 | 0.8 | 1.1** | 1.4*** | 1.2*** | 1.3* | -0.4 | -0.4 | -0.2 |
| CHILE | 5.6*** | 14.3*** | 1.1 | 1.9*** | 1.7*** | 1.7* | 3.7** | 12.6*** | -0.6 |
| URUGUAY | -3.7 | -8.5** | -1.2 | 0.8*** | 0.6*** | 0.4* | -4.5 | -9.1** | -1.7** |
| TEMPERATE SOUTH AMERICA | 1.2 | 1.9 | 1.0** | 1.4*** | 1.3*** | 1.4* | -0.2 | 0.6 | -0.4 |
| LATIN AMERICA | 3.3*** | 3.6*** | 3.2*** | 2.7*** | 2.4*** | 2.5* | 0.6 | 1.2** | 0.7*** |

LEVEL OF SIGNIFICANCE IS REPRESENTED AS FOLLOWS

*** P<0.005 ** P<0.01 * P<0.05

PIGMEAT

SUMMARY OF LATIN AMERICA TRADE (THOUSAND TONS)

| REGION | EXPORT | | | IMPORT | | | +IMPORT-EXPORT | | |
|-------------------------|---------|---------|------|---------|---------|------|----------------|---------|------|
| | 1966/71 | 1976/81 | 1982 | 1966/71 | 1976/81 | 1982 | 1966/71 | 1976/81 | 1982 |
| BRAZIL | 1 | 6 | 3 | 1 | 0 | 0 | 0 | -6 | -3 |
| MEXICO | 1 | 2 | 0 | 1 | 0 | 0 | 0 | -2 | 0 |
| | 2 | 8 | 3 | 2 | 0 | 0 | 0 | -8 | -3 |
| BOLIVIA | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| COLOMBIA | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 1 |
| CUBA | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 |
| DOMINICAN RP | 0 | 0 | 0 | 0 | 4 | 7 | 0 | 4 | 7 |
| ECUADOR | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PARAGUAY | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PERU | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 |
| VENEZUELA | 0 | 0 | 34 | 4 | 8 | 14 | 4 | 8 | -20 |
| TROPICAL SOUTH AMERICA | 0 | 0 | 34 | 5 | 14 | 22 | 5 | 14 | -12 |
| COSTA RICA | 1 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 0 |
| EL SALVADOR | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 1 | 0 |
| GUATEMALA | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 0 |
| HONDURAS | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 |
| NICARAGUA | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| PANAMA | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 1 | 0 |
| CENTRAL AMERICA PANAMA | 2 | 2 | 0 | 4 | 6 | 0 | 2 | 4 | 0 |
| BARBADOS | 1 | 0 | 0 | 1 | 1 | 1 | 0 | 1 | 1 |
| GUYANA | 1 | 1 | 0 | 1 | 0 | 0 | 0 | -1 | 0 |
| HAITI | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 |
| JAMAICA | 0 | 1 | 0 | 1 | 1 | 0 | 1 | 0 | 0 |
| TRINIDAD ETC | 1 | 1 | 3 | 1 | 1 | 2 | 0 | 0 | -1 |
| CARIBBEAN | 3 | 3 | 3 | 5 | 4 | 4 | 2 | 1 | 1 |
| TROPICAL LATIN AMERICA | 7 | 13 | 40 | 16 | 24 | 26 | 9 | 11 | -14 |
| ARGENTINA | 4 | 4 | 1 | 0 | 3 | 0 | -4 | -1 | -1 |
| CHILE | 0 | 0 | 0 | 1 | 3 | 2 | 1 | 3 | 2 |
| URUGUAY | 1 | 0 | 0 | 0 | 1 | 1 | -1 | 1 | 1 |
| TEMPERATE SOUTH AMERICA | 5 | 4 | 1 | 1 | 7 | 3 | -4 | 3 | 2 |
| LATIN AMERICA | 12 | 18 | 41 | 23 | 24 | 29 | 11 | 6 | -12 |

PIGMEAT

PRODUCTION, TRADE AND APPARENT CONSUMPTION

| COUNTRY | 1966/71 | | | | | 1971/82 | | | | |
|-------------------------|------------|--------------------|-------------------------|---------------------------------------|------------------------------|------------|--------------------|-------------------------|---------------------------------------|------------------------------|
| | PRODUCTION | +IMPORT -EXPORT | APPARENT CONSUMPTION | APPARENT PER CAPITA CONSUMPTION | SELF SUFFICIENCY INDEX | PRODUCTION | +IMPORT -EXPORT | APPARENT CONSUMPTION | APPARENT PER CAPITA CONSUMPTION | SELF SUFFICIENCY INDEX |
| | 1000 MT | | | -KG- | | 1000 MT | | | -KG- | |
| BRAZIL | 723.1 | -0.95 | 722.16 | 7.89 | 100.13 | 838.02 | -3.75 | 834.27 | 7.41 | 100.45 |
| MEXICO | 230.2 | 0.05 | 230.27 | 4.72 | 99.99 | 397.21 | -0.86 | 396.35 | 6.28 | 100.22 |
| | 953.3 | -0.90 | 952.43 | 6.79 | 100.09 | 1235.2 | -4.61 | 1230.6 | 7.00 | 100.37 |
| BOLIVIA | 14.73 | 0.00 | 14.73 | 3.53 | 100.00 | 26.15 | -0.02 | 26.13 | 5.11 | 100.00 |
| COLOMBIA | 68.96 | 0.00 | 68.96 | 3.46 | 100.00 | 92.27 | 0.08 | 92.36 | 3.85 | 99.91 |
| CUBA | 33.70 | 0.00 | 33.70 | 4.04 | 100.00 | 50.65 | 1.00 | 51.65 | 5.50 | 98.06 |
| DOMINICAN RP | 10.15 | 0.00 | 10.15 | 2.35 | 100.00 | 16.75 | 3.60 | 20.44 | 3.75 | 81.98 |
| ECUADOR | 29.30 | 0.00 | 29.30 | 5.13 | 100.00 | 47.95 | 0.00 | 47.95 | 6.61 | 100.00 |
| PARAGUAY | 39.51 | 0.00 | 39.51 | 17.88 | 100.00 | 63.36 | 0.00 | 63.36 | 22.29 | 100.00 |
| PERU | 59.33 | 0.49 | 59.82 | 4.63 | 99.19 | 71.23 | 0.00 | 71.23 | 4.42 | 100.00 |
| VENEZUELA | 39.19 | 3.07 | 42.26 | 4.06 | 92.73 | 74.02 | -28.59 | 45.42 | 3.27 | 162.95 |
| TROPICAL SOUTH AMERICA | 294.9 | 3.56 | 298.43 | 4.39 | 98.81 | 442.37 | -23.85 | 418.53 | 4.98 | 105.70 |
| COSTA RICA | 6.37 | -0.01 | 6.36 | 3.84 | 100.20 | 8.92 | 0.09 | 9.01 | 4.41 | 99.04 |
| EL SALVADOR | 11.25 | 0.01 | 11.26 | 3.31 | 99.90 | 13.50 | 0.07 | 13.57 | 3.12 | 99.45 |
| GUATEMALA | 12.44 | 0.00 | 12.44 | 2.43 | 99.97 | 14.43 | 0.11 | 14.54 | 2.21 | 99.27 |
| HONDURAS | 9.57 | 0.00 | 9.57 | 3.77 | 100.00 | 9.08 | 0.00 | 9.08 | 2.76 | 99.96 |
| NICARAGUA | 13.29 | 0.00 | 13.29 | 7.04 | 100.00 | 16.46 | -0.15 | 16.31 | 6.64 | 100.93 |
| PANAMA | 4.06 | 0.01 | 4.07 | 2.82 | 99.68 | 5.98 | 0.02 | 6.00 | 3.37 | 99.59 |
| CENTRAL AMERICA PANAMA | 56.98 | 0.01 | 57.00 | 3.96 | 99.97 | 68.36 | 0.14 | 68.51 | 3.71 | 99.79 |
| BARBADOS | 2.30 | 0.05 | 2.35 | 9.88 | 97.88 | 4.74 | 0.23 | 4.97 | 19.84 | 95.45 |
| GUYANA | 1.05 | 0.01 | 1.05 | 1.54 | 99.24 | 1.52 | -0.00 | 1.52 | 1.85 | 100.23 |
| HAITI | 22.33 | 0.01 | 22.34 | 5.00 | 99.97 | 25.22 | 0.06 | 25.29 | 4.71 | 99.76 |
| JAMAICA | 4.27 | 0.36 | 4.63 | 2.52 | 92.27 | 7.62 | 0.22 | 7.84 | 3.76 | 97.24 |
| TRINIDAD ETC | 2.32 | 0.37 | 2.69 | 2.65 | 86.40 | 2.99 | 0.46 | 3.45 | 3.10 | 86.76 |
| CARIBBEAN | 32.26 | 0.79 | 33.05 | 4.01 | 97.61 | 42.10 | 0.96 | 43.06 | 4.47 | 97.78 |
| TROPICAL LATIN AMERICA | 1337 | 3.46 | 1340.9 | 4.27 | 99.74 | 1788.1 | -27.36 | 1760.7 | 6.08 | 101.55 |
| ARGENTINA | 216 | -3.72 | 212.26 | 9.12 | 101.75 | 244.39 | -1.24 | 243.15 | 9.40 | 100.51 |
| CHILE | 40.74 | 0.34 | 41.07 | 4.51 | 99.18 | 45.00 | 2.55 | 47.55 | 4.54 | 94.64 |
| URUGUAY | 21.83 | -0.13 | 21.70 | 7.78 | 100.62 | 20.79 | -0.09 | 20.71 | 7.20 | 100.41 |
| TEMPERATE SOUTH AMERICA | 278.5 | -3.51 | 275.03 | 7.82 | 101.28 | 310.18 | 1.22 | 311.40 | 7.94 | 99.61 |
| LATIN AMERICA | 1616 | -0.05 | 1615.9 | 6.03 | 100.00 | 2098.3 | -26.14 | 2072.16 | 6.29 | 101.26 |

POULTRY: stocks and production for selected regions, 1982

| Region and country | Production | | Stock | |
|-------------------------|-----------------|------------|-----------------|------------|
| | Total ('000 tm) | Percentage | Total ('000 tm) | Percentage |
| World | 29810 | 100.0 | 6879191 | 100.0 |
| United States | 7009 | 23.5 | 393875 | 5.7 |
| Europe | 7345 | 24.6 | 1290213 | 18.8 |
| Latin America | 3650 | 12.2 | 1044209 | 14.7 |
| Tropical Latin America | 3133 | 10.5 | 966846 | 14.1 |
| . Brazil | 1516 | 5.1 | 455400 | 6.6 |
| . Colombia | 150 | 0.5 | 3300 | 0.0 |
| . Venezuela | 295 | 1.0 | 4400 | 0.0 |
| Temperate Latin America | 517 | 1.7 | 77363 | 1.1 |
| . Argentina | 362 | 1.2 | 42800 | 0.6 |
| Asia | 7028 | 23.6 | 2331533 | 33.9 |
| Africa | 1413 | 4.7 | 633279 | 9.2 |
| Oceania | 324 | 1.1 | 57383 | 0.8 |

POULTRY MEAT

PRODUCTION, RELATIVE IMPORTANCE IN THE REGION
AND PER CAPITA PRODUCTION LEVELS

| COUNTRY | P R O D U C T I O N | | | PERCENTAGE PER CAPITA | |
|-------------------------|---------------------|---------|---------|-----------------------|------------|
| | 1000 MT | | | OF TOTAL | PRODUCTION |
| | 1966/70 | 1976/80 | 1980/82 | % | KG |
| | 1966/70 | 1976/80 | 1980/82 | 1980/82 | 1980/82 |
| BRAZIL | 299 | 928 | 1424 | 42.190 | 11 |
| MEXICO | 195 | 389 | 461 | 13.645 | 6 |
| | 494 | 1317 | 1885 | 55.835 | 9 |
| BOLIVIA | 3 | 7 | 10 | 0.306 | 2 |
| COLOMBIA | 43 | 90 | 110 | 3.268 | 4 |
| CUBA | 37 | 60 | 74 | 2.182 | 8 |
| DOMINICAN RP | 26 | 49 | 64 | 1.886 | 10 |
| ECUADOR | 8 | 19 | 28 | 0.820 | 3 |
| PARAGUAY | 7 | 13 | 15 | 0.444 | 5 |
| PERU | 48 | 133 | 177 | 5.253 | 10 |
| VENEZUELA | 80 | 206 | 272 | 8.057 | 17 |
| TROPICAL SOUTH AMERICA | 250 | 576 | 750 | 22.216 | 8 |
| COSTA RICA | 3 | 6 | 5 | 0.158 | 2 |
| EL SALVADOR | 4 | 13 | 14 | 0.405 | 3 |
| GUATEMALA | 7 | 32 | 49 | 1.461 | 7 |
| HONDURAS | 5 | 8 | 9 | 0.276 | 2 |
| NICARAGUA | 5 | 9 | 7 | 0.197 | 2 |
| PANAMA | 6 | 12 | 14 | 0.425 | 7 |
| CENTRAL AMERICA PANAMA | 29 | 79 | 99 | 2.923 | 4 |
| BARBADOS | 0 | 4 | 6 | 0.178 | 23 |
| GUYANA | 5 | 11 | 13 | 0.385 | 14 |
| HAITI | 3 | 5 | 6 | 0.178 | 1 |
| JAMAICA | 11 | 25 | 29 | 0.849 | 13 |
| TRINIDAD TOB | 13 | 20 | 20 | 0.602 | 17 |
| CARIBBEAN | 32 | 66 | 74 | 2.192 | 7 |
| TROPICAL LATIN AMERICA | 805 | 2038 | 2808 | 83.165 | 8 |
| ARGENTINA | 144 | 328 | 452 | 13.398 | 17 |
| CHILE | 47 | 61 | 97 | 2.863 | 9 |
| URUGUAY | 10 | 17 | 19 | 0.573 | 7 |
| TEMPERATE SOUTH AMERICA | 201 | 406 | 568 | 16.835 | 14 |
| LATIN AMERICA | 1007 | 2444 | 3376 | 100.000 | 9 |

COLUMNS MAY NOT ADD EXACTLY DUE TO ROUNDING

POULTRY MEAT

PRODUCTION PER CAPITA 1966/82

| COUNTRY | ANNUAL GROWTH | AVERAGE | AVERAGE | 1982 |
|-------------------------|-------------------|---------|--------------------|-------|
| | RATE 1966/82 % | 1966/71 | 1976/81 KG/YEAR | |
| BRAZIL | 9.18*** | 3.39 | 8.45 | 11.82 |
| MEXICO | 3.70*** | 4.08 | 6.00 | 6.38 |
| | 7.39*** | 3.63 | 7.56 | 9.83 |
| BOLIVIA | 5.90*** | .76 | 1.34 | 1.87 |
| COLOMBIA | 5.21*** | 2.15 | 3.71 | 4.15 |
| CUBA | 3.70*** | 4.49 | 6.45 | 7.71 |
| DOMINICAN RP | 3.66*** | 6.16 | 8.85 | 9.76 |
| ECUADOR | 6.67*** | 1.41 | 2.62 | 4.21 |
| PARAGUAY | 2.87*** | 3.14 | 4.32 | 4.45 |
| PERU | 7.20*** | 3.88 | 8.32 | 11.00 |
| VENEZUELA | 5.88*** | 7.94 | 14.62 | 17.00 |
| TROPICAL SOUTH AMERICA | 5.73*** | 3.79 | 6.85 | 8.32 |
| COSTA RICA | 3.51*** | 1.61 | 2.57 | 2.15 |
| SALVADOR | 7.71*** | 1.18 | 2.83 | 2.95 |
| GUATEMALA | 11.50*** | 1.45 | 4.91 | 6.49 |
| HONDURAS | 2.01*** | 1.87 | 2.25 | 2.52 |
| NICARAGUA | 1.03 | 2.51 | 3.34 | 2.74 |
| PANAMA | 4.34*** | 4.23 | 6.61 | 6.45 |
| CENTRAL AMERICA PANAMA | 6.68*** | 1.85 | 3.76 | 4.20 |
| BARBADOS | 20.38*** | 2.03 | 17.68 | 26.02 |
| GUYANA | 6.17*** | 7.19 | 13.44 | 15.18 |
| HAITI | 3.61*** | .66 | .96 | .98 |
| JAMAICA | 6.23*** | 6.71 | 12.06 | 12.87 |
| TRINIDAD ETC | 2.61*** | 13.27 | 17.49 | 17.47 |
| CARIBBEAN | 4.83*** | 4.14 | 6.72 | 7.16 |
| TROPICAL LATIN AMERICA | 6.79*** | 3.57 | 7.06 | 8.91 |
| ARGENTINA | 7.17*** | 6.64 | 13.21 | 16.31 |
| CHILE | 2.93** | 5.10 | 6.32 | 8.27 |
| URUGUAY | 4.45*** | 3.95 | 6.16 | 6.74 |
| TEMPERATE SOUTH AMERICA | 6.23*** | 6.03 | 10.85 | 13.45 |
| LATIN AMERICA | 6.60*** | 3.89 | 7.50 | 9.41 |

LEVEL OF SIGNIFICANCE IS REPRESENTED AS FOLLOWS

*** P<0.005 ** P<0.01 *P<0.05

POULTRY

PRODUCTION PER HEAD IN STOCK 1966/82

| COUNTRY | ANNUAL GROWTH RATE 1966/82 % | 1966/71 1976/81 1982 | | |
|-------------------------|------------------------------------|----------------------|------|-----|
| | | KG/YEAR | | |
| BRAZIL | 4.97*** | 1.6 | 2.6 | 3.4 |
| MEXICO | 4.65*** | 1.6 | 2.6 | 2.9 |
| | 4.93*** | 1.6 | 2.6 | 3.2 |
| BOLIVIA | 0.73 | 0.9 | 0.9 | 1.3 |
| COLOMBIA | 1.99*** | 2.7 | 3.4 | 3.4 |
| CUBA | -0.90* | 3.1 | 2.7 | 2.9 |
| DOMINICAN RP | 4.71*** | 4.0 | 6.4 | 7.3 |
| ECUADOR | -1.65* | 1.3 | 0.9 | 1.4 |
| PARAGUAY | 0.12 | 1.1 | 1.1 | 1.1 |
| PERU | 2.83*** | 2.9 | 3.8 | 5.3 |
| VENEZUELA | 2.17*** | 4.8 | 6.0 | 6.5 |
| TROPICAL SOUTH AMERICA | 1.61*** | 3.0 | 3.5 | 4.0 |
| COSTA RICA | 2.24** | 0.8 | 1.0 | 0.9 |
| SALVADOR | 2.45*** | 2.0 | 2.7 | 2.7 |
| GUATEMALA | 11.01*** | 0.8 | 2.6 | 3.4 |
| HONDURAS | 0.30 | 1.8 | 1.8 | 2.0 |
| NICARAGUA | 0.05 | 1.7 | 2.0 | 1.6 |
| PANAMA | 2.24*** | 2.1 | 2.6 | 2.5 |
| CENTRAL AMERICA PANAMA | 5.20*** | 1.3 | 2.2 | 2.5 |
| BARBADOS | 14.17*** | 1.4 | 6.5 | 8.2 |
| GUYANA | -0.09 | 1.0 | 1.0 | 1.0 |
| HAITI | 2.68*** | 0.9 | 1.2 | 1.2 |
| JAMAICA | 3.29*** | 4.6 | 6.4 | 6.6 |
| TRINIDAD ETC | -0.26 | 2.9 | 2.8 | 2.8 |
| CARIBBEAN | 1.19*** | 2.1 | 2.4 | 2.5 |
| TROPICAL LATIN AMERICA | 3.98*** | 1.9 | 2.8 | 3.4 |
| ARGENTINA | 7.29*** | 4.8 | 10.0 | 9.0 |
| CHILE | 0.58 | 3.2 | 3.1 | 3.7 |
| URUGUAY | 1.18* | 2.1 | 2.3 | 2.4 |
| TEMPERATE SOUTH AMERICA | 5.25*** | 4.1 | 6.8 | 6.8 |
| LATIN AMERICA | 3.92*** | 2.1 | 3.1 | 3.7 |

LEVEL OF SIGNIFICANCE IS REPRESENTED AS FOLLOWS

*** P<0.005 ** P<0.01 *P<0.05

POULTRY MEAT

(ANNUAL GROWTH RATES)

| COUNTRY | PRODUCTION | | | POPULATION | | | PRODUCTION PER CAP. | | |
|-------------------------|------------|----------|---------|------------|---------|---------|---------------------|----------|---------|
| | 1966/71 | 1976/81 | 1966/82 | 1966/71 | 1976/81 | 1966/82 | 1966/71 | 1976/81 | 1966/82 |
| BRAZIL | 9.9*** | 18.1*** | 11.7*** | 2.7*** | 2.4*** | 2.5* | 7.1*** | 15.7*** | 9.2*** |
| MEXICO | 8.3*** | 6.2*** | 6.8*** | 3.3*** | 2.9*** | 3.1* | 5.0** | 3.3*** | 3.7*** |
| | 9.3*** | 14.6*** | 10.1*** | 2.9*** | 2.6*** | 2.7* | 6.3*** | 12.0*** | 7.4*** |
| BOLIVIA | 4.7*** | 14.0*** | 8.4*** | 2.4*** | 2.6*** | 2.5* | 2.3*** | 11.4** | 5.9*** |
| COLOMBIA | 2.7** | 9.6*** | 7.5*** | 2.7*** | 2.1*** | 2.3* | -0.0 | 7.5*** | 5.2*** |
| CUBA | 4.5*** | 8.1*** | 5.1*** | 1.8*** | 0.7*** | 1.4* | 2.6*** | 7.4*** | 3.7*** |
| DOMINICAN RP | 4.3*** | 12.7*** | 6.5*** | 3.2*** | 2.5*** | 2.8* | 1.1** | 10.2*** | 3.7*** |
| ECUADOR | 9.2*** | 8.8** | 9.6*** | 3.0*** | 3.1*** | 3.0* | 6.2** | 5.8* | 6.7*** |
| PARAGUAY | 1.4* | 7.1*** | 6.0*** | 2.6*** | 3.3** | 3.1* | -1.2 | 3.8*** | 2.9*** |
| PERU | 9.4*** | 3.9 | 9.9*** | 2.8*** | 2.7** | 2.7* | 6.6*** | 1.2 | 7.2*** |
| VENEZUELA | 8.1*** | 9.0*** | 9.4*** | 3.6*** | 3.5** | 3.5* | 4.5*** | 5.5** | 5.9*** |
| TROPICAL SOUTH AMERICA | 6.3*** | 8.1*** | 8.3*** | 2.8*** | 2.5*** | 2.6* | 3.6*** | 5.6*** | 5.7*** |
| COSTA RICA | 2.4*** | -0.3 | 6.1*** | 3.0*** | 2.4*** | 2.5* | -0.6** | -2.6 | 3.5*** |
| SALVADOR | 4.1*** | 6.7 | 10.7*** | 3.4*** | 2.9*** | 3.0* | 0.7 | 3.8 | 7.7*** |
| GUATEMALA | 5.8*** | 27.4*** | 14.5*** | 3.0*** | 3.0*** | 3.0* | 2.9*** | 24.4*** | 11.5*** |
| HONDURAS | 2.1*** | 8.0*** | 5.3*** | 2.7*** | 3.5*** | 3.2* | -0.6*** | 4.5** | 2.0*** |
| NICARAGUA | 3.1** | -13.6*** | 4.3*** | 3.0*** | 3.3*** | 3.2* | 0.1 | -16.9*** | 1.0 |
| PANAMA | 11.0*** | 8.3** | 6.9*** | 2.8*** | 2.2*** | 2.5* | 8.2** | 6.2** | 4.3*** |
| CENTRAL AMERICA PANAMA | 5.4*** | 12.2*** | 9.7*** | 3.0*** | 3.0*** | 3.0* | 2.3*** | 9.2** | 6.7*** |
| BARBADOS | 19.6*** | 12.2*** | 21.1*** | 0.4*** | 1.6*** | 0.8* | 19.2*** | 10.5*** | 20.4*** |
| GUYANA | 14.4*** | 3.8** | 8.4*** | 2.6*** | 2.2*** | 2.3* | 11.9*** | 1.6 | 6.2*** |
| HAITI | 8.1*** | 5.6** | 5.9*** | 2.2*** | 2.4*** | 2.3* | 5.9*** | 3.2 | 3.6*** |
| JAMAICA | 17.8*** | 4.8*** | 7.8*** | 1.3*** | 1.3*** | 1.5* | 16.5*** | 3.4*** | 6.2*** |
| TRINIDAD ETC | 5.3*** | 0.8 | 3.8*** | 0.9*** | 1.6*** | 1.2* | 4.4** | -0.8 | 2.6*** |
| CARIBBEAN | 11.6*** | 4.0*** | 6.8*** | 1.8*** | 2.0*** | 2.0* | 9.8*** | 1.9*** | 4.8*** |
| TROPICAL LATIN AMERICA | 8.3*** | 12.3*** | 9.5*** | 2.8*** | 2.6*** | 2.7* | 5.4*** | 9.7*** | 6.8*** |
| ARGENTINA | 11.4*** | 12.2*** | 8.5*** | 1.4*** | 1.2*** | 1.3* | 10.0*** | 11.0*** | 7.2*** |
| CHILE | 6.0 | 21.6*** | 4.7*** | 1.9*** | 1.7*** | 1.7* | 4.2 | 19.9*** | 2.9** |
| URUGUAY | 12.2*** | 3.2*** | 4.9*** | 0.8*** | 0.6*** | 0.4* | 11.4*** | 2.5** | 4.5*** |
| TEMPERATE SOUTH AMERICA | 10.4*** | 13.2*** | 7.6*** | 1.4*** | 1.3*** | 1.4* | 8.9*** | 11.9*** | 6.2*** |
| LATIN AMERICA | 8.7*** | 12.4*** | 9.1*** | 2.7*** | 2.4*** | 2.5* | 6.1*** | 10.0*** | 6.6*** |

LEVEL OF SIGNIFICANCE IS REPRESENTED AS FOLLOWS

*** P<0.005 ** P<0.01 * P<0.05

MEAT POULTRY FRESH SUMMARY OF LATIN AMERICA TRADE (THOUSAND TONS)

| REGION | EXPORT | | | IMPORT | | | +IMPORT-EXPORT | | |
|-------------------------|---------|---------|------|---------|---------|------|----------------|---------|------|
| | 1966/71 | 1976/81 | 1982 | 1966/71 | 1976/81 | 1982 | 1966/71 | 1976/81 | 1982 |
| BRAZIL | 1 | 109 | 297 | 1 | 1 | 0 | 0 | -108 | -297 |
| MEXICO | 0 | 1 | 0 | 1 | 4 | 15 | 1 | 3 | 15 |
| | 1 | 110 | 297 | 2 | 5 | 15 | 1 | -105 | -282 |
| BOLIVIA | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| COLOMBIA | 0 | 1 | 0 | 1 | 1 | 1 | 1 | 0 | 1 |
| CUBA | 0 | 0 | 0 | 0 | 14 | 23 | 0 | 14 | 23 |
| DOMINICAN RP | 0 | 0 | 0 | 1 | 2 | 1 | 1 | 2 | 1 |
| ECUADOR | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PARAGUAY | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PERU | 0 | 1 | 0 | 1 | 1 | 0 | 1 | 0 | 0 |
| VENEZUELA | 1 | 1 | 0 | 1 | 20 | 18 | 0 | 19 | 18 |
| TROPICAL SOUTH AMERICA | 1 | 3 | 0 | 4 | 38 | 43 | 3 | 35 | 43 |
| COSTA RICA | 1 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 0 |
| EL SALVADOR | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 |
| GUATEMALA | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| HONDURAS | 0 | 1 | 0 | 1 | 1 | 1 | 1 | 0 | 1 |
| NICARAGUA | 1 | 0 | 0 | 1 | 2 | 4 | 0 | 2 | 4 |
| PANAMA | 0 | 1 | 0 | 1 | 1 | 1 | 1 | 0 | 1 |
| CENTRAL AMERICA PANAMA | 3 | 5 | 1 | 5 | 7 | 7 | 2 | 2 | 6 |
| BARBADOS | 1 | 1 | 0 | 3 | 3 | 3 | 2 | 2 | 3 |
| GUYANA | 1 | 0 | 0 | 1 | 1 | 1 | 0 | 1 | 1 |
| HAITI | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 |
| JAMAICA | 0 | 0 | 0 | 5 | 21 | 27 | 5 | 21 | 27 |
| TRINIDAD ETC | 1 | 1 | 1 | 1 | 3 | 2 | 0 | 2 | 1 |
| CARIBBEAN | 3 | 2 | 1 | 11 | 29 | 34 | 8 | 27 | 33 |
| TROPICAL LATIN AMERICA | 8 | 120 | 299 | 22 | 79 | 99 | 14 | -41 | -200 |
| ARGENTINA | 1 | 5 | 0 | 1 | 8 | 13 | 0 | 3 | 13 |
| CHILE | 0 | 0 | 0 | 1 | 2 | 4 | 1 | 2 | 4 |
| URUGUAY | 1 | 3 | 3 | 0 | 1 | 0 | -1 | -2 | -3 |
| TEMPERATE SOUTH AMERICA | 2 | 8 | 3 | 2 | 11 | 17 | 0 | 3 | 14 |
| LATIN AMERICA | 10 | 130 | 302 | 33 | 79 | 116 | 23 | -51 | -186 |

POULTRY MEAT

PRODUCTION, TRADE AND APPARENT CONSUMPTION

| COUNTRY | 1966/71 | | | | | 1971/82 | | | | |
|-------------------------|------------|--------------------|-------------------------|---------------------------------------|------------------------------|------------|--------------------|-------------------------|---------------------------------------|------------------------------|
| | PRODUCTION | +IMPORT -EXPORT | APPARENT CONSUMPTION | APPARENT PER CAPITA CONSUMPTION | SELF SUFFICIENCY INDEX | PRODUCTION | +IMPORT -EXPORT | APPARENT CONSUMPTION | APPARENT PER CAPITA CONSUMPTION | SELF SUFFICIENCY INDEX |
| | 1000 MT | | | -KG- | | 1000 MT | | | -KG- | |
| BRAZIL | 312.2 | 0.21 | 312.41 | 3.41 | 99.93 | 832.56 | -85.96 | 746.61 | 6.63 | 111.51 |
| MEXICO | 200.2 | 0.06 | 200.22 | 4.10 | 99.97 | 363.77 | 3.09 | 366.85 | 5.82 | 99.16 |
| | 512.4 | 0.26 | 512.64 | 3.65 | 99.95 | 1196.3 | -82.87 | 1113.5 | 6.34 | 107.44 |
| BOLIVIA | 3.21 | 0.00 | 3.21 | 0.77 | 100.00 | 6.20 | 0.00 | 6.20 | 1.21 | 100.00 |
| COLOMBIA | 43.08 | 0.03 | 43.12 | 2.16 | 99.92 | 78.01 | 0.12 | 78.13 | 3.26 | 99.85 |
| CUBA | 37.57 | 0.00 | 37.57 | 4.50 | 100.00 | 57.19 | 13.62 | 70.81 | 7.54 | 80.77 |
| DOMINICAN RP | 26.67 | 0.16 | 26.62 | 6.21 | 99.42 | 43.90 | 0.80 | 44.70 | 8.21 | 98.21 |
| ECUADOR | 8.11 | 0.00 | 8.11 | 1.42 | 100.00 | 18.09 | 0.00 | 18.09 | 2.49 | 100.00 |
| PARAGUAY | 6.95 | 0.00 | 6.95 | 3.14 | 100.00 | 11.64 | 0.00 | 11.64 | 4.09 | 100.00 |
| PERU | 50.44 | 0.26 | 50.70 | 3.92 | 99.49 | 130.68 | -0.05 | 130.63 | 8.11 | 100.04 |
| VENEZUELA | 83.06 | -0.00 | 83.05 | 7.98 | 100.00 | 187.86 | 11.00 | 198.86 | 14.30 | 94.47 |
| TROPICAL SOUTH AMERICA | 259.1 | 0.45 | 259.53 | 3.81 | 99.83 | 533.57 | 25.48 | 559.05 | 6.65 | 95.44 |
| COSTA RICA | 2.68 | -0.02 | 2.66 | 1.61 | 100.57 | 4.42 | 0.02 | 4.44 | 2.17 | 99.48 |
| EL SALVADOR | 4.04 | -0.05 | 3.99 | 1.17 | 101.29 | 9.70 | -0.04 | 9.66 | 2.22 | 100.46 |
| GUATEMALA | 7.49 | 0.00 | 7.49 | 1.46 | 100.00 | 25.79 | -0.19 | 25.60 | 3.90 | 100.73 |
| HONDURAS | 4.75 | 0.08 | 4.83 | 1.90 | 98.42 | 7.05 | -0.02 | 7.04 | 2.14 | 100.23 |
| NICARAGUA | 4.76 | 0.10 | 4.86 | 2.57 | 98.03 | 8.06 | 0.95 | 9.01 | 3.67 | 89.50 |
| PANAMA | 6.15 | 0.05 | 6.20 | 4.30 | 99.16 | 10.79 | 0.14 | 10.93 | 6.13 | 98.73 |
| CENTRAL AMERICA PANAMA | 29.87 | 0.16 | 30.03 | 2.08 | 99.47 | 65.81 | 0.86 | 66.67 | 3.61 | 98.71 |
| BARBADOS | 0.49 | 2.38 | 2.87 | 12.08 | 16.92 | 3.67 | 2.77 | 6.44 | 25.73 | 57.03 |
| GUYANA | 4.95 | 0.02 | 4.97 | 7.28 | 99.69 | 10.45 | 0.01 | 10.46 | 12.76 | 99.92 |
| HAITI | 2.99 | 0.00 | 2.99 | 0.67 | 99.92 | 4.93 | 0.07 | 4.99 | 0.93 | 98.67 |
| JAMAICA | 12.41 | 4.66 | 17.07 | 9.29 | 72.69 | 23.74 | 16.25 | 39.99 | 19.20 | 99.37 |
| TRINIDAD ETC | 13.48 | 0.14 | 13.62 | 13.43 | 98.98 | 18.47 | 1.23 | 19.70 | 17.72 | 93.75 |
| CARIBBEAN | 34.31 | 7.20 | 41.51 | 5.04 | 82.65 | 61.27 | 20.32 | 81.59 | 8.47 | 75.09 |
| TROPICAL LATIN AMERICA | 835.6 | 8.07 | 843.70 | 2.69 | 99.04 | 1857 | -36.20 | 1820.8 | 6.29 | 101.99 |
| ARGENTINA | 155.3 | 0.22 | 155.50 | 6.68 | 99.86 | 312.48 | 3.53 | 316.01 | 12.21 | 98.88 |
| CHILE | 46.62 | 0.52 | 47.13 | 5.17 | 98.91 | 63.85 | 2.80 | 66.64 | 6.36 | 95.80 |
| URUGUAY | 11.05 | -0.06 | 10.98 | 3.94 | 100.59 | 17.88 | -2.51 | 15.37 | 5.34 | 116.35 |
| TEMPERATE SOUTH AMERICA | 212.9 | 0.67 | 213.62 | 6.07 | 99.68 | 394.21 | 3.82 | 398.03 | 10.14 | 99.04 |
| LATIN AMERICA | 1049 | 8.75 | 1057.3 | 3.95 | 99.17 | 2251.2 | -32.38 | 2218.8 | 6.74 | 101.46 |