Citrus fruit has always been the main agricultural export (33 percent in of the value of total agricultural exports in 1982 and 20 percent in 1990) and a major source of foreign exchange (4 percent of total export revenues in 1982 and 1990). Export markets are concentrated in the EU (over 70 percent of export value in 1990) which is also a major producer. Exports have fallen back to 34 percent of total output in 1997-2001, from 62 percent in 1980-85.

The export of fresh produce has expanded thanks to the opening up of refrigerated road transport when Spain joined the EU (Table 17). Access to the European market is essential for these products. Access conditions are set out in the Euro-Moroccan Association Agreement of 1995. For citrus fruits, tomatoes, courgettes, cucumbers and artichokes, favourable access has been reserved for Moroccan exports at particular times of the year and up to a maximum volume. This access is subject to annual adjustment involving a gradual increase in import quotas combined with reductions in import fees.

The main processed exports are canned olives, apricots, green beans, gherkins, capers, frozen foods (green beans and strawberries) and orange juice. Several products have virtually disappeared from the export range, particularly tomato concentrates, wines and olive oils, largely because of the European production subsidies under the CAP.

Morocco is the world's fourth largest orange juice exporter, the world's second largest for canned olives, and the leader for capers. It is also Europe's leading supplier of apricot conserves and the second for processed green beans. A recent foreign trade ministry study estimated that the domestic resource coefficients were 0.33 for apricot conserves, 0.49 for canned olives, 0.58 for citrus fruit concentrates, 0.75 for citrus juice and 0.95 for tomato concentrate.

A dualism exists in the main export ranges between traditional traders and the large integrated enterprises managed jointly with foreign investors. The first category provides the semi-finished products to be processed by the European industries or to be sold on the domestic market. These operators generally do not have the critical size needed to be competitive on the world market. The second category of operators are the large-scale, vertically-integrated operations which are linked to European or American distributors or which supply high value-added products. Their strategy is to formalize the raw material collection system through upstream integration, exclusive contracts with agricultural raw materials producers, quality control and price guarantees. These enterprises dominate the main processed fruit and vegetable production sectors.

Imports

Soft wheat imports grew rapidly in the 1970s to a maximum in 1980-85 (about 2 million tonnes). Between 1986 and 1990 they fell as a result of the increase in domestic output (imports averaged 1.4 million tonnes). Since then, wheat imports have increased considerably because of the decline in national output (due to the climate) and peaked in 2000 (3.5 million tonnes imported on average), except for 1994 when imports dropped lower (an average of 1.2 million tonnes).

The maize deficit dates back to 1970 and rose considerably in the mid-1970s linked to the development of industrial poultry farming. Since 1980, the deficit

has remained stationary (between 150 000 and 200 000 tonnes). The cost of cereal imports accounted for 2.5 percent of Morocco's total import bill in 1990.

Sugar self-sufficiency varies between 40 and 63 percent. Imports were on average around 284 000 tonnes between 1975 and 1990, but then rose to 537 000 tonnes in the period 1997-2001.

CONSEQUENCES OF REFORMS: TARGET VARIABLES

National food security

Like many other countries, Morocco has moved away from an approach to agriculture aiming at food self-sufficiency which was in vogue in the 1960s to one of food security. The food self-sufficiency strategy was based on developing the production of strategic commodities in order to cover the maximum national demand. The strategy involved considerable policy intervention in the markets for basic foodstuffs.

Over the long term, cereal self-sufficiency rates have followed a downward trend as production has failed to keep up with growing consumption. Global cereal consumption has increased at the same pace as the population (2.6 percent per year for the past 40 years). However per capita consumption has stagnated at about 310 kg/inhabitant. According to a national household consumption and expenditure survey carried out in 1984/85 annual per capita consumption was 210 kg higher in the rural areas (242 kg) than in the urban areas (169 kg). However, there has been a sharp increase in soft wheat consumption which can be explained in terms of its price. Domestically refined soft wheat flour is the main form of soft wheat consumption, and is highly subsidized. It is mainly produced from imported wheat and in drought years its influence grows as imports increase). Durum wheat is the preferred cereal of consumers, and on the farms much of the output is domestically consumed.

Sugar self-sufficiency rates have generally risen, although they have recently declined in response to the liberalization of imports and increasing consumption. Self-sufficiency in oils initially rose before dipping and then rising again more recently.

Self-sufficiency for animal products is high, ranging from 87 percent for milk to 100 percent for red and white meats. Milk consumption has been rising to 30 kg/inhabitant/year in 1985 from 28 kg in 1975, but with a fall rural consumption (from 27 kg to 20 kg) and an increase in towns (30 kg to 40kg), perhaps because of the effectiveness of milk collection. Conversely, butter consumption fell with the abolition of the subsidy (2.5 kg in 1970 to 1.4 kg in 1985).

TABLE 18
Food self-sufficiency rates, 1960-2000 (percent)

Products	1960-64	1965-69	1970-74	1975-80	1985	1986-88	1990-94	1998-00
Cereals	86	87	86	75	70	76	79	57
Oils	27	30	31	19	17	14	35	76
Sugars	4	28	46	50	56	65	58	47
Milk and derivatives	61	54	60	58	65	-	55	92

Source: Akesbi and Guerraoui, 2001.

TABLE 19
Incidence of poverty, 1984/85, 1990/91, and 1998/99

Location	Population of poor ('000)	Poverty rate (%)	Poverty threshold (DH per capita per year)
1984/85			
Urban	1 300	13.8	1 755
Rural	3 300	26.7	2 473
Total	4 600	21.1	
1990/91			
Urban	912	7.6	2 432
Rural	2 448	18	3 427
Total	3 360	13.1	
1998/99			
Urban	2 478	16.4	3 922
Rural	3 712	28.9	3 037
Total	6 190	22.1	

Source: Direction de la statistique, Enquête Niveau de Vie au Maroc (ENNVM), 1984/85, 1990/91, 1998/99.

Fresh vegetable consumption increased from 123 kg/urban inhabitant/year in 1970 to 138 kg in 1985, and from 71 kg/rural inhabitant/year in 1970 to 94 kg in 1985. Citrus fruit consumption was 18.5 kg/urban inhabitant and 7.5 kg/urban inhabitant. Consumption is rising at 6 percent annually.

Household level food security

Household level food security needs to be assessed against an understanding of the demographic and poverty context. The population of 29 million in 2001 is estimated to stabilize at around 45 million after 2050. After having peaked at 2.8 percent on average between 1960 and 1971, the demographic growth rate between 1994 and 2000 was 1.7 percent per year. Between 1960 and 1971 some 87 000 rural dwellers annually left their region to settle in the towns, but this figure grew to 100 000 during the 1970s, to 140 000 per year at the beginning of the 1980s.

In the 1996 agricultural census, the rural population stood at 13.2 million, or 1.9 million households, of which 85 percent were farmers. The annual growth rate of the rural population between the 1982 and 1994 censuses was 0.6 percent per year. It is this growth rate that explains the increasing pressure on agricultural resources. If this rate were to be maintained, the rural population would reach 15 million by 2010.

Table 19 shows that the incidence of poverty fell between 1984/85 and 1990/91, but worsened during the 1990s. It is greater in rural than in urban areas.

In 1998/99, the poverty threshold was DH 3 922 per person per year in the towns and DH 3 037 per person per year in the countryside. The deficit between actual income and the poverty threshold is greater - in percentage terms - in the rural areas (6.7 percent) than in the urban areas (2.5 percent). Poverty is also more severe in the countryside where in 1990/99 the poverty severity index, was 2.5 percent compared to 0.8 percent in the towns. These figures point to increasing poverty during the 1990s.

Income formation of the rural population

In 2000, per capita GDP was DH 12 108, and the value added by the agriculture, forestry and fisheries sector per rural inhabitant was only DH 3 535, and DH 4 311 per agricultural worker.

TABLE 20
Sources of income of rural households, 1998-1999

Source	Percent
Salaries	15.5
Non-agricultural	16.7
Agricultural revenue	37.9
Joint income	10.0
Home consumption of production	6.4
Transfers	5.7
Ad hoc	7.8
Total	100.0

Source: Direction de la Statistique, ENNVM 1990/91 & 1998/99.

This figure was 15 percent below the estimated total per capita expenditure of DH 5 085 in the rural areas. Per capita food expenditure was estimated in 1998-99 at DH 2 746. In 1990 this accounted for 54 percent of the total per capita expenditure. Presuming that the amount of food expenditure remained unchanged in 2000, this would absorb 64 percent of the annual income of each household member living on agriculture. Table 20 provides an indication of the source of rural household income.

In 2000 the agriculture sector generated an annual income per active person that was 30 percent below the national income per active person. Nationally, the average value-added per worker was DH 38 289 in 2000 compared to just DH 11 244 per active person employed in agriculture in 2000.

The redefinition of the Government's economic role and the liberalization of external trade also contributed, initially, to the expansion of, and increased household dependence upon, the informal employment sector. In towns, the proportion of the self-employed in the active working population rose from 14.5 percent in 1987 to 22.9 percent in 1991 before falling back to 20.6 percent in 1998. This trend was also observed in the countryside.

The decline in the volume of average consumption appears to have affected different social classes differently, but has above all hit the rural and urban poor. Amongst the urban poor those belonging to the 30 percent whose expenditure per inhabitant is just above the poverty threshold suffered from the steepest decline in per capita consumption. However, the most marked decline in per capita consumption was among the poorest 20 percent of the rural population.

Between 1990/91 and 1998/99, the wealthiest 20 percent of the population improved their share of aggregate expenditure by 1.5 percentage points; the share of the poorest 20 percent fell back by 1.7 percent. However, the poorest urban decile increased their share of aggregate expenditure.

POLICY LESSONS

Unlike many other developing countries, Morocco's development strategy since the 1960s gave priority to agriculture. Morocco differed from many African countries in particular, in providing net support for agriculture rather than taxing it. The relatively high levels of support for agriculture have been enhanced by exchange rate

devaluations during the reform process, along with the relatively slow, and resisted, implementation of price reforms.

The high level of protection tended to serve the interests of large farmers and farmers in areas with a high agricultural production potential. It did not benefit the small producers in the semi-arid and arid zones, who mainly farmed to meet their own subsistence requirements and had few marketable surpluses. These social and regional differences have been further compounded by high domestic costs of production and inefficient resource use.

Differences in the performance of different commodities during the reform period can be partly explained by the extent to which domestic prices were protected from the secular downward trend in commodity prices. For soft wheat, changes in the world price only had an impact in the latter stages of reform. By contrast, for maize and barley, the domestic prices can be partially explained by world price changes. For groundnuts or sugar crops (beet and cane), domestic price changes are mainly due to changes in other factors.

Despite the rapid industrialization of the country over the past few years, Morocco's economic growth has been largely determined by the performance of the agriculture sector, which depends heavily on climate. The great variability in climatic conditions can make it difficult to determine the relationship between policy change and supply response, given large swings in production due to the droughts.

PASA 2 was ambitious and its objectives were more difficult to achieve than initially anticipated. Despite various changes to make the plan more flexible, it was delayed and only partly implemented. On the whole, PASA 2 was evaluated to be positive, but some reforms were still far from having been completed. One of the main reasons for this was an underestimation of the ability of large pressure groups, particularly in the agro-industrial sectors, to organize opposition to the reforms that they considered to be against their own interests.

Specific problems in implementing policy include a time lag between official policy decisions and policy implementation. There has also been some hesitancy and ambiguity in the liberalization of domestic agricultural marketing. For example, the law reorganizing the cereals market has been enacted, but it is facing serious problems and opposition and has yet to be implemented. The monopoly over the import and marketing of tea, sugar and seed has been abolished in theory, but private operators do not seem to be interested and the rules are not at all clear. Conversely, fertilizer trade has been properly liberalized.

The gap between the average income per agricultural worker and the national average indicates a need for greater agricultural productivity. The delay in increasing productivity in the agriculture sector is due to the slow pace of introducing innovations in cropping practices (the quality of mechanical work, the quality of seeds and plants, weed reduction, and methods of soil enrichment) and in livestock techniques (supervising flocks, selection, reproduction methods, veterinary care, and establishing feed diets). The low level of rural education and training and high illiteracy rates hinder improved productivity by hampering information flows and the dissemination of new technologies.

The reduction in investment programmes caused by the PASAs has restricted the Government's capacity to guarantee the necessary physical infrastructure for economic development and at the same time placed a curb on the main source of

growth, namely, demand. Private investment did not compensate for the reduction in public investment and the simultaneous liberalization of domestic and foreign trade did not give enough time for the domestic economy to prepare itself for foreign competition.

The policy for modernizing agriculture in Morocco has been designed to include the construction of irrigation dams; mechanization; and intensifying production using selected seeds, fertilizer and phytosanitary products. Irrigation plays a strategic role in improving Morocco's food security. Even though mechanization, including the tractor stock, has considerably increased since 1975, levels are still low and the steep devaluations of the dirham made agricultural equipment more costly during the 1980s. While the overall consumption of fertilizer rose from 60 000 tonnes in 1956 to 1 400 000 tonnes in 1990, consumption levels are still weak. Since 1987 the quantities of fertilizer used have fallen because of the abolition of subsidies, which has raised its price. There is also an imbalance in the use of agricultural equipment and other inputs between zones, crops and farms.

The reduction of poverty at the end of the 1980s was due mainly to the rapid expansion of the informal sector and to good agricultural seasons, combined with strong domestic demand mainly stimulated by increased wages and salaries. Since the main outlet for this sector is domestic market, the policy to restrict wages and public expenditure resulted in a reduction in per capita incomes of the active population, whether employed or self-employed. This reduction was not sufficiently offset by a redistribution policy for this category of the population (households working in the informal sector). Two indicators support this observation: an increase in national saving while the final per capita consumption was deteriorating, and an increase in the gap between the expenditure of the poorest and the richest groups of the population.

Poverty is both more frequent and more severe in the countryside than in the towns, and these disparities are even more marked in the regions of the south. The population has tripled since independence (1956), and the delay in taking account of this trend has annulled efforts to develop social services and facilities in the rural areas, and further worsened the gap between the rural and the urban environments.

In short, poverty is tending to rise and is one of the main concerns of the Government. Another major challenge is the need to reconcile short-term interests marked by economic and social imperatives and the need to protect the environment, which is more a long-term issue.

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Nigeria

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EXECUTIVE SUMMARY

Pre-reform

Marketing boards had monopoly power for organizing the purchase and sale of the country's export crops, they acted as fiscal agents of the Government and paid producers prices that were well below world market prices for their crops. In the late 1970s, most of the taxation elements had been removed. However, because of the overvaluation of the exchange rate farmers continued to be effectively taxed

The single most important event that served as the precursor of general economic policy reforms in Nigeria from the mid-1980s was the abrupt end of the oil export boom in 1981. This event and the associated responses to it had a severely negative effect on the Nigerian economy in general and on the agricultural sector in particular.

The reforms

In April 1984 a short-term programme consisting of ad hoc measures designed to reduce the fiscal deficit and suppress import demand as a means improving the balance-of-payments position was initiated. In July 1986, a two-year structural adjustment programme (SAP) was launched that included the introduction of a market-based exchange rate system, reform to the trade regime, and monetary and fiscal restraint. Although the SAP document envisaged 18 months for its implementation, the main elements were implemented up to the end of 1993 and beyond.

Changes in the exchange rate constituted the cornerstone of reform with a substantial devaluation of the naira in 1986, when the exchange rate declined by over 60 percent. This change was minor compared to the magnitude of depreciation experienced during 1986-93 (1 161 percent) and 1994-2000 (364 percent). Agricultural trade policy changes were not as radical and the main trade policy instruments remained essentially the same.

At a sectoral level, the focus was on agricultural export crops. The abolition of commodity marketing boards in 1986 was aimed at raising incentives for the production of agricultural export crops. On the input side, the removal of the ceilings on interest rates on rural loans and greater availability of agricultural credit through cooperatives were observed. Tighter controls on imports were established with a view to encouraging increased domestic food production and imports of wheat, maize, rice, vegetable oil, poultry and animal feed were banned.

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Impact on intermediate variables

Both rice and millet experienced substantial real price increases in 1986-93, but by 1994-2000, much of the gain in real prices had disappeared. Average real prices of export crops experienced substantial increases across the three sub-periods. Changes in domestic prices of major staples and cash crops were moderately positive in the pre-reform period (1980–1985) despite a decline in world prices of these commodities (cocoa, rubber, groundnut, coffee, palm kernel and palm oil) from 1980 to 1982. The positive changes in the prices were the result of moderate changes in exchange rate and in other factors.

The change in domestic prices of major cash crops during 1986–88 was positive and in most cases higher than in any other sub-periods under consideration. In most cases developments in the exchange rate drove the significant change in the domestic prices. The period between 1992 and 1994 recorded positive changes in the domestic prices of cash crops. Developments in the exchange rate and in macroeconomic and agricultural sector specific policies accounted for the observed trend. The 1995-1997 period witnessed a strong positive change in the exchange rate; however, the marginal change in the world prices coupled with unfavourable development in other factors, limited the positive changes in domestic prices for most cash crops.

In aggregate, the agricultural sector achieved an average annual growth rate of 5 percent over the period from 1980 to 2000. The average annual growth rates over the same period were 6 percent for all crops, 7 percent for staple crops and 3 percent for other crops. Agriculture's performance was particularly poor in the first half of the 1980s when aggregate agriculture grew at an annual average of only 2 percent. The second half of the 1980s witnessed a sharp improvement in the growth performance of the agricultural sector. The average annual growth rate of aggregate agriculture fell to 5 percent in 1990-95 and 3 percent during 1995-2000. There was a significant expansion in the area under cultivation suggesting that this was more important than intensification. Production increases also contributed to an increase in agricultural exports.

Impact on target variables

Food import dependence fell from an average of 13 percent of total imports during 1980-82 to 6 percent during 1989-91, but then rose to 12 percent in 1998-2000. The country's dependence on food imports is however minimal as significant proportions of most food items were met through domestic food production.

The number of undernourished declined from about 25 million in 1979-80 to about 7 million in 1998-2000. Daily calorie intake increased. There was a decline in the proportion of undernourished from 39 percent in 1979-80 to 13 percent in 1990-92 and further to 7 percent in 1998-2000.

The share of consumption of own production hovered between 20 and 26 percent for the period under review. The rural population's integration with markets for production and consumption remains limited. Farmers remained predominantly at a subsistence level of production and the reform did not alter this characteristic significantly. The real income of the average rural household rose by 60 percent between the pre-reform and the reform periods, and by 5 percent between the reform and post-reform periods. However, the incidence of poverty seems to be increasing. Self-employed rural households appear to have been better off, in terms

of real income gains, than their urban counterparts. The proportion of household expenditure on food increased in the reform period, but fell in the post-reform period to the levels attained in the pre-reform period.

Policy lessons

Agricultural liberalization, coupled with a depreciation of the national currency, generated substantial incentives to agricultural commodity producers. However, policy reversals and a lack of internal policy consistency generated confusing signals, limiting the supply response and preventing real structural changes in the agricultural sector. The response to the incentives created was below expectations. Gains were not consolidated.

National food security status has, however, improved and the incidence of malnutrition seems to have been reduced, although the data also points to an increasing incidence of poverty.

CONTEXT AND NATURE OF THE REFORMS

The role and level of development of the agriculture sector

In the 1960s, before the oil boom, the agricultural sector accounted for more than 60 percent of GDP, over 70 percent of total export earnings and about 70 percent of employment. By the end of the 1970s, the significance of agriculture had fallen dramatically, to about 40 percent of GDP and to about 2 percent of total export earnings.

A significant part of the decline in agriculture's dominance derives from the emergence of crude petroleum oil exploration and the subsequent oil boom of the 1970s. At the peak of the oil boom in 1980, crude petroleum accounted for 31 percent of Nigeria's GDP and 96 percent of total export earnings. By comparison, the manufacturing sector contributed less than 10 percent to GDP and less than 1 percent of export earnings.

In spite of the booming oil sector, however, agriculture retained its role as the source of employment for most Nigerians throughout the 1980s and the 1990s. As Table 1 shows, agriculture's contribution to total GDP was 35 percent during 1980–82. This share peaked at an average of 42 percent during 1986 – 88 and declined only marginally to 41 percent during 1998-2000.

The sector's contribution to non-oil GDP was higher averaging 41 percent in 1980–82 and reaching a peak of 48 percent in 1986–88, although it fell to 45 percent at the end of 1990s. In effect, the agricultural sector regained in the 1980s and 1990s part of the share of GDP which it had lost as a result of the oil-boom. This translates to 43 percent of the non-oil GDP in the pre-reform period, increasing to 48 percent in the post-reform period.

Between 1970 and 1982, sharp declines occurred in the annual production of cocoa (43 percent), rubber (29 percent), cotton (65 percent), and groundnuts (64 percent). While the aggregate value of agricultural exports fell by around 46 percent over this period, exports of cotton and groundnuts disappeared altogether.

The agricultural sector made a limited contribution to total exports between 1980 and 2000, varying from a peak of 4.3 percent in 1986-88 to a low of 1.3 percent in 1995-97, which translates to a decline from 2.3 percent in the pre-reform

TABLE 1
Share of agriculture in GDP, imports and exports, 1980-2000

	1980-82	1983-85	1986-88	1989-91	1992-94	1995-97	1998-2000	Pre-reform (before 1986)	Reform 1986–1993)	Post-reform (after 1993)
Agriculture as % of total GDP	35.2	38.6	41.9	39.4	38.1	39.1	40.8	36.9	39.8	40
Agriculture as % of non-oil GDP	40.6	45.1	48.1	45.4	43.8	44.8	45.1	42.9	48	45
Agricultural imports as % of total imports	15.0	14.0	12.0	7.0	11.0	14.1	14.0	14.5	10	14
Food imports as % of total imports	13.0	12.0	11.0	6.0	9.0	12.0	12.0	12.5	8.7	12
Agricultural exports as % of total exports	1.9	2.7	4.3	2.1	2.0	1.3	1.4	2.3	2.8	1.4
Agricultural exports as % of non-oil exports	81.0	63.3	73.8	54.9	55.6	37.8	37.6	72.15	61.4	37.7
Agricultural exports as % of agricultural imports	14.0	22.7	7.9	46.0	17.9	9.0	10.5	18.4	23.9	9.8

Source: CBN, Annual Reports and Statements of Accounts.

period to 1.4 percent in the post-reform period. By contrast, agriculture remained dominant as the major export source in relation to non-oil exports, although its relative contribution declined between 1980 and 2000 from 81 percent in 1980-82 to approximately 38 percent during 1998-2000. Thus, the contribution of agriculture to non-oil exports declined from 72 percent in the pre-reform period to 61 percent in the reform period and to 38 percent in the post-reform period.

On the import side, agriculture fluctuated between 7 and 15 percent of the value of total imports; while food imports accounted for between 6 and 13 percent of total imports. Over the entire period, agricultural export earnings were insufficient to finance the country's agricultural imports, most of which was food. In particular, agricultural exports financed between 8 percent and 23 percent of the corresponding agricultural imports over this period, except during 1989-91 when the proportion was as high as 46 percent. This was at variance with the early 1970s when earnings from agricultural exports were 277.4 percent of the agricultural imports. This was reversed in the second half of the 1970s when agricultural exports financed about 52 percent of agricultural imports. In sum, the performance of agricultural exports relative to agricultural imports was relatively better in the 1970s than in the last two decades.

Degree of openness of the economy prior to the reforms

From the 1940s, a series of commodity marketing boards had monopoly power for the purchase and sale of the country's export crops. These boards acted as fiscal agents of the Government and paid producers at well below world market prices. Reforms in the late 1970s removed most of the tax elements were, so that by 1982 producer prices were higher than world prices at the official exchange rate. However, because of exchange rate overvaluation, the world price was substantially discounted in terms of the naira; hence farmers continued to be taxed.

Government intervention with respect to the marketing and pricing of food crops was more limited in scope and more recent in origin. In the mid-1970s, the Government established food commodity boards to set official guaranteed minimum prices (GMPs) and act as buyer of last resort. The GMPs served as below-market safety net prices rather than as effective price-floors. In fact, they played little or no role in the pricing and marketing of food crops, as through much of the late 1970s and early 1980s, GMPs were typically less than 60 percent of average farmgate prices.

On the input side, an extensive programme of subsidies for agricultural inputs and capital equipment was developed from the mid-1970s. This covered tractors, fertilizers, improved seed varieties, herbicides, insecticides, fungicides and other chemicals. By the early 1980s, the subsidies had become substantial, ranging from 50 percent for tractors to 85 percent for fertilizers. They represented 10.2 percent of total government expenditure on agriculture in 1978 and 33.1 percent in 1981. Yet, this subsidy programme does not appear to have generated a substantial agricultural output response: food production barely kept pace with population growth and the production of export crops declined.

The Government was heavily interventionist with respect to economic policy making through the 1970s and early 1980s. This activist policy stance was particularly prominent in agriculture and gave rise to considerable institutional experimentation. Through the early 1980s, institutions were established and re-structured in such areas as production and product distribution and sale, as well as in input procurement, distribution, and finance. In 1980, the following government institutions were involved in production and input supply: Agricultural Development Projects (ADPs), River Basin Development Authorities (RBDAs), the Green Revolution Programme, the Agricultural Credit Guarantee Scheme, and the National Center for Agricultural Mechanization. For output purchase and export, the commodity boards constituted the most important institutions. The ADPs were established with the support of the World Bank as joint ventures between the federal and state governments to modernize smallholder farming systems across the country by providing integrated support, including key inputs, as well as research and extension services.

Motivations for the reforms

Nigeria's impressive growth performance during the 1975-80 period was largely fuelled by the oil boom - initiated by the quadrupling of crude oil prices in 1973-74 - but the overwhelming dependence of the economy on the oil sector had the inherent weakness of subjecting its growth and associated macroeconomic performance to the vagaries of world oil market fluctuations. During the first half of the 1980s, both the volume of oil exports and the price fell drastically. The country's total export earnings, which had risen rapidly from only US$4 billion in 1975 to a peak of US$26 billion in 1980, crashed by about 60 percent from this level by 1983 and declined by a further 50 percent by 1986. Correspondingly, GDP declined by an average of over 3 percent per year between 1980 and 1985; per capita GNP which had risen from US$360 in 1975 to about US$1 000 by 1980 fell rapidly back to only US$300 by 1986.

The oil price collapse also generated fiscal and balance-of-payments deficits (especially in the early 1980s when expenditure continued to expand even though

both export earnings and fiscal revenues had fallen off) and increasing inflation resulting from the way in which the rising fiscal deficit was financed. Rising external imbalances were temporarily financed by public sector borrowing abroad. This debt rose three-fold from less than US$9 billion in 1980 to well over US$23 billion by 1986 and brought along with it an unsustainable external payments obligation. The initial response to this problem was an austerity regime, which relied exclusively on demand restraint measures, including expenditure reduction and import control. As a result, both fiscal and external deficits fell sharply, particularly between 1983 and 1985. In particular, the overall public sector deficit fell from 12 percent of GDP in 1983 to 3 percent in 1985; the growth of net domestic credit to the economy fell from an annual average of 47 percent in 1980 to 13 percent during 1981-83 and 10 percent in 1984-85.

Coinciding with the drastic fall in export earnings, domestic agricultural production virtually stagnated As a result, import capacity was reduced, and the import of key food items was stringently compressed at the same time as purchasing power was falling. Consequently, food security at the national level probably worsened during 1981-85.

When the oil boom came to an end in 1981, the Government did not react immediately, and when it eventually did, the main focus of attention was on demand management measures, which were directed at restoring the balance-of-payments position. In 1983, the Government took steps to limit a wide range of imports, including a number of agricultural products: import bans were imposed on products such as rice, maize, vegetable oils and, at a later date, wheat. Import duties on food items such as grains and oils, were raised to between 50 percent and 100 percent during 1978-82. The placing of most agricultural imports under specific import licence soon followed this. Between 1982 and 1985, about 200 commodities were subject to quantitative import restrictions while virtually all food items were placed under export ban. In April 1984, a new reform programme was launched; but this was also built around ad hoc measures designed to reduce the fiscal deficit, compress import demand, save foreign exchange and improve the balance of payments.

This policy, driven entirely by balance-of-payments considerations, differed from the previous pattern. In the past, agricultural import policies fluctuated in response to changing priorities for on the one hand increasing food supplies and limiting food price increases to protect consumers; and on the other, stimulating domestic food production and raising rural income.

The single most important event to serve as a stimulus for general economic policy reforms from the mid-1980s was therefore the abrupt end of the oil export boom, in 1981. This event and the associated management of and responses to it had a severely negative effect on the economy in general and on the agricultural sector in particular (Table 2).

The oil-boom related "Dutch Disease"[2] affected agriculture through several channels. The exchange rate appreciated by 80 percent in real terms between 1973 and 1980 as oil revenue rose dramatically. The growing overvaluation of the

[2] The deindustrialization of a nation's economy that occurs when the discovery of a natural resource raises the value of the currency, making manufactured goods less competitive. The term originated in Holland after the discovery of North Sea gas.

TABLE 2
Key macroeconomic changes, 1980-1985

	1975-80	1981	1982	1983	1984	1985
Annual Growth Rate (%) of GDP	3.5	-5.1	-4.8	-3.3	-7.7	9.5
Annual Growth Rate (%) of Exports	5.5	-39.8	-14.3	-14.7	18.0	28.4
Annual Growth Rate (%) of Imports	6.3	11.4	10.0	-18.6	-19.4	-2.6
Resource Balance ($million)	9.36	-3.33	-5.09	-4.25	-3.39	-3.42
Current Account Balance ($million)	4.31	-6.04	-7.34	-4.99	0.12	2.60
Fiscal Balance as % of GDP	-1.20	-10.50	-9.50	-11.20	0.23	4.45
Official Exchange Rate (N/$)	0.54	0.64	0.67	0.75	0.77	0.89
Parallel Market Exchange Rate(N/$)	0.9	0.9	1.1	1.8		
Parallel Market Premium (%)	65.8	45.2	69.9	141.5		
Inflation Rate (%)	10.0	20.8	7.7	23.2	39.6	5.5
Agriculture (% of GDP)	26.51	26.76	30.62	32.96	49.4	40.3
Petroleum (% of GDP)	24.33	20.14	16.23	13.63	25.2	15.1
Manufacturing (% of GDP)	13.70	15.48	15.20	14.72	7.8	8.57

Source: CBN (various issues).

naira put agricultural exports in particular at a disadvantage. Further, growers of agricultural export crops suffered from the taxes and retention charges imposed by the commodity marketing boards and thus received only a proportion of the average world market prices for their crops. Even on the world market, the declining terms of trade for Nigeria's main agricultural commodity exports (such as cocoa, palm produce, and rubber) contributed to the decline in agricultural export earnings.

Macro and sectoral components and the policy instruments used

The first reform attempt was launched in April 1984. This was an essentially short-term programme consisting of ad hoc measures designed primarily to reduce the fiscal deficit and compress import demand as a means of saving foreign exchange and improving the balance-of-payments position. These measures succeeded in slashing the fiscal deficit. External imbalances were not as easily controlled. The further reduction by 50 percent of world prices early in 1986 caused oil export revenues to drop to US$6 billion. This increased the urgency of reform and made it clear that the problem had to be approached through a longer-term structural adjustment programme.

By this time, both the World Bank and the IMF had concluded that Nigeria's macroeconomic problems arose from an over-valued domestic currency (the naira), a protectionist trade regime and an unduly regulated economic environment. They proposed a programme of structural reform, but this was overwhelmingly refused in a national referendum.

In spite of this result, the Government launched a two-year structural adjustment programme (SAP) in July 1986, whose main components included the introduction of a market-based exchange rate system; reform of the trade regime starting with the elimination of the import licensing system; and monetary and fiscal restraint designed to moderate inflationary pressure on the real exchange rate.

One of the main aims was to control the country's large and growing external imbalances, so as to facilitate a re-negotiation of the external debt. More generally, the SAP sought to increase the competitiveness of the economy's non-oil tradable sectors. In specific terms, the aims of SAP included the restructuring and diversification of

TABLE 3
Macroeconomic indicators for Nigeria and Africa, 1980-2000

		Nigeria	Africa
Real GDP average			
Growth Rate (%)	1980-1990	1.6	2.5
	1991-2000	2.7	2.3
Current account balance			
(% of GDP)	1980-1990	-5.0	-2.9
	1991-2000	-3.0	-2.1
Fiscal deficit			
(% of GDP)	1980-1990	-5.2	-6.4
	1991-2000	-1.2	-4.0
Inflation: annual			
Average change (%)	1980-1990	21.6	15.7
	1991-2000	30.9	23.0

Source: ADB, 2001.

the country's productive base in order to increase efficiency and reduce dependence on the oil sector; achieving fiscal and balance-of-payments viability; improving the efficiency of public sector investments; and concentrating government efforts on the creation of an enabling environment.

Although the SAP document envisaged an implementation period of about 18 months, implementation of the main elements took until the end of 1993 and even beyond. For the purpose of this study, the reform period is taken as the period between 1986 and 1993, although there was a major policy reversal in 1994.

Table 3 shows the evolution of the economy in the reform and post-reform periods. Real GDP grew from 1.6 percent per annum during 1980-90 to 2.7 percent in the following decade. As a proportion of GDP, the country's current account deficit averaged -5 percent during 1980-90 but was reduced to an average of -3 percent over 1991-2000. As a ratio of GDP, its fiscal deficit fell from -5.2 percent in 1980-90 to -1.2 percent in 1991-2000. The country's average annual inflation rate increased from 21.6 percent in 1980-90 to 30.9 percent in 1991-2000.

Macroeconomic reforms

Fiscal policy

The need to pursue a tight fiscal policy predated the reform that started in 1986. The proportion of the budget earmarked for agriculture fell from 6.6 percent during 1980-85 to 3.7 percent in 1986-93 and rose marginally to 3.8 percent during 1994-2000. In terms of what was actually spent, the share of agriculture was much lower and this share fell after the reform period (Table 4).

One explanation for the fall in share could be that it reflected the decision to increasingly disengage the public sector from direct agricultural production, procurement and distribution.

Exchange rate policy

Changes in the exchange rate constituted the cornerstone of Nigeria's policy reform programme and were aimed at reducing price distortions and improving the efficiency of resource allocation. Although policy reform started with a substantial

TABLE 4
Agriculture in Federal Government spending, 1980-2000

	1980-85	1986-93	1994–2000
Budget			
Agriculture as % of total	6.61	3.72	3.75
Actual spending			
Agriculture as % of total	3.54	2.28	1.93
Actual/Budget (%)	**53.6**	**61.3**	**51.5**

Source: Authors' computations from various government documents.

TABLE 5
Changes in the exchange rate (naira/US$), 1980-2000

	1980-85	1986–93	1994-2000
Period average	0.7038	9.373	77.7959
Minimum	0.5468	1.7545	21.9960
Maximum	0.8938	22.0654	102.1000
Total change (%)	63.5	1 158.6	364.3
Annual average change (%)	12.36	165.88	60.72
Changes in real effective exchange rate			
Total change (%)	60.49	118.07	113.44
Annual average change (%)	10.08	13.12	16.21

Source: Authors' computations from various government documents.

devaluation of the currency in 1986, the exchange rate actually declined by over 60 percent during the pre-reform period. However, this change was minor compared to the magnitude of depreciation experienced during 1986-93 (1 161 percent) and 1994-2000 (364 percent) (Table 5).

The changes in the real effective exchange rate (REER) were smaller but followed the pattern depicted by the changes in the nominal exchange rate. The REER depreciated by about 60 percent in the pre-reform period, by 118 percent in the reform period and by 113 percent in the post-reform period.

Trade policy

Reform of the trade regime was designed to diversify the productive and export base and reduce import dependence. Special emphasis was laid on the development of non-oil exports, particularly those of agriculture and manufacturing.

Agricultural trade policy changes were not as radical as the corresponding exchange rate changes over the 1980-2000 period. Over the entire period, the main instruments deployed remained the same, i.e. import and export duties as well as quantitative import and export restrictions. But the mix changed over time:, export duties were already being phased out in the 1970s and had virtually disappeared by 1980. In 1984, import tariffs were rationalized and reformed by reducing the range of import duties from 0 to 500 percent to 5 to 200 percent.

From 1986, the process of trade policy reform started with a number of interim tariff reductions, a reduction in the number of items on the import prohibition list from 72 to 17 broadly defined product groups, and the abolition of import and export licensing schemes. This was followed by the introduction of a comprehensive tariff schedule for the seven-year period of 1988-94, followed by another established

TABLE 6
Agricultural tariffs, 1988-2000

	Agricultural tariff rates (%)		
	Average	Minimum	Maximum
1988	37.34	5	115
1990	37.31	5	115
1992	37.33	10	110
1994	35.18	15	100
1996	32.67	5	150
1998	32.68	5	150
2000	32.72	5	100

Source: Ogunkola, 2003.

TABLE 7
Structure of agricultural tariffs, 1988 and 2000

Tariff rate	Percentage of tariff lines	
	1988	2000
≤20%	29.09	28.84
≤50%	87.41	92.68
≤55%	12.60	7.32

Source: Ogunkola, 2003.

in 1995 to cover 1995-2001. The structure of agricultural tariffs contained in the two schedules shows a gradual decline in the average tariff on agricultural products (from 37 percent in 1988 to 33 percent in 2000) as well as a narrowing of the dispersion of tariffs around the average (Table 6). The percentage of tariff lines attracting tariff rates of 50 percent or less rose between 1988 and 2000, while the proportion with tariff rates of 55 percent and above fell from about 13 percent in 1988 to 7 percent in 2000 (Table 7). During the second half of this period, the highest average tariff rates were applied to the following product groups: beverages and spirits (76.4 percent); tobacco and products (61.2 percent); cereals (54.2 percent); and live tree, plants, and cut flowers (52.5 percent).

Agriculture sector reforms

In an attempt to boost domestic food production and enhance farm incomes, the first focus was on agricultural export crops. The abolition of commodity marketing boards in 1986 was aimed at raising the incentives for their production through the payment of more remunerative prices, which the equalization of domestic producers' prices with world market prices and the naira devaluation made possible. On the input side, reforms included the removal of the ceilings on interest rates on rural loans and greater availability of agricultural credit through cooperatives. On the import side, the change was in the direction of tighter control, with a view to encouraging increased domestic food production; imports of such food products as wheat, maize, rice, vegetable oil, poultry and animal feed were banned. Most of these policies were implemented at the inception of the SAP in 1986.

Institutional reform included the creation, strengthening or abolition of a range of institutions concerned with rural infrastructure and agricultural services. Importantly,

in 1986 the Commodity Boards were abolished. The Fertilizer Procurement and Distribution Department (FPDD) of the Federal Ministry of Agriculture was reorganized in 1989 in preparation for the privatization and commercialization of fertilizer trade.

Price policy
Direct public sector intervention in fixing prices for export crops ended with the abolition of the export commodity boards in 1986. The guaranteed minimum prices (GMPs) scheme for other crops had been largely ineffective, and instead, influence was exerted through the use of trade policy instruments, particularly import and export bans and licensing. While the use of these instruments diminished after 1986, it did not disappear entirely. In addition, exchange rate policy has had an impact on price trends, particularly for agricultural tradables.

Input supply policy
In the first half of the 1980s, the Government was actively involved in the procurement and distribution of key agricultural inputs, such as fertilizer, chemicals, and other farm machineries and equipment, typically at subsidized prices. The launch of the structural adjustment programme in 1986 heralded a new regime with respect to input supply policy. The mid-1980s saw a gradual move away from heavy fertilizer subsidization and by 1989, fertilizer prices had increased by 50 percent. This trend was, however, short-lived: a fertilizer subsidy was re-introduced in 1997. But, as in the past, this did not solve the problem of inadequate supply and lack of access to fertilizers by many small-scale farmers. During the last two years of the 1990s, supply shortfalls were regularly reported. In addition, the average cost of procuring a 50 kg bag of fertilizer was estimated at naira 1 800 in most parts of the country as against the recommended subsidized price of naira 800.

The decision to commercialize fertilizer procurement and distribution and to reduce the subsidy was therefore not consistently implemented. Fertilizer procurement and distribution through the public sector remained substantial through 1980-2000: The annual average quantity of fertilizer (about 1 371 thousand tonnes) procured and distributed by public agencies during the reform period was much larger than before 1986 and after 1993 (Table 8). However, the subsidy rate did decline from an annual average of about 75 percent during 1980-85 to 60 percent in 1986-93 and 64 percent in 1994-2000 (Table 9).

TABLE 8
Procurement and distribution of fertilizer by public agencies

	Annual average ('000 tonnes)
1980–1985	764.83
1986–1993	1 370.78
1994–2000	866.32

Source: CBN (various issues).

TABLE 9
Fertilizer prices (naira per 50 kg), 1980-2000

	Subsidized	Unsubsidized	Subsidy rate (%)
1980-1985	1.9	7.75	74.97
1986-1993	57.39	144.33	60.24
1994-2000	500	1 391.67	64.07

Source: Authors' computations from various government documents.

Credit policy

The standard policy before reform had three components. One was to compel traditional banks to set aside a certain proportion of their total credit for agricultural loans. The second was to establish special agricultural credit institutions. Finally, a concessional interest rate was imposed on agricultural credit. The first and third of these mechanisms were essentially phased-out as a result of the policy reform programme.

Agricultural credit received periodic policy attention. In 1985, for instance, lending institutions were required by the Government to grant a moratorium on the repayment of agricultural loans. In the following year, at least 15 percent of all loans made by commercial banks were to be allocated to agriculture, with the proviso that half of this should be reserved for supporting the production of grains. In an effort to further enhance the accessibility of small-scale farmers to credit, a new national small farmers' credit programme was inaugurated in 1987. These agricultural credit initiatives continued through the 1990s. Thus, in 1991, tax exemption was granted with respect to agricultural loans; while in 1994, loans for large-scale cropping, fishing and poultry farming were allowed five years of grace for repayment. Two years later, another initiative was launched to revitalize special banks to make funds available for the development of agriculture and rural infrastructure. Finally, the Agricultural Credit Guarantee Scheme Fund was strengthened to increase the amount of agricultural loans covered.

The average share of agriculture in total credit during 1980-85 was actually higher (13.5 percent) than the target of 9.0 percent. The share increased to an average of almost 22 percent during 1986-93, before falling to 12 percent in 1994-2000. Following the lifting of the cap on the interest rate on agricultural loans, the rate rose sharply from an average of 7.5 percent during 1980-85 to 22.6 percent in 1986-93 before falling by three percentage points to 19.6 percent in 1994-2000.

Social safety nets

None of the policy reform programmes adopted and implemented explicitly include official social safety nets. Several poverty-related government programmes were initiated during the reform period, including programmes relating to health, transport, housing and microcredit. However, a lack of clear targeting to those who were particularly vulnerable to the negative impact of the structural policy reform programmes meant that these initiatives did not provide an effective social safety net.

Food security

It is possible to view national food security initiatives as a distinct element of agricultural development strategy. These include the tasking of the National Grains Board to build up a strategic buffer stock of not less than 50 000 tonnes in 1986; as well as the creation the following year of a national food security and storage system with the capacity to hold 500 000 tonnes. In 1989, the reduction of high food prices was added to the objectives of agricultural development. During the first half of the 1990s, successive budget statements added the following objectives: reduction in food prices; accelerated production of food consumed by low and middle income groups; reduction in the high cost of food and fibre production; access to adequate

food and fibre at affordable prices; attainment and guarantee of national food security; sustained growth of agriculture to enhance domestic sourcing of industrial raw materials and to increase farm income.

The pace of the reforms and their completeness and sequencing

By and large, implementation of the policy reform schedules associated with World Bank loans was initially satisfactory. However, from 1988, the Government's changing fiscal posture began to undermine the stabilization objectives of the reform programmes. Rising extra-budgetary expenditures caused increasing inflation, which, in turn, placed downward pressure on the naira. The country's progressive abandonment of its reform programmes accelerated in 1993, with the restoration of a fixed exchange rate system. It was completed in 1994 with further foreign exchange and financial market controls and the forfeiture of fiscal discipline.

In 1995 the rapidly worsening macroeconomic situation led to the restoration of fiscal control and the establishment of a dual exchange rate system. A new market-based exchange rate system for private sector transactions operated alongside the official fixed rate system, which was restricted to official transactions. Finally, the dual exchange rate system ended in 1999, with all foreign exchange transactions carried out within the market-based system.

CONSEQUENCES OF REFORMS: INTERMEDIATE VARIABLES

Many of the reforms that have been implemented simultaneously or/and sequentially are aimed at removing structural bottlenecks that impede the proper functioning of the market mechanism. It is therefore difficult to isolate policies that have been beneficial or harmful to agricultural performance.

Trends in international and domestic prices

Average nominal prices of cassava, rice and millet rose rapidly over the three sub-periods indicated, but in real prices, the picture changes dramatically (Tables 10 and 11). In the case of cassava, the average real price increased only slightly between 1980-85 and 1986-93, and fell sharply during 1994-2000. Both rice and millet experienced a substantial price increase in real terms during the 1986-93 period, but by 1994-2000, much of the gain in real prices had disappeared, especially in the case of rice.

TABLE 10
Prices of cassava, rice and millet, 1980-2000 (naira per tonne)

		1980-85	1986-93	1994-2000
Cassava	Average nominal price	879.5	2 790.1	928.0
	Average real price	879.5	893.9	369.3
	Index of real price	100.0	101.6	42.0
Rice	Average nominal price	1 423.7	7 451.5	37 163.6
	Average real price	1 423.7	2 396.0	1 382.6
	Index of real price	100.0	168.3	97.1
Millet	Average nominal price	622.7	2 699.1	18 140.4
	Average real price	622.7	867.9	674.9
	Index of real price	100.0	139.4	108.4

Source: Authors' computations from price data in CBN, Statistical Bulletin.

TABLE 11
Prices of cocoa, rubber and palm oil, 1980-2000 (naira per tonne)

		1980-85	1986-93	1994-2000
Cocoa	Average nominal price	1 656.5	11 111.4	100 995.9
	Average real price	1 656.5	3 572.8	3 757.3
	Real price index	100	215.7	226.8
Rubber	Average nominal price	4 523.0	9 310.0	50 215.4
	Average real price	4 523.0	2 993.6	1 868.1
	Real price index	100	66.2	41.3
Palm oil	Average nominal price	389.8	3,409.6	46,405.7
	Average real price	389.8	1,096.3	1,726.4
	Real price index	100	281.2	442.9

Source: Authors' computations from price data in CBN, Statistical Bulletin.

TABLE 12
Change in real prices of selected cash crops, 1980-2000 (average percentage change)

	Pre-reform	Reform	Post-reform
Cocoa	-7.24	50.71	-2.77
Cotton	-7.41	34.91	28.96
Coffee	-7.49	33.14	60.56
Palm kernel	3.35	25.11	3.31
Rubber	-1.95	36.71	1.46
Palm oil	-2.65	73.02	-18.79
Groundnut	1.45	7.14	7.66
Benniseed	-9.36	36.79	-20.41

Source: CBN (various issues).

As in the case of the food staples, the average nominal prices of the key export crops experienced substantial increases across the three sub-periods. These increases were preserved in real terms in the cases of cocoa and palm oil. Rubber was the exception; its real price index fell to 66 in 1986-93 and declined further to 41 in 1994-2000.

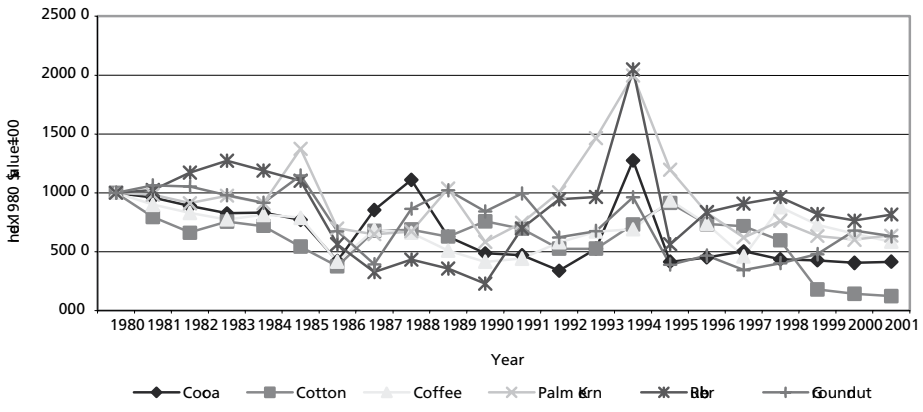
The average changes in the real prices of cash crops ranged from –9.36 (benniseed) to 3.35 percent (palm kernels) in the pre-reform period; and between 7.14 (groundnut) and 73 percent (palm oil) in the reform period. Changes in the prices of cash crops in the reform period were also more pronounced than in the pre-reform era. The changes in the real prices of these crops varied in the post-reform period. While the real prices of cotton and coffee increased significantly, sharp declines in the prices of benniseed and palm oil were also recorded during this period (Table 12).

With the depreciation of naira, there were significant increases in prices over the 1980 level. Apart from occasional fluctuations, notably for rubber and palm kernel in the pre-reform period, cocoa at the beginning of the reform and palm kernel and rubber towards the end of the reform, prices of cash crops were below their 1980 levels in 2001. The prices of cotton, groundnut and coffee were consistently below their 1980 prices in dollar terms.

Decomposition of price changes

Changes in domestic prices are composed of changes in world price; changes in exchange rates and changes in other, residual, factors such as trade policy (tariffs,

FIGURE 1
Trends in prices of selected agricultural commodities (Index 1980 US$ value=100)



Source: Based on data from CBN (various issues)

quantitative restrictions), fiscal policy (taxes and subsidies, etc), commodity/crop specific policies, transportation costs and marketing margins.

The results (Table 13) show that pre-reform changes in domestic prices of major staples and cash crops were moderately positive, despite a decline in world prices of cocoa, rubber, groundnut, coffee, palm kernel and palm oil in the 1980–82 period. This was the result of moderate changes in the exchange rate and in other factors. An exception was the fall in the domestic price of cotton where the positive change in the exchange rate was not sufficient to offset the combined effects of the decline in the world price and unfavourable changes in other factors.

The change in domestic prices of major cash crops between 1986 and 1988 was positive and in many cases greater than in the other sub-periods under consideration.[3] For most commodities, developments in the exchange rate drove the significant change in the domestic prices of cash crops through depreciation of the naira. The contribution of changes in other factors to the positive change in domestic prices, especially the abolition of marketing boards, is mixed. For cocoa, and cotton, the impact was positive. However, for rubber, palm kernel and palm oil, the impact was negative. The estimates suggest that the effects of other factors outweighed that of the marketing and trade policy reforms.

The change in the domestic prices was positive for all products except cocoa between 1989 and 1991, though it was generally inferior to the 1986-88 performance. Notwithstanding the relatively small change in the exchange rate, changes in world prices and in other factors seem to have driven the overall changes in domestic prices. The period between 1992 and 1994 recorded positive changes in all the components of the domestic prices of cash crops (except for a decline in the world

[3] An exception was the domestic price of cocoa in the 1989-91 sub-period.

TABLE 13
Composition of real price changes in selected agricultural commodities, 1980-2000

	1980-1982	1983-1985	1986-1988	1989-1991	1992-1994	1995-1997	1998-2000
Cocoa							
Change in domestic price	4.00	4.77	66.41	-2.65	59.85	12.75	0.12
Change in world price	-20.09	8.60	-11.77	-9.45	5.24	4.94	-19.43
Change in exchange rate	9.87	9.46	54.32	26.02	26.58	43.71	7.29
Change in other factors	14.23	-13.30	23.87	-19.22	28.03	-35.91	12.25
Cotton							
Change in domestic price	-10.73	2.85	62.31	26.38	28.29	43.02	-46.72
Change in world price	-15.15	-0.76	-0.77	6.96	1.42	-1.34	-6.74
Change in exchange rate	9.87	9.46	54.32	26.02	26.58	43.71	7.29
Change in other factors	-5.45	-5.86	8.76	-6.60	0.29	0.65	-47.27
Rubber							
Change in domestic price	17.83	7.44	23.10	42.07	62.34	16.67	1.54
Change in world price	-24.21	-2.67	5.19	-0.81	0.90	3.02	-0.05
Change in exchange rate	9.87	9.46	54.32	26.02	26.58	43.71	7.29
Change in other factors	32.17	0.65	-36.40	16.87	34.87	-30.06	-5.70
Groundnut							
Change in domestic price	12.57	12.26	44.90	30.70	25.51	9.21	30.26
Change in world price	-20.08	-6.75	10.85	9.33	-8.65	1.15	-5.27
Change in exchange rate	9.87	9.46	54.32	26.02	26.58	43.71	7.29
Change in other factors	22.78	9.55	-20.26	-4.64	7.58	-35.66	28.24
Coffee							
Change in domestic price	0.68	7.71	48.39	12.58	41.61	30.00	18.97
Change in world price	-4.93	1.36	-2.49	-15.43	18.59	7.32	-25.91
Change in exchange rate	9.87	9.46	54.32	26.02	26.58	43.71	7.29
Change in other factors	-4.26	-3.12	-3.44	1.99	-3.56	-21.04	37.59
Palm kernel							
Change in domestic price	5.27	23.10	30.54	29.57	59.28	4.71	6.30
Change in world price	-22.98	6.16	-0.76	-8.59	13.69	1.25	-12.45
Change in exchange rate	9.87	9.46	54.32	26.02	26.58	43.71	7.29
Change in other factors	18.38	7.48	-23.01	12.14	19.01	-40.26	11.46
Palm oil							
Change in domestic price	10.85	10.62	33.44	26.58	112.95	-23.68	9.56
Change in world price	-13.50	3.94	-4.54	-8.48	14.84	1.03	-18.91
Change in exchange rate	9.87	9.46	54.32	26.02	26.58	43.71	7.29
Change in other factors	14.48	-2.79	-16.33	9.04	71.52	-68.42	21.19
Rice							
Change in domestic price	5.00	27.82	14.82	99.46	-41.51	23.51	0.84
Change in world price	-15.01	1.41	3.89	-0.92	3.67	0.64	-6.13
Change in exchange rate	9.87	9.46	54.32	26.02	26.58	43.71	7.29
Change in other factors	10.14	16.95	-43.39	74.37	-71.76	-20.85	-0.32
Sorghum							
Change in domestic price	28.35	18.81	15.08	33.99	14.23	42.56	8.37
Change in world price	-8.67	-1.68	-1.51	2.18	-0.40	1.80	-7.32
Change in exchange rate	9.87	9.46	54.32	26.02	26.58	43.71	7.29
Change in other factors	27.15	11.03	-37.73	5.79	-11.96	-2.95	8.41

Note: Comparative results from price decomposition analyses across the case study countries are provided in Annex B of the Synthesis chapter. The results in Annex B present the change in the domestic price as a percentage change with respect to previous period. The case study analyses vary in that some present results as a percentage change with respect to a base period. Whilst the interpretation of results in the case study narrative holds irrespective of the end points compared, the results presented in Annex B should be used for comparative purposes.

Source: Computed by the authors from various government documents.

price of groundnut and other factors for rice and sorghum). The developments in the exchange rate and various macroeconomic and agricultural sector specific policies accounted for the observed trend.

The 1995-1997 period witnessed a strong positive change in the exchange rate. However, the weak changes in world prices, together with unfavourable development in other factors, limited the positive changes in domestic prices for most cash crops. The negative developments in other factors were even greater than the positive changes in the exchange rate, hence a fall in the domestic price of palm oil. The 1998-2000 period recorded marginal changes in domestic prices of major cash crops. Exceptions to this trend are the negative change in the domestic price of cotton and a significant positive change in the domestic price of groundnut. These exceptions are explained by changes in the residual factors.

Changes in the domestic price of rice and sorghum were positive between 1980 and 2000. The changes in prices of sorghum were relatively stable when compared with that of rice. As the changes in world prices were, at best, marginally positive, and the changes in the exchange rate consistently positive, changes in other factors exerted a decisive impact on the domestic prices. The reform period, 1986 to 1994, was characterized by unfavourable changes in the residual factors especially between 1986-88 and 1992-94. During the pre-adjustment period, the changes in the domestic prices of these food crops were positive notwithstanding the decline in world prices. Stable exchange rate and residual factors contributed to this development. Changes in the prices of rice and sorghum in the post-reform period were sustained by the depreciation of naira and changes in the residual factors as the changes in the world prices remained very low.

Table 14 presents a simple framework used to further investigate changes in agricultural prices as a function of real effective exchange rate (REER), international prices of agricultural products (IP), and trade policy indicators (TP). For the aggregate agricultural domestic price equation[4], the exchange rate elasticity is negative and statistically insignificant. The expected relationship between currency depreciation and domestic prices is not captured by the regression result. A possible interpretation is that an exchange rate-induced change in domestic prices was not sustained. The model captures medium to long-run relationships whilst the changes in domestic price as a result of exchange rate depreciation observed in the price decomposition was a short-run phenomenon.

As expected, the model captures a positive relationship between domestic prices and international prices. In the aggregate agricultural price equation, the international price elasticity is not only positive but also statistically significant. The fact that the elasticity is greater than unity (1.16) implies that domestic prices tend to respond more than proportionally to changes in international prices.

The index of trade policy (published tariff rates) exhibits a positive but statistically insignificant relationship to aggregate agricultural prices. Since this is an aggregation of prices, a plausible interpretation is that the reform has a mixed impact on the different sectors and the negative effects tend to outweigh the positive ones. The analysis at sectoral level supports this observation. The coefficient of the dummy is

[4] The specifications are in natural logarithm, thus the estimated coefficients are elasticities. The period for the analysis was from 1980 to 2002.

TABLE 14
Estimated price equations for selected commodities

	Constant	Logarithm of real effective exchange rate	Logarithm of international price	Logarithm of trade policy indicator	Dummy	R^2 (adjusted)	DW	F
Cocoa	-4.22	0.01	0.87	1.63	-0.45	0.76	2.22	12.24
t-value	(-0.41)	(0.21)	(2.02)	(0.58)	(-0.22)			
Coffee	-6.26	0.09	0.48	3.40	-0.06	0.87	2.03	24.47
t-value	(-072)	(0.12)	(1.52)	(1.15)	(-0.05)			
Cotton	15.46	-0.21	1.19	-6.59	2.30	0.77	2.35	12.99
t-value	(2.34)	(-0.23)	(3.00)	(-2.10)	(1.91)			
Groundnut oil	-23.62	0.46	1.12	5.95	-1.39	0.87	2.10	23.93
t-value	(-2.34)	(0.61)	(4.28)	(2.52)	(-1.42)			
Ginger	-1.68	-0.23	1.44	-0.33	-0.60	086	1.68	22.53
t-value	(-0.14)	(-0.31)	(3.32)	(-0.11)	(-0.40)			
Palm kernel	2.44	0.75	2.52	-5.94	4.51	0.55	2.59	5.24
t-value	(0.15)	(0.43)	(1.23)	(-1.08)	(2.25)			
Palm oil	-0.92	-0.11	1.26	-0.62	-0.63	0.81	2.22	15.56
t-value	(-0.06)	(-0.09)	(3.19)	(-0.17)	(-0.38)			
Soya Beans	14.26	0.36	0.71	-5.59	3.72	0.77	1.46	12.43
t-value	(1.02)	(0.32)	(1.54)	(-1.13)	(1.06)			
Aggregate	-22.47	-085	1.16	9.57	-2.12	0.77	.182	12.87
t-value	(-0.53)	(-1.00)	(1.66)	(0.73)	(-0.41)			

TABLE 15
Average price changes of staples by region, 1980-2000

		Lagos	Cross Rivers	Plateau	National
Garri	Pre-reform	-7.40	7.43	1.11	-4.49
	Reform	21.50	16.53	18.41	10.09
	Post-reform	19.35	6.34	7.25	-0.05
Rice	Pre-reform	3.98	2.03	4.79	5.54
	Reform	5.75	1.92	0.13	-1.97
	Post-reform	10.26	-3.22	3.67	-1.90
Yam	Pre-reform	-2.47	0.29	-6.91	-4.92
	Reform	22.27	25.19	16.17	3.09
	Post-reform	-8.14	-1.75	13.20	4.22
Beans	Pre-reform	4.81	7.61	8.51	5.02
	Reform	1.17	-1.70	-1.26	0.21
	Post-reform	-1.90	3.85	3.31	3.21
Millet	Pre-reform	-6.86	1.35	3.53	1.35
	Reform	10.77	13.69	3.44	5.82
	Post-reform	2.73	4.42	5.62	5.82
Maize	Pre-reform	-0.18	-3.94	7.10	-7.15
	Reform	7.43	8.54	8.48	0.77
	Post-reform	6.40	-4.03	4.32	5.05

Source: CBN (various issues).

negative and statistically insignificant, suggesting that the reforms had no appreciable impact on the aggregate domestic agricultural price.

In summary, though impact of the REER on selected agricultural commodities varies, the estimated coefficients are generally statistically insignificant. The elasticity with respect to the international price is generally positive and statistically significant. The effect of trade policy is mixed both in direction and statistical level of significance. While the estimate for cocoa, coffee, and groundnut oil recorded positive responses, others (cotton, ginger, palm kernel, palm oil and soybeans) recorded negative responses. Similarly, the direction, magnitude and statistical level of significance of the estimated coefficient for reform is mixed. For cotton and palm kernel it exhibited a strong positive relationship. For soybeans, however, a positive but weak relationship is captured. Others (cocoa, coffee, groundnut oil, ginger and palm oil) were negatively and weakly affected by the reform.

Market integration

Variations in price changes by region can be explained by regional differences in output, specialization and taste, and by high transport costs and marketing margins (Table 15).

Effects on agricultural output and value added

In this section, the findings from the price analysis are related to evidence of changes in output levels. These are presented by changes in area and in yield, in order to examine the link between prices (and non-price factors) and output response (or lack of response).

In assessing the ability of producers to respond it is important to recognize the agroclimatic context within which they operate as illustrated in Box 1.

Table 16 shows the performance of aggregate agriculture and of different crops. Over the whole period 1980-2000, the key crops did better than overall agriculture. Performance was particularly poor in the first half of the 1980s when aggregate agricultural output grew at an annual average of only 2.2 percent, although staple crops did better, while the output of other crops actually declined. The second half of the 1980s witnessed a sharp improvement in the growth performance of the agricultural sector, with staple crops leading the change. This trend was not sustained through the 1990s, when the growth rate of aggregate agriculture fell, as did that of staple crops. The output of other crops declined during 1990-95 but recovered in 1995-2000.

TABLE 16

Average annual growth rate of agriculture, 1980-2000 (percent)

	1980-85	1985-90	1990-95	1995-2000	1980-2000	Pre-reform	Reform	Post-reform
Aggregate agriculture	2.2	10.0	4.7	3.3	5.1	2.2	7.4	4.20
Crops	2.1	12.3	3.3	5.2	5.7	2.1	7.8	5.45
Staple crops	3.3	14.0	8.4	3.1	7.2	3.3	11.2	5.15
Others crops	-0.4	6.6	-0.2	6.0	3.0	-0.4	3.2	4.50
Population growth rate	3.18	2.95	2.95	2.67	2.94	3.18	2.94	2.85

Source: CBN (various issues).

BOX 1
Agroclimatic conditions

Nigeria has a land area of 923 708 square kilometres. About 31 percent is arable land and about 15 percent is forest cover. The climate is equatorial for the most part. The country has two seasons; the wet season from April to October, and the dry season from November to March. Regardless of seasonal changes, temperatures range from 20°C to 30°C. The mean monthly rainfall is greater than 10 cm and humidity averages above 60 percent. These averages hide considerable regional variations. For instance, the wet season ranges from only three months in the far north of the country to eleven months in the coastal south. Similarly, mean annual rainfall ranges from a low of 50 cm in parts of the far north to as much as 400 cm in parts of the south. The northern half of the country is much more susceptible to drought than the south. In addition, the heavy downpours associated with tropical storms, which this region experiences in its short wet season, often lead to severe leaching of the soils, rapid run-off and soil erosion. Only one crop per year can be grown in the northern part of the country under rain-fed agricultural production conditions. By comparison, annual rainfall in the south and much of the middle belt is adequate to support the planting of two crops each year.

In general, soils are highly weathered. About half of the country's soils are vertisols, lithosols, rigosols and the semi-arid soils that are of low quality (Udo, 1981). This is consistent with the finding by FAO (1966) that about 63 percent of soils can be rated as low or very low in productivity.

There are three main vegetation zones: the swamp, the forest and savannah zones. The swamp zones consist of fresh-water swamp and mangrove swamp. The mangrove swamp zone supports the cultivation of swamp rice; in the fresh-water swamp zone, fishing and fibre making are the main agricultural activities. The tropical high forest zone covers much of the southern half of the southeastern and southwestern regions of Nigeria. This zone accounts for most of the country's timber requirements and forest reserves. It is also home to the main perennial crops such as cocoa, oil palm, coffee, kola, cashew, rubber, roots and tubers (i.e. yam, cassava, cocoyam, sweet potato). In addition, the zone supports the cultivation of maize, rice, groundnuts, cowpeas, and beans.

The savannah vegetation zone covers much of Nigeria. There are five sub-divisions to this zone. Its southern-most belt is referred to as derived savannah and extends over the northern half of the south-west and south-east of the country, just north of the tropical forest zone, and supports the production of some grains, particularly maize, roots and tubers (cassava, yams) as well as tobacco. Immediately north of this belt is the southern guinea savannah sub-zone which covers the southern portion of the Middle Belt and produces yams, cassava, guinea corn, cotton, tobacco, soybeans, cowpeas and rice. The northern guinea savannah sub-zone supports grain and livestock production. The Sudan savannah sub-zone's main agricultural activities include the production of cereals (millet, sorghum, maize, and rice), cotton, groundnuts, legumes, and livestock. The sahel savannah sub-zone supports limited production of millet and groundnuts and has some potential for irrigated rice and wheat.

The traditional staples (grains and tubers such as millet, sorghum, cassava, yam and cocoyam) maintained steady and reasonable production growth rates during the 1980–2000 period. Other staples such as maize, rice, plantain, vegetables and beans have also held their own. Output growth performance is more mixed in the case of the traditional cash or export crops. In particular, the production trends for the tree crops (i.e. cocoa, palm produce, and rubber) have been below average. In comparison, commodities such as groundnuts and groundnut oil as well as cotton appear to be making a robust recovery, having virtually disappeared from the export list in the 1970s.

Apart from 1987, agricultural production increased between 1984 and 1992. However, although prices increased for all commodities, the direction of changes in output was mixed. More importantly, changes in output were generally lower than changes in prices. This suggests that while farmers responded to price incentives, changes in prices were not sufficient to elicit proportional changes in output. Put differently, absent or insufficient non-price incentives limited the output response to changes in prices.

Output of commodities such as yam, cottonseed, cottonseed oil and palm oil, which was declining in the pre-reform era, turned positive in the reform period; most of them sustained this positive growth even in the post-reform period. For some commodities, the pre-reform growth rates were superior to the reform rates. The commodities in this category include: wheat, maize, millet, sorghum, groundnut, groundnut oil, and palm kernel oil. These trends are summarized in Table 17.

A possible explanation for the observed uneven changes in output is relative changes in prices, as shown in Table 18. Comparing the relative changes in prices of the commodities within the sub-periods of pre-reform, reform and post-reform

TABLE 17
Growth rates in output of selected crops, 1980-2000

Average growth rate	Pre-reform	Reform	Post-reform
Rice (milled)	5.71	6.28	2.52
Wheat	66.14	-3.42	20.55
Maize	25.45	4.82	-3.74
Millet	9.02	3.94	2.09
Sorghum	6.49	3.84	2.22
Cassava	1.62	12.85	0.75
Yam	-1.90	17.42	2.94
Groundnut	6.82	6.43	14.11
Cottonseed	-14.35	6.82	10.23
Palm kernel	5.71	6.03	0.70
Groundnut oil	23.24	6.37	18.36
Cottonseed oil	-26.52	7.56	-2.57
Palm kernel oil	13.80	11.40	-4.31
Palm oil	-0.22	3.04	1.08
Cocoa beans	1.50	4.27	16.99
Index of sectoral production (1984=100)			
Crops	95.88	177.85	277.56
Staple crops	92.83	190.26	306.17
Other crops	102.8	136.1	170.21
Major agricultural commodities	97.42	160.36	245.16

Source: CBN (various issues); FAO, 2002.

TABLE 18
Relative price changes of selected commodities

Pj \ Pi	Period	Cocoa	Cotton	Coffee	Palm kernel	Rubber	Palm oil	Ground-nut
Cocoa	Pre-reform	1.0	0.8	1.0	1.2	1.3	1.2	1.2
	Reform	1.0	1.1	1.0	1.6	1.2	1.9	1.4
	Post-reform	1.0	1.1	1.7	1.8	1.9	2.7	1.1
Cotton	Pre-reform	1.2	1.0	1.2	1.5	1.6	1.4	1.4
	Reform	1.1	1.0	0.9	1.6	1.2	2.3	1.3
	Post-reform	1.6	1.0	2.5	2.5	3.0	4.2	2.1
Coffee	Pre-reform	1.0	0.9	1.0	1.2	1.3	1.2	1.2
	Reform	1.2	1.2	1.0	1.7	1.3	2.3	1.5
	Post-reform	0.7	0.7	1.0	1.1	1.2	1.7	0.7
Palm kernel	Pre-reform	0.9	0.8	0.9	1.0	1.2	1.0	1.0
	Reform	0.8	0.8	0.7	1.0	0.7	1.1	0.9
	Post-reform	0.6	0.6	1.0	1.0	1.2	1.6	0.7
Rubber	Pre-reform	0.8	0.7	0.8	0.9	1.0	0.9	0.9
	Reform	1.3	1.3	1.1	1.7	1.0	1.5	1.6
	Post-reform	0.6	0.6	0.9	1.0	1.0	1.5	0.6
Palm oil	Pre-reform	0.9	0.8	0.9	1.0	1.1	1.0	1.0
	Reform	1.1	1.2	0.9	1.4	0.8	1.0	1.5
	Post-reform	0.4	0.4	0.6	0.7	0.7	1.0	0.4
Groundnuts	Pre-reform	0.9	0.7	0.8	1.0	1.1	1.0	1.0
	Reform	0.9	0.9	0.8	1.3	1.0	1.8	1.0
	Post-reform	1.0	1.2	1.6	1.7	1.8	2.5	1.0

Note: pi/pj is the relative change in the price of commodity i with respect commodity j. When it is 1 it implies no change in price, when it is less than 1 it implies that price of commodity i is less than price of commodity j.
Source: Computed on the basis of data from CBN and FOS.

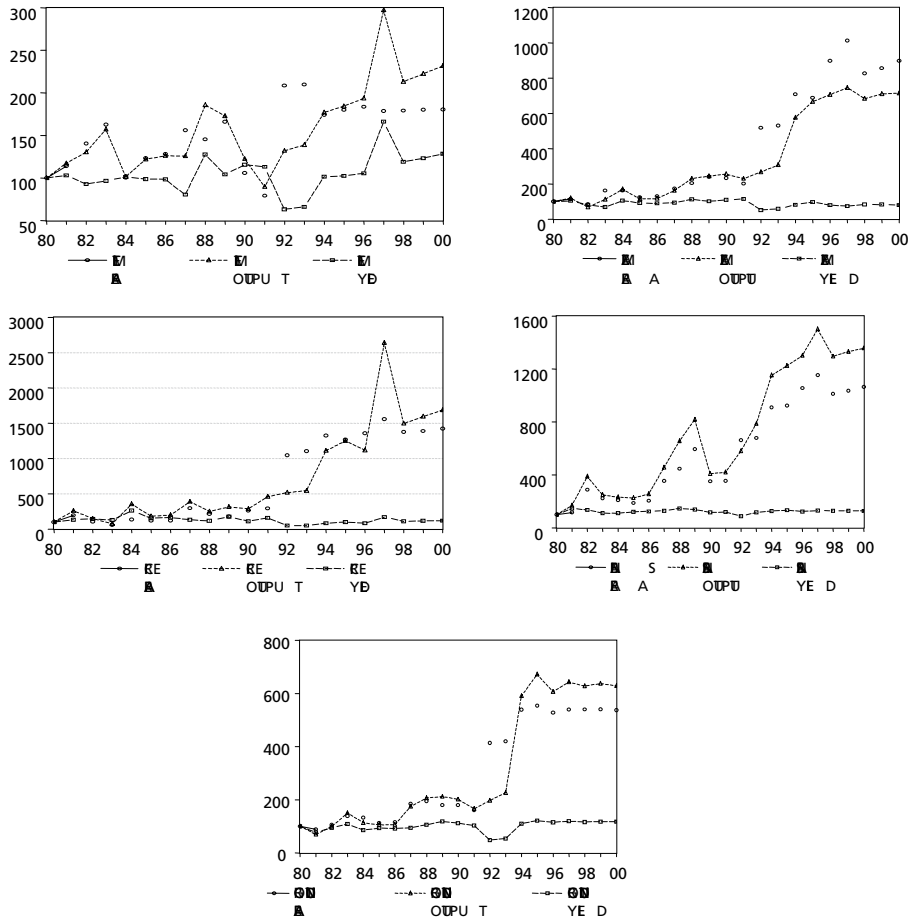
revealed the following pattern. First, the relative prices of cotton remain consistently inferior throughout the periods; and second, in the case of cocoa, changes in its relative prices, were consistently inferior to that of cotton for the three sub-periods, comparable with that of coffee for the pre-reform and reform period and superior to the changes in the price of coffee in the post reform era. Indeed, for other commodities, a reasonable conclusion from the statistics is that while the changes in price of cocoa in the pre-reform and reform periods compare favourably with those of palm kernel, rubber, palm oil, and groundnuts, these changes were superior to the corresponding changes in prices of palm kernel, rubber, and palm oil in the post-reform era. By and large the changes in prices of other commodities are comparable with each other except for cotton in the post reform period.

Output decomposition

Changes in area under cultivation show a long-term upward trend (Figure 2). This is explained in part by the activities of government agencies. Also, the relative improvement in the fortune of farmers at the start of the reforms coupled with the retrenchment of workers both in the public and private sector attracted more labour to the sector.

The reform has not, however, changed the pattern of agricultural technology, which remains predominantly rainfed, and is characterized by low yields, little use of modern inputs, limited access to improved seeds and seedlings, vulnerability to droughts, floods, pests, diseases and post-harvest losses, and a fragmented land

FIGURE 2
Trends in output, yield and area harvested of selected agricultural commodities, 1980-2000



Source: FAOSTAT, Annual Statistical Yearbook of Statistics (various issues)

tenure system. Farming is often conducted by the aged with little or no knowledge of modern farming practices. Much improvement is also required in developing an efficient and effective transportation system and in the provision of storage and distribution facilities.

Only 24 percent of the country's arable land is under cultivation. Between 1980-84 and 1995-99 the irrigated area had only increased from 3.3 percent to 3.7 percent of arable land. Tractors per thousand hectares of arable land increased slightly from 0.42 to 1.03, and fertilizer consumption decreased from 8.06 tonnes per thousand ha to 6.09 tonne per thousand hectares.

TABLE 19
Annual average real value of agricultural exports, 1980-2000 (million naira in 1985 prices)

	Food and live animals	Beverages and tobacco	Animal and vegetable oils and fats	Total
1980-82	417.4		16.8	434.1
1983-85	286.3		4.6	290.9
1986-88	92.3	0.6	0.3	93.2
1989-91	500.7	2.0	0.4	503.1
1992-94	366.8	3.2	1.7	371.7
1995-97	215.5	130.3	15.6	361.4
1998-00	317.8	192.5	22.9	533.3
Pre-reform	351.9		10.7	362.5
Reform	319.9	1.9	0.8	322.7
Post-reform	266.7	161.4	19.3	447.4

Source: CBN (various years).

Agricultural growth has been achieved through extension of cultivated land more than by intensification. To a certain extent this trend is expected to continue into the future as only about 30 percent of arable land is currently under cultivation. Ineffective land policy, strong family ties to the land, and relative uncompetitiveness of the sector are some of the limiting factors.

Effects on imports and exports

The production increases contributed to an increase in agricultural exports during the 1980–2000 period (Table 19).

The dominant agricultural export category consists of food and live animals. In the period 1989-2000, it accounted for roughly 80 percent of total agricultural export earnings. Beverages and tobacco products re-entered the export list during 1986-88 but had, by the last half of the 1990s, overtaken the third agricultural export category, animal and vegetable oils and fats.

Imports of agricultural commodities also experienced an 80-fold increase over the 1980-2000 period, rising from an annual average of naira 1 548 million in 1980-82 to naira 125 056 million in 1998-2000. This translates into an increase of about 17 percent in real terms (Table 20).

Food and live animals constitute the dominant agricultural import category. While this group of agricultural imports rose by 10 percent in real value between 1980-82 and 1998-2000, its dominance actually declined as its share of total agricultural imports fell from over 91 percent in 1980-82 to 88 percent in 1989-91 and just over 85 percent in 1998-2000. Imports of animal and vegetable oils and fats also increased sharply over the 1980-2000 period, with much of the increase concentrated in 1992-2000. By 1998-2000, this import category accounted for 9.6 percent of total agricultural imports, up from 7.2 percent in 1980-82. Compared to these two import groups, the imports of beverages and tobacco experienced the largest, a threefold, increase much of which was secured in the second half of the 1990s. This raised the share of beverages and tobacco imports from less than 2 percent of the total in 1980-82 to 5 percent in 1998-2000.

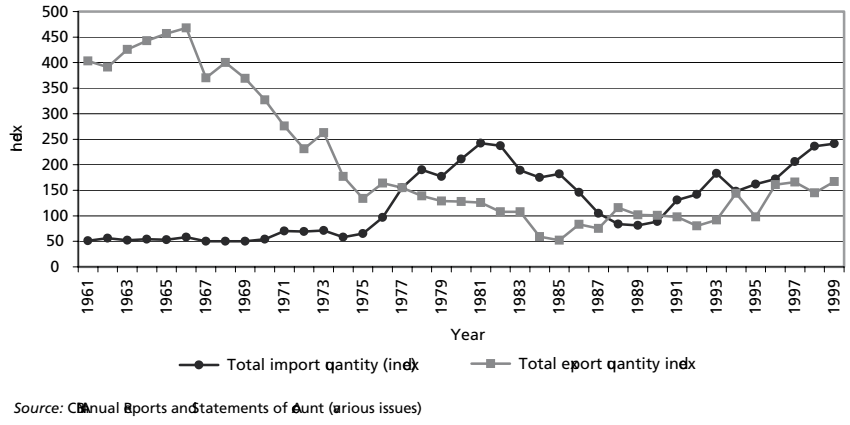
The export quantity index declined from between 400 and 450 in the sixties to around 150 in the latter half of the 1970s (Figure 3). The index of imports remained

TABLE 20
Annual average real value of agricultural imports, 1980-2000 (million naira in 1985 prices)

	Food and live animals	Beverages and tobacco	Animal and vegetable oils and fats	Total
1980–82	2 847.5	55.8	223.8	3 127.1
1983–85	1 171.8	8.4	99.5	1 279.8
1986–88	1 085.5	32.6	63.3	1 181.4
1989–91	962.3	69.8	62.4	1 094.6
1992–94	1 806.6	84.7	183.1	2 074.5
1995–97	3 505.5	136.9	363.3	4 005.7
1998-2000	3 140.6	182.7	353.6	3 676.8
Memo:				
Pre-reform	2 009.7	32.6	161.7	2 203.5
Reform	1 284.8	62.4	102.9	1 450.2
Post-reform	3 323.1	159.8	358.5	3 841.4

Source: CBN (various years).

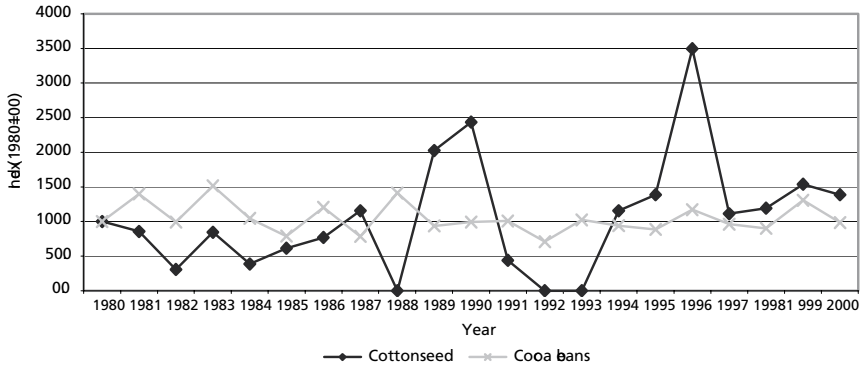
FIGURE 3
Agricultural trade: total import and export indices, 1961-1999



Source: CBN Annual Reports and Statements of Account (various issues)

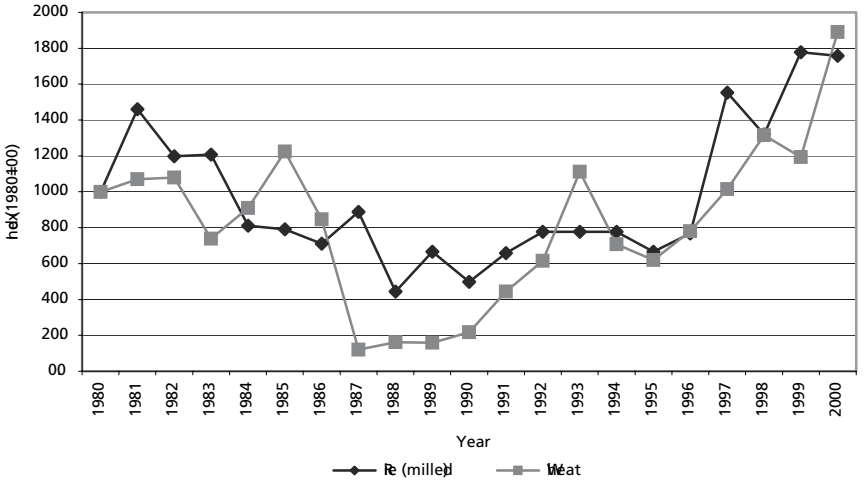
fairly stable at about 50 until the second half of the 1970s. The impact of the oil boom on the sector explained the observed trends. The decline in the quantity of agricultural exports continued, reaching an all-time low of about 50 in 1985. Similarly, the increase in the quantity of agricultural imports continued into the 1980s, reaching a peak of about 250 in 1981 and 1982. These trends are explained by the changes in both trade and exchange rate policies. The overvalued exchange rate prior to the introduction of the SAP reduced the competitiveness of tradables. The reform at its inception narrowed the gap between imports and exports and by the close of the 1980s, the index for exports was in excess of that of imports, due to the realignment of the exchange rate which began in 1986. However, the 1990s were characterized by relatively higher and increasing import quantities, although exports also continued to increase, albeit with significant annual fluctuations.

FIGURE 4
Trends in index of quantity of export of cocoa and cottonseed, 1980-2000



Source: CBAnnual Reports and Statements of Account (various issues)

FIGURE 5
Trends in import quantities of rice and wheat, 1980-2000



Source: CBAnnual Reports and Statements of Account (various issues)

The index for exports of cocoa beans revealed short-run variations around a constant long-run trend: the impact of the reform on the quantity of exported cocoa beans was negligible (Figure 4). Cottonseed is an emerging export but the quantity exported has been fluctuating widely, reflecting the vagaries of ecological conditions. On the import side, there was a continuous decline in the quantity of rice relative to the 1980 level, and wheat reached an all time low at the beginning of the reforms.

After that imports of rice and wheat rose again and their indexes increased to about 180 by 2000 (Figure 5).

An overvaluation of the naira clearly played the leading role in making Nigeria's traditional agricultural exports uncompetitive in the world market, thereby causing the production of these commodities to fall sharply during the 1970s and, in some cases, stop completely. Thus, between 1970 and 1982 annual production of the following key agricultural export crops fell by between 29 percent and 65 percent: rubber (29 percent), cocoa (43 percent), groundnuts (64 percent) and cotton (65 percent), with the result that aggregate value of agricultural exports fell by close to half over this period.

During the oil boom, the Government favoured a policy of cheap food, particularly for urban consumers. As a result, imports of wheat, rice, maize, vegetable oils, sugar and poultry rose phenomenally and Nigeria rapidly became a net food importer. In spite of this, domestic food prices rose sharply. The food component of the consumer price index (CPI) rose from a base of 100 in 1970 to 493 in 1982, and was higher than the all-items CPI every year during this period. This did not, however, translate into the same upward trend for real farmgate prices: real food crop prices declined relative to the overall CPI index during 1970-82.

By comparison, the labour cost of domestic agricultural production rose substantially during this period. As the oil boom generated a rapidly increasing demand for non-tradables, more and more rural labour was drawn into the urban areas and, as a result, seasonal labour shortages arose that, in turn, caused rural wages to rise. The three-fold increase in the real rural wage rate between 1970 and 1982 appears to have played a significant role in the poor performance of agriculture during this period, given the usually labour intensive nature of Nigerian agriculture and its increasing dependence on hired instead of family labour.

CONSEQUENCES OF REFORMS: TARGET VARIABLES

National food security

At the national level, the primary focus over the 1980-2000 period was to ensure food security by achieving food self-sufficiency across a broad range of agricultural commodities. In effect, policies promoted domestic production and restricted the import of food products.

National food balance

The trend in food-import dependence exhibited a clear pattern over the 1980-2000 period. First, it fell from an average of 13 percent of total imports during 1980-82 to 6 percent during 1989-91, then rose, progressing to 12 percent in 1998-2000. The trend is shown by food self-sufficiency indices in Table 21.

In examining the food self-sufficiency indices it is important to bear in mind that certain food crops are largely not traded internationally. Among these are millet and sorghum (which are also the major cereals consumed in Nigeria), as well as the starchy food crops such as yam and cassava. This explains why food self-sufficiency was maintained with respect to each of these commodities over the period. In addition, food self-sufficiency was maintained for the locally consumed range of fruit and vegetable commodities.

TABLE 21
Food self-sufficiency indices, 1980-2000

	1980-82	1983-85	1986-88	1989-91	1992-94	1995-97	1998-2000
Cereals							
Wheat	0.02	0.05	0.19	0.04	0.15	0.05	0.06
Maize	0.73	0.96	0.99	0.99	0.99	0.99	1.00
Millet	0.99	0.99	0.99	1.00	0.99	1.00	1.00
Sorghum	0.99	0.99	0.99	1.00	0.99	1.00	0.99
Rice	0.59	0.68	0.79	0.85	0.88	0.82	0.75
Roots and tubers							
Yam	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Cassava	1.00	1.00	0.99	0.99	0.99	0.99	0.99
Others	1.00	1.00	0.99	0.99	0.99	0.99	1.00
Fats and oils							
Palm oil	0.85	0.85	0.91	0.98	0.99	0.91	0.91
Groundnut oil	0.86	0.98	0.96	0.96	1.00	1.00	1.00
Vegetable oil	0.77	0.88	0.94	0.97	0.99	0.97	0.96
Soybean oil	0.00	0.00	0.04	0.62	0.12	0.76	0.57
Fruits and vegetables							
Vegetables	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Tomatoes	0.94	0.97	0.99	0.99	0.99	0.99	0.99
Fruits	0.99	0.99	1.00	1.00	1.00	0.99	0.99
Others foods							
Sugar	0.06	0.10	0.10	0.08	0.12	0.05	0.04

Source: FAO food balance sheet (various years).

Before the implementation of structural reforms, Nigeria maintained absolute self-sufficiency in root crops and tubers, and the country produced almost all the maize, millet and sorghum consumed. For major fats and oils, the country was highly self-sufficient, with appreciable levels of imports in some specific cases. On the other hand, only about 5 percent of wheat consumed was domestically sourced, and import dependency was also significant for rice and sugar, and was almost complete in the case of soybean oil. In spite of the restrictive policies which were in place at that time, local consumption of some major foods such as wheat, rice, sugar and soybean oil relied substantially on imports.

During the reforms, the country maintained a high level of self-sufficiency with respect to major cereals. However, import dependency on wheat remained extremely high, while self-sufficiency increased with respect to rice. Ironically, roots and tubers that were dependent on domestic production joined the list of items imported into the country. Import dependency reduced for major fats and oils. The emerging trend with respect to import dependency for rice, major roots and tubers, and soybeans was the result of changes in relative prices of these commodities. Soybeans and rice were respectively the most responsive in this respect, while a decline in self-sufficiency in roots and tubers could be explained by a shift towards the production of soybeans and rice due to the increase in their relative prices.

In the post reform period there were increases in self-sufficiency for many of the cereals. Self-sufficiency increased dramatically for soybean oil, which was mainly imported before and during the reform period. Import dependency for soybean oil declined from 96 percent in 1986-88 to 43 percent in 1998-2000.

Overall, significant proportions of most main food items are met through domestic food production. Table 22 reveals the decreasing proportion of food imports in gross

TABLE 22
Aggregate food supply in Nigeria, 1985 and 1995 ('000 tonnes grain equivalent)

Commodity groups	1985			1995		
	Domestic production	Imports	Gross supply	Domestic production	Imports	Gross supply
Cereals	9 382.79	2 036.4	11 419.19	20 915.28	941.24	21 856.52
Starchy foods	6 111.91	0	6 111.91	16 205.72	0	16 205.72
Grain legumes	1 907.92	0	1 907.92	4 040.93	0	4 040.93
Oilseeds and nuts	301.92	0	301.92	594.65	0	594.65
Vegetables and fruits	636.94	6.2	643.14	690.18	0	690.18
Vegetable oils	1677.6	330	2 007.60	3 334.60	0	3 334.60
Sugar	39.59	194.30	233.90	98.44	371.29	469.73
Livestock and fish products	842.6	200.6	1 043.20	834.42	80.58	915
Beverages	46.16	2	48.16	62.56	3.77	66.33
Total	20 947.43	27 69.51	23 716.94	46 776.78	1396.88	48 173.66

Source: Olayemi, 1998.

TABLE 23
Some food indicators for Nigeria

		1979-81	1990-92	1998-2000
Total population	Million	64.3	88.5	110.9
Number of undernourished	Million	25.2	11.9	7.3
Proportion of undernourished	Percentage	39	13	7

Source: Compiled based on FAO, 2002.

TABLE 24
Minimum required and actual caloric intake (calories per capita per day)

	Pre-reform	Reform		Post-reform
	1983-85	1986-88	1989-91	1994-97
Minimum required calorie intake per person/day	2 100	2 100	2 100	2 100
Actual calorie intake per capita/day	1 955	2 199	2 409	2 793
Actual /minimum required	0.93	1.05	1.15	1.33

Source: FAO (various issues).

food supply from about 12 percent in 1985 to about 3 percent in 1995. During the same period, the dependence of the country on imported cereals (especially wheat and, to a lesser extent, rice) declined from about 18 percent to about 4 percent, and of sugar from about 83 percent to 79 percent.

While the population of the country increased, the number of undernourished declined continuously from 25 million in 1979-80 to 7 million in 1998-2000, proportionally from about 39 percent of the population to 7 percent (Table 23).

The daily calorie intake per capita increased from 1 955 - less than the recommended minimum requirement - in the pre-reform period to 2 199 and 2 409 in the first and second halves of the reform period, respectively, and to 2 793 in the post reform period (Table 24). This suggests significant improvements in food security, although average caloric intake does not necessarily imply improvements in the nutritional status of the poorest households.

TABLE 25
Poverty headcount and ranking (percent of population) by geopolitical zone, 1980-1996

Zone	1980 % population (rank)	1985 % population rank)	1992 % population (rank)	1996 % population (rank)
North-East	35.5 (2)	54.9 (1)	54.0 (1)	66.7 (4)
North-West	37.6 (1)	54.1 (2)	36.5 (6)	68.0 (1)
North-Central	32.2 (3)	50.8 (3)	46.0 (2)	66.1 (6)
South-East	12.9 (6)	30.4 (6)	41.0 (4)	67.7 (2)
South-West	13.3 (4)	38.6 (5)	43.1 (3)	66.9 (3)
South-South	13.2 (5)	45.7 (4)	40.8 (5)	66.6 (5)
All Nigeria	27.1	46.3	42.7	66.9

Source: FOS, 1999.

Household level food security

The population is estimated to have increased from 84.73 million in 1980 to 118.80 million in 2001. The rural component, which was 73 percent in 1980, declined to about 56 percent in 2001, while the proportion of urban dwellers rose steadily from about 27 percent to 44 percent over the same period. Infant mortality per thousand live births has fallen by about 50 percent since the early 1980s and is currently 75. Life expectancy at birth is 54 years; up from 48 years in 1980. However, health care and health facilities have also deteriorated over time. Only 73 percent of children are fully immunized.

Rural households typically had a higher dependency ratio than the average urban household. The literacy rate of household members also reflects a significant urban bias.

Poverty increased from 27 percent (poverty headcount) in 1980 to 46 percent in 1985, declined to 43 percent in 1992 and increased further to 67 percent in 1996. These proportions translate, to an increase from18 million people in poverty in 1980 to 67 million in 1996.

The geopolitical distribution of the poverty headcount reveals two important features (Table 25). One is the concentration of poverty in the three northern zones of Nigeria in both 1980 and 1985 - in 1980 the average poverty headcount for the northern zones (35 percent) was more than twice as high as the average for the southern zones (13 percent). The other is the reduction in regional differences over time. The convergence was not due to an improvement in the poverty situation in either the northern or southern zones. Poverty worsened in both zones. By 1996, the average poverty headcount for the northern zones (67 percent) was actually slightly below the southern zones average (67 percent). The convergence is a reflection of the more rapidly worsening poverty situation in the south.

Changes in food production at household level

For all households, the share of consumption of own production hovered between 21 and 26 percent for the period under review. It depicted an upward trend between 1980 and 1985 (the pre-reform period) and this trend was maintained in the reform period. Table 26 points to a decline in consumption of own production as a share of total food expenditure in the post-reform period (21.4 percent in 1996).

TABLE 26
Consumption of own food production in total expenditure (percent)

	1980	1985	1992	1996
Consumption of own food production	22.8	23.1	25.8	21.4
Urban	4.4	7.8	14.3	5.9
Rural	25.6	35.3	34.2	33.8
Non-poor	22.0	20.9	24.9	17.0
Moderately poor	34.7	29.6	31.9	29.7
Extreme poor	28.9	31.0	29.3	31.1

Source: FOS (various years).

Rural households' dependence on consumption of own production is obviously much greater than that of urban households. It increased from about a quarter of expenditure on food consumption to slightly above one third in 1985. Although it has since declined slightly, it has still remained at about one third of total expenditure.

The observed trend suggests that rural dwellers' (mainly farmers) dependence on the market for food production and consumption is still limited. Farmers remain predominantly at a subsistence level of production and the reforms have not altered this characteristic significantly. For the poor (the moderately and extremely poor) the share of own food production in consumption was as high as that of the rural dwellers as a whole, which is consistent with the fact that most poor are located in the rural areas. The share of own production of the non-poor remained at about a fifth of food consumption throughout the entire period, apart from in 1996 when it declined to about 17 percent.

Changes in incomes and expenditure patterns

The average monthly income of both rural and urban households increased over the three periods in real terms. Overall, the real income of the average rural household rose by 60 percent between the pre-reform and the reform periods, and by 5 percent between the reform and post-reform periods. In the particular case of the wage-employed rural households, real income increases were 20 percent and 5 percent over these periods, respectively. In comparison, the wage-employed urban household's real income rose by 14 percent and 38 percent respectively. For the self-employed rural household, average real income increased by 50 percent and 12 percent over these periods; while their urban counterparts experienced average real income increases of 60 percent and –2 percent respectively. Thus, the self-employed rural households appear to have been better off, in terms of real income gains than their urban counterparts.

During each of the three periods the average income of urban household was higher than that of rural household (Table 27). The two income levels converged somewhat during the reform period. However, while the reform appears to have narrowed the income between the rural and urban households, the reversal of reforms in the post-reform period resulted in a widening the gap between the two.

Despite increasing average incomes, poverty increased over time for each of the four categories represented in Table 28. The level of poverty in the farming population is consistently higher than that of the non-farming population; it is also

TABLE 27
Average monthly household real income by type of household head (naira)

Period	Wage employed	Self employed	Other	All
Pre-reform				
Rural	236	150	103	141
Urban	251	169	146	190
Reform				
Rural	284	225	204	225
Urban	285	271	201	240
Post-reform				
Rural	298	251	173	236
Urban	394	266	229	299

Sources: NDSH,1990; FOS (various years).

TABLE 28
Distribution of poverty among the farming and non-farming population and between rural and urban areas, 1980-1996 (percent)

	Farming	Non-farming	Urban	Rural
1980	31.0	18.0	14.5	28.3
1985	57.0	36.0	37.8	51.4
1992	48.0	36.0	37.5	46.0
1996	76.0	59.0	58.2	69.0

Source: FOS, 1999.

TABLE 29
Poverty incidence and crop mix, 1996 (percent)

Farmers specializing in:	Non-poor	Moderately poor	Extremely poor
Food crops	25.02	29.40	45.58
Export crops	22.73	31.82	45.45
Food and export crops	30.55	34.07	35.38
All farmers	23.19	28.75	48.06

Source: FOS (1999).

higher in the rural than the urban areas. The difference in the poverty level between the rural and urban population has decreased over time.

In 1996, a larger proportion of farmers specializing in food crop production was above the poverty level than farmers growing export crops only, although both groups suffered a similar level of extreme poverty (Table 29). It is to be expected that food growers are more food-secure than those who rely on the market for food. Farmers who produced both food and export crops suffer least from poverty, illustrating the benefits of diversification.

Household expenditure

The pattern of household expenditure replicates several of the key features of household income (Tables 30 and 31). In real terms, household expenditures experienced increases across the board only between the pre-reform and reform periods.

Subsequently, the average expenditure of each type of household declined, with the exception of the urban wage-earning household, which achieved an increase of about

TABLE 30
Average monthly real expenditure (naira) per household by type of household head

Period	Wage earner	Self employed	All
Pre-reform			
Rural	188	153	152
Urban	239	201	204
Reform			
Rural	253	249	228
Urban	257	250	236
Post-reform			
Rural	225	183	182
Urban	273	227	231

Sources: NDSH, 1990; FOS (various years).

TABLE 31
Percentage distribution of household expenditure

	Food expenditure		Other expenditure
	Cash	Non-cash	
Pre-reform			
Rural	36	39	25
Urban	53	12	35
Reform			
Rural	46	34	20
Urban	62	13	25
Post-reform			
Rural	40	28	32
Urban	55	6	39

Sources: NDSH, 1990; FOS (various years).

6 percent. In other words, the gains of reform, in terms of real expenditure increase, were partially lost in the average household following the reversal of reforms.

The proportion of household expenditure on food increased in the reform period and fell in the post-reform period to the levels attained in the pre-reform period. In the case of rural households, food expenditure was 75 percent of total spending in the pre-reform period. This rose to 80 percent in the reform period but fell in to 68 percent subsequently. The corresponding proportions for the average urban household were 65 percent, 75 percent and 61 percent respectively. The average rural household devoted a higher proportion of its total expenditure to food during each of the three periods than the typical urban household. The average rural household's food expenditure consisted of a high proportion of consumption of own-production. The declining proportion of consumption of own-production in the total food expenditure of rural households points to increasing reliance on the market for the purchase of food.

The average household's actual food expenditure during the entire period was more than adequate to meet the minimum required food expenditure necessary to maintain a satisfactory diet (Table 32).

An analysis of the household food expenditure pattern in 1996 reveals variations in terms of the rural-urban dimension as well as in relation to poverty status (Table 33).

TABLE 32
Minimum required and actual food expenditure (1985 naira)

	1980	1985	1992	1996
Minimum required food expenditure	471.5	326.2	1 319.8	300.2
Actual food expenditure (naira)	4 664.7	4 490.4	6 595.4	2 766.70
Actual/minimum required	9.89	13.76	5.00	9.21

Source: FOS, 1999.

TABLE 33
Household food expenditure pattern, poverty status and location, 1996

	Actual food expenditure (naira)	Purchased food (%)	Own-produce consumption (%)	Actual/min required food expenditure
Urban	**2 867.9**	**89.7**	**10.3**	**1.04**
Rural	**2 701.3**	**50.0**	**50.0**	**0.98**
Poverty status				
Non-poor	**3 684.7**	**70.9**	**29.1**	**1.33**
Moderately poor	**2 375.1**	**59.3**	**40.7**	**0.86**
Extremely poor	**1 412.4**	**59.3**	**40.7**	**0.51**

Source: FOS, 1999.

The incidence of food insecurity was roughly comparable in rural and urban areas; in both locations, actual household food expenditure was just sufficient to maintain a minimum level of satisfactory diet. Variation in the incidence of food insecurity was more significant in relation to poverty status.

In particular, while the actual food expenditure of the average non-poor household was about a third higher than the minimum requirement, in the case of the moderately poor the coverage was 86 percent and for the core poor, it was even smaller at 51 percent.

Food consumption in rural households was equally split between cash purchases and own-produce consumption. The average non-poor household relied on purchased food for 71 percent of its consumption, compared to 59 percent in the case of the poor.

Household expenditure pattern before reform reveals that about 45 percent of average monthly expenditure by rural wage earners was spent in the food market. The corresponding figure for urban counterparts is about 48 percent. The figure increased to about 58 percent (rural) and 67 percent (urban), during the reforms. At the same time there was an increase in consumption of own production by rural wage earners, suggesting that this was a strategy to hedge against failure and insecurity with respect to food markets (consumption of own production by wage earners was 2.9 percent and 16.7 percent for urban and rural workers respectively). Food transfers have also helped to provide increased security for the poor; this is operated through family members, social and religious groups.

POLICY LESSONS

Reform objectives and strategies overtly relied on market forces that were driven by the need to eliminate the country's large and growing external imbalances.

Trade, exchange rate and institutional reforms were key elements of the reform programme.

The liberalization of agricultural marketing coupled with currency depreciation increased the incentives facing agricultural producers. However, the effects of devaluation were mixed. Devaluation helped offset the negative impact on the domestic price of tradables of declining international commodity prices and helped increase the earnings of farmers. On the other hand, it also increased the cost of inputs, such as seed, seedlings, fertilizers and chemicals increased. This rise in input prices was exacerbated by the removal of government input subsides.

Growth in agricultural output has been more closely associated with increases in cultivated area and labour input than with increases in yield and agricultural intensification. At the early stage of the reform, additional labour was released from other sectors of the economy to the agricultural sector and this contributed to boosting agricultural output, primarily through increases in harvested area. The activities of government agencies also helped. However, the response to higher prices was below expectations. Agriculture continued to be characterized by low yielding, rainfed production on fragmented landholdings. Failure to adopt improved technologies and persistent vulnerability to the vagaries of climate remain a major constraint to increased agricultural productivity.

Nevertheless, national food security seems to have improved since the pre-reform period in terms of per capita availability of food and calorie intake.

Cropping patterns in Nigeria have always favoured food crop production. Yet, despite near self-sufficiency in a large proportion of non-tradable food staples, Nigeria continues to import large quantities of food (especially, wheat, sugar and rice) which continues to dominate total imports. Agricultural trade, especially regional trade in food staples, appears to have increased, suggesting increased regional specialization as a result of reform. The reform period saw increased production of cash crops but the tempo was not sustained in the post-reform period. It is noteworthy that farmers relying exclusively on export crops had higher poverty rates than those who produced only food crops, and those that produced a combination of food and cash crops (the latter had the lowest poverty rates).

Analysis at the household level suggests that the reforms may have narrowed the income gap between rural and urban households. Unfortunately, the reversal of the reforms resulted in a widening the gap between the two. In the 1980s, poverty was significantly higher in the northern regions, but by the 1990s, the incidence of poverty in the south had reached the same level as in the north. The incidence of poverty at a national level increased significantly during the 1980s and 1990s, although it fell slightly during the reform period, before increasing again in the post reform period.

There has been no official social-safety net programme to ameliorate the impact of adjustment on vulnerable groups. Social programmes aimed at the poor were not well targeted and failed to address the negative impacts of the policy reforms. The increasing incidence of poverty points to a need for better targeted social safety nets.

The policy environment has been unstable, with policy reversals and a lack of internal consistency generating confusing signals. The decision to disengage the public sector and encourage the private sector to assume increased responsibilities in certain agricultural activities has been problematic. For example, as a result of the sudden

abolition of the commodity boards, farmers were exposed to sharp fluctuations in world commodity prices and exchange rate risk without any compensatory policies. Also, without quality control services provided by the boards, there was some deterioration in product quality that adversely effected export sales, particularly in the case of cocoa.

The initial response of the agricultural sector was positive and significant. The favourable environmental conditions also helped. The gains were, however, not consolidated. Policy reversals, especially in trade policy, as well as unfavourable international prices limited the supply response and prevented real structural changes in agricultural production taking place.

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Peru

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EXECUTIVE SUMMARY

Pre-reform

Peru was a highly distorted economy with widespread government intervention in product, service and factor markets. Most basic agricultural products had guaranteed prices, implemented through the operation of public enterprises such as the Enterprise for Rice Marketing which had a pan-territorial buying and selling price, thus benefiting producers and consumers in remote locations. The main inputs were subsidized. Average import tariffs for primary agricultural products were in the range of 50 percent to 60 percent, and non-tariff barriers were widespread.

The reforms

From 1990 to 1993, a tough economic reform programme was implemented, consisting of trade liberalization, fiscal and monetary restraint, the introduction of a floating exchange rate, and the privatization of public enterprises. The post–reform period of 1993-1997 saw rapid growth in GDP, trade, and foreign investment, and improvement in social welfare indicators. However, the economy went into recession in 1998. The institutional framework was reformed, eliminating state marketing agencies and agricultural banks with a view to relying more on private sector initiatives, although the private sector response was slower than expected. Input and credit subsidies were replaced by investments in rural infrastructure to reduce transaction costs to farms and non-farm activities. The experience with government credit provision schemes was disappointing, with massive losses in capital reported. Most of the credit to the agricultural sector now comes from commercial banks and there was a dramatic reduction in the number of small farmers supported by the formal financial system during the 1990s. At the macroeconomic level, exchange rate and interest rate determination were left to market forces, with occasional government intervention.

The main objectives of the reforms were to control domestic inflation, to achieve fiscal and monetary discipline, to obtain a balance of payments equilibrium, to boost economic growth and to reduce unemployment. Exchange rate reform was a key element and one of the first measures was the unification of the exchange rate system and later, in 1991, the adoption of a free-floating exchange rate policy. Tariffs were reduced to 26 percent and all non-tariff restrictions on imports were eliminated. The most important exception was the price band system, applied to some sensitive products.

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All price interventions in agricultural product and input markets were eliminated and all state monopolies were abolished. Currently, agricultural support policies amount to only 5 percent of the total value of production in the sector. Important safety net policies were initiated in tandem with the reform programme and took the form of food and health programmes for the extremely poor, with support from multilateral financial institutions and non-governmental organizations.

Impact on intermediate variables

Trade and related reforms have substantially changed the agricultural incentive framework and have impacted negatively on agricultural prices. There was a profound deterioration in the terms of trade of agricultural products vis-à-vis the rest of the economy as a result of hyperinflation and the breakdown of the agricultural incentive system at the end of the pre-reform era. Despite positive world market agricultural price trends during the second half of the 1990s, agricultural producers faced deteriorating domestic terms of trade. Between agricultural products there were important changes in relative prices; for example, a reduction in the relative price of cotton with respect to rice and yellow maize. The most important variables in explaining changes in domestic prices were the real exchange rate and the world price index. Tariff levels were found to be less important. Specific trade reforms do not seem to have had a significant effect on the evolution of real agricultural domestic prices.

After a short-lived production increase during the pre-reform years, agricultural production gradually collapsed until reaching its lowest per capita level in 1992. Growth accelerated after 1992 despite the persistent negative price trends. The evolution of output is explained mainly by increases in yields due to better than expected weather and support provided through government programmes on infrastructure and technology, small-scale irrigation works, and measures to increase crop and livestock productivity.

The value of agricultural trade more than doubled in the five-year period after the reforms begun. Exports grew by 13.8 percent per year, and imports increased at a rate of 14.8 percent per year during the second half of the 1990s.

Impact on target variables

In the past, food supply has often been inadequate to provide the amount of calories considered sufficient for a healthy life. However, in the second half of the 1990s, the recovery of domestic food production and increased imports allowed Peru to overcome its food availability problem. The sudden improvement in food availability has made Peru stand out as one of the apparent liberalization success stories. The proportion of undernourished decreased from 40 percent of the population in the early nineties (1990-1992) to only 11 percent in the late nineties (1998-2000). No other country managed to achieve this kind of improvement in nutrition indicators in such a short time.

However, the financial situation facing most small rural farmers deteriorated sharply during the late 1980s and did not improve with the policy reforms – a consequence of the downward trend in the prices of the small farm production basket, the upward trend in agricultural input prices, combined with depressed real wages and employment. In 1997-2000, real income obtained from one hectare planted with main small farm products was substantially lower than in mid 1980s.

A social safety net programme and associated transfers have played an important role in helping vulnerable households to cope with economic hardship and food insecurity. Additionally, the substantial reduction in agricultural real prices allowed the non-farming poor and food-deficit farmers to maintain or even increase their access to food. These factors are consistent with the hypothesis of a substantial improvement in food security following the policy reforms in the early 1990s.

Policy lessons

Trade and related reforms have substantially changed the agricultural incentive framework and have impacted negatively on agricultural prices. The food security picture for Peru showed overall improvements across a range of food security indicators during the 1990s. With a resumption of economic growth, access to food improved, particularly after the mid 1990s. Poverty was reduced and extreme poverty was diminished even more. These achievements gave rise to significant nutritional gains for most of the 1990s.

However, during 1998-2001, the economic situation in Peru deteriorated dramatically, with an increase in extreme poverty from 15 to almost 25 percent of the population. The gains in food security in the mid-1990s did not prove to be sustainable. Furthermore, the situation of most small rural farmers, which had deteriorated sharply during the late 1980s, did not improve with the subsequent policy reforms. Their plight and that of the agricultural sector and the rural sector as a whole remains a major policy challenge.

INTRODUCTION: CONTEXT AND NATURE OF THE REFORMS

The role and level of development of the agriculture sector

Agricultural production has increased almost continuously since 1985, even though the relative prices of agricultural products have been decreasing. The average rate of growth increased from 1.5 percent per year in the pre-reform period to 5.9 percent in the late post-reform period, most of the time outperforming total GDP growth. As a consequence, the share of agriculture in GDP has increased (Table 1).

The main agricultural products in terms of output value are sugar and coffee (exportables); potatoes, alfalfa and plantains (non-tradables); and poultry, rice, milk and maize (importables). These products represent close to 80 percent of Agriculture Value Added in 1995. Their relative importance has changed since 1985, the most

TABLE 1
Agricultural indicators, 1985-2000

	1985-90 (%)	1990-95 (%)	1995-2000 (%)
GDP Growth Rate (average)	-2.9	5.3	2.4
Per capita GDP Growth (average)	-4.9	3.5	0.7
Real Agricultural GDP growth (average)	1.5	4.5	5.9
Agric GDP/Total GDP	7.2	7.7	8.2
Agric Export Growth	-2.2	13.8	3.6
Agric Import Growth	6.8	14.8	-6.0
Share Agric Exports to Total Exports	10.5	9.1	10.9
Share Agric Imports to Total Imports	21.2	19.1	16.1

Source: INEI, 1990, 2000, FAOSTAT and CUANTO, 2001.

TABLE 2
Main agricultural products, 1990-2000

Importables	Exportables	Non-tradables
Poultry	Sugar	Potatoes
Rice	Coffee	Alfalfa
Milk	Cotton	Plantains
Yellow maize	Garlic	Cassava
Grapes	Onions	White maize
Oranges		
Apples		

Source: Computed by authors from FAOSTAT.

important being the declining share of cotton and sugar, the surge in poultry production and the production of vegetables for export. Tradables represent around 61 percent of the total value of the commodities in Table 2.

For small farmers, the key crops are potatoes, maize and plantain. For large farmers and cooperatives, the key crops are most of the above listed products, especially rice, sugar cane, maize, coffee, and alfalfa. Most of the products from the coastal region are tradables, while the production of non-tradables is concentrated in the Sierra and to some extent in Amazonia.

Agricultural exports have grown less rapidly than mining and other exports – the agricultural share has decreased from 10 percent in 1985 to 9 percent in 2001. Traditionally, the main agricultural export commodities have been coffee, sugar, cotton and cocoa. However, exports of sugar and cotton have continuously decreased in the post-reform period and have been replaced in terms of importance by non-traditional exports such as fruits (mangoes, grapes) and vegetables (asparagus, onions). The markets for these new exports include the APEC countries.

The main import commodities in the 1990s were grains (wheat, maize, rice, barley), oils (soyoil), milk products, and meats. Import-competing activities in the economy are the production of maize, rice, palm oil, milk products and ovine/bovine livestock. Some traditional exports have already begun to be imported, due to reduced domestic production incentives, quality differences and market segmentation. Such is the case with cotton and sugar. Peru has shifted from being a net exporter of these commodities in 1985 to a net importer in 1995 and 2001.

Several categories of small farmer are distributed between non-commercial and commercial agriculture. Small-scale peasant producers with landholdings between 1 and 5 hectares constitute the vast majority of farmers. The majority of these are located in the Sierra, which is predominantly an area of poorly developed rainfed agriculture. The commercial producers are mainly located on the coast, where there is a concentration of financial and commercial services and better productive and institutional infrastructure. According to each of the 1961, 1972 and 1994 census practically all farms (97 percent) are in the hands of individuals.

The situation before reform

From 1985 to 1990, disproportionate demand-side growth policies led to macroeconomic imbalances, high inflation, a huge government deficit, and major distortions in financial markets. During the second half of 1980s, the economy

was highly distorted, with widespread government intervention in product, service and factor markets. In 1985, economic stagnation was combined with inflation, a stagflation situation that prevailed in many Latin American economies after the debt crisis of 1982. The Government's response to this involved freezing all prices by decree, introducing a fixed nominal exchange rate and expansionary monetary and fiscal policies. These measures were accompanied by higher import tariffs, increased quantitative trade restrictions and wider exclusive state trading than was the case earlier in the decade.

The increase in domestic demand, resulting from government spending, was expected to stimulate economic growth. The programme resulted in a short-lived economic boom (1986-87) that was quickly eroded by increasing inflationary pressures and decreasing foreign exchange reserves. In the case of the agricultural sector in particular, some basic product prices were adjusted upwards before the price freezing, so they enjoyed a temporary improvement in terms of trade with respect to other products in the economy.[2]

Most basic agricultural products had guaranteed prices, implemented through the operation of public enterprises. The Enterprise for Rice Marketing (ECASA) had the function of buying all paddy rice, contracting milling services, and importing, and distributing milled rice. ECASA had a pan-territorial buying and selling price, so benefiting producers and consumers of remote locations. The National Enterprise for Input Marketing (ENCI) fulfilled similar functions with respect to other grains, oils, milk, and sugar. ENCI would buy the agricultural products from producers and would sell them to processors or retailers at a price below what was required to cover the procurement cost plus the marketing margin, thus implementing a consumer subsidy. Most prices at the retail level were regulated and controlled by the Ministry of Agriculture.

Fertilizer production, marketing and distribution were controlled through FERTISA, a state enterprise. Irrigation water was priced well below its cost recovery level. Agricultural credit was mostly provided by the Banco Agrario, a state bank in charge of financing agricultural operations at subsidized interest rates – sometimes at zero. This loan policy within an inflationary economy combined with a high volume of default loans eroded the capital base of the Banco Agrario.

Average import tariffs for primary agricultural products (animal and vegetable products and fats and oils) ranged from 50 percent to 60 percent, while foodstuffs and beverages had an average tariff of 91 percent. However, a large number of exemption schemes allowed duty free entry for most basic food products, especially for those imported by the state marketing enterprises and food aid. Non-tariff barriers were widespread during the pre-reform period, reaching a maximum in 1987 when all products were affected by some kind of import restriction. The import of basic agricultural commodities was restricted to state enterprises, whilst other imports by the private sector were subject to licensing by the Ministry of Agriculture.

One of the most discriminatory policies against agriculture was exchange rate policy. The multiple exchange rate system discriminated against agricultural tradables by assigning the lowest exchange rate within the range to agricultural imports and exports. Moreover, the effort to keep artificially low nominal exchange rates together

[2] See Paz and Larios, 1991; Escobal *et al*., 1990.

with expansionary monetary and fiscal policies led to a strong appreciation of the real exchange rate throughout the pre-reform period and again in the late 1990s. This put downward pressure on the relative prices of tradable goods, which constitute the majority of agricultural goods.

Export subsidies were applied to all non-traditional exports as compensation for distortions induced by high tariffs on inputs and as compensation for domestic indirect taxes.

Motivations for the reforms

By late 1980s, there was a huge macroeconomic disequilibrium and a deep crisis in the agricultural sector. Total GDP decreased by over 25 percent between 1988 and 1990. There was a major balance of payments crisis, with net foreign reserves reaching -300 million dollars in 1990. The fiscal deficit was around 7.2 percent of GDP in 1988/90 and the ratio of taxes/GDP fell from 14 percent to 4 percent in the 1985-90 period. Inflation reached 7 700 percent in 1990. Public and private investment totally dried up and agricultural GDP declined by 13 percent in 1989/1990.[3] State intervention in agriculture led to bankrupted state enterprises, ineffective price controls and consumption subsidies, and ineffective state marketing boards. The poor overall food situation spread nationally, with the import component of the domestic food supply covering most of the basic urban food demand.

Macro and sectoral components and the policy instruments used

The period studied can be subdivided as follows:

(a) From 1990 to 1993: a tough reform programme was implemented, consisting of trade liberalization, fiscal and monetary restraint, the introduction of a floating exchange rate, and the privatization of public enterprises.
(b) From 1993 to 1997: a post-reform period involving rapid growth in GDP, trade, and foreign investment, and improvement in social welfare indicators.
(c) From 1998 to the present: a period of economic recession.

The main objectives of the reforms in the early 1990s were to control domestic inflation, to achieve fiscal and monetary discipline, to obtain balance of payments equilibrium and regenerate foreign exchange reserves, and to boost economic growth and reduce unemployment. These objectives were to be achieved by: increasing domestic market competition through private sector development and the privatization of state enterprises; opening up markets and encouraging greater integration with the international economy through freer domestic and international trade; deregulating factor markets; providing macroeconomic stability; and helping to alleviate poverty by providing a social safety net as part of the reform package.

Macroeconomic reforms

Fiscal reform

The new government that took office in July 1990 pursued tight fiscal and monetary control in order to contain hyperinflation, stabilize the economy and create the necessary conditions for growth. The central government deficit was gradually

[3] See Boloña, 1993.

TABLE 3
Main macroeconomic variables affecting agriculture, 1986-2000

	1986	1988	1990	1992	1994	1996	1998	2000
Central government deficit (% GDP)	-11.4	-8.4	-5.3	-3.9	-3.2	-1.4	-1.1	-2.8
Nominal interest rate (lending)	40.5	174.3	4774.5	173.8	53.6	26.1	30.8	27.9
Inflation	77.9	667.0	7476.8	73.5	23.7	11.5	7.3	3.8
Real interest rate (lending)	-21.0	-64.2	-35.7	57.8	24.1	13.1	22.0	23.3
Real effective exchange rate index	267.6	259.6	128.5	97.0	100.0	98.5	98.0	107.4

Source: Banco Central de Reserva, 2003; IMF, 2002; CUANTO, 2002.

reduced during the first half of the decade, reaching -1.4 percent of GDP in 1996. Inflation also fell gradually, reaching 8.6 percent in 1997.

Within the adjustment programme, tight government expenditures involved total elimination of fiscal subsidies, many of them related to agricultural production; dismantling or privatization of state enterprises (including ENCI, ECASA, Agrarian Bank) and reducing the government wage bill, through personnel reductions (Table 3). These measures affected the agricultural sector directly, through sectoral policy changes, and indirectly through the impact on domestic demand for its products.

Financial policy

The financial market was liberalized early in the programme, allowing a free market determination of interest rates. This resulted in a sudden increase in real interest rates, from -35.7 percent in real terms in 1990 to 57.8 percent in 1992, reflecting the market's pessimistic assessment of the Government's ability to maintain control over inflation.

Interest rate reform had a substantial impact on agricultural production costs, especially for those farmers accustomed to receiving subsidized loans during the pre-reform period. Producers of traditional agricultural export commodities, such as sugar, cotton, coffee, who were the main clients of the Agrarian Bank, were particularly hard hit by credit policy reform and by the bank's closure.[4]

Exchange rate policy

Exchange rate policy reform was a key element in the programme to integrate the country into the international economy and foster more outward orientated growth and was one of the first policy initiatives of the reform period. Unification of the exchange rate system was the first step, and then in 1991, a free-floating, market determined exchange rate was adopted, with Central Bank intervention limited to maintaining stability and reducing speculative currency movements. A new currency (nuevo sol) was also issued, replacing the previously highly depreciated currency.

However, the new policy stabilized the exchange rate at a level which resulted in a substantial real appreciation of the currency with respect to its average level in the pre-reform period. As noted earlier, this had a negative effect on incentives in the agricultural sector, as well as other sectors producing tradable goods. The average real effective exchange rate index (REER) for the 1985-90 period was

[4] ENCI was also assisting export producers.

TABLE 4
Nominal average tariffs for agricultural products*, 1980-1999

Products	December 1980	December 1985	December 1988	December 1990	December 1992	August 1999
Live animals; animal products	32.0	51.0	59.0	33.0	16.0	17.8
Vegetable products	35.0	49.0	56.0	30.0	18.0	17.6
Fats and oils	31.0	55.0	63.0	21.0	15.0	12.0
Foodstuffs and beverages	53.0	89.0	94.0	40.0	21.0	18.1
Average National Tariff	34.0	63.0	70.0	26.0	18.0	13.6

*Note: Including surcharges and variable specific rates.

Source: WTO, 2000.

around 210-220, whereas since 1991 the REER has fluctuated narrowly around its base value (1994=100). This real appreciation was supported by a strong inflow of short-term capital (responding to high real interest rates) and investment capital (due to the privatization of state utilities, mining and other).

Trade policy

Tariff reform

Drastic tariff cuts were made at the beginning of the reform programme and afterwards tariff rates continued to decrease gradually. The general average tariff was reduced from around 66 percent at the end of 1989 to 26 percent by the end of 1990. Average tariffs for agricultural products were cut by half. Agricultural imports have on average higher rates than manufactures.

After 1994, Peru implemented a new tariff policy consisting of a flat 12 percent rate for all tariff lines, with the exception of a 20 percent tariff for the most sensitive products. Tariffs for agricultural products (excluding surcharges) have a 14 percent average, with only three levels of escalation: 4, 12 and 20. Tariff surcharges on imports have been applied since 1982, with different levels and product coverage. From 1997, a tariff surcharge of 5 percent on imports of 331 agricultural products was in effect. This surcharge was increased later to 10 percent for around 56 of the original products. Revenues from this surcharge go to the Agricultural Development Fund (Table 4).

In the WTO, Peru negotiated a general bound tariff rate equal to 30 percent. As an exception to this, relatively high tariffs (68 percent) were set for sensitive agricultural products, including rice, maize, wheat, sugar and milk. (These products are also included in the price band system, described below). Note that the general bound tariff (30 percent) is in practice higher than the maximum tariff level in Peru (25 percent, including a 5 percent surcharge).

Non-tariff restrictions

Peru eliminated all non-tariff restrictions on imports (prohibitions, licenses, and state monopolies) in the early 1990s. The remaining list of prohibited imports is short, motivated by health and environmental considerations and not relevant for the present analysis of agricultural production. Other restrictive measures, such as anti-dumping measures, have been used sparingly, with only nine measures in force in early 2000 and none of them on agricultural items.

Peru maintains local-content requirements in relation to various government nutrition programmes, as well as a trade-related investment measure in dairy products. A number of provisions favour domestic suppliers in government procurement, which is governed by a more transparent regulatory framework introduced in 1997.

Import price bands

The most important exception to the elimination of non-tariff trade restrictions is the price band system. This system is applied by Peru to some sensitive products. It is regarded as a complementary policy to the adjustment policies, to deal with problems from instability in world markets prices.

The price band system is applied to 29 items which are subject to additional duties, over and above their normal duties (tariff plus surcharges), that vary in accordance with the difference between a commodity's current world market price and its estimated minimum normal world price set annually as a reference. A new price band system was established in 2001, affecting only five product groups: milk, maize, sorghum, rice, and sugar. The system was an important stabilizer of import costs with a neutral effect on protection.[5] Peru has applied additional duties as high as 29 percent for sugar (a total tariff of 54 percent) and of 39 percent for rice import (a total of 59 percent) at certain periods, in order to stabilize domestic market prices and provide some protection to its "sensitive" import-competing sectors. The legality of the price band system in relation to WTO rules has been the subject of debate and scrutiny.

Export subsidies

Exports received very limited direct government support before or after adjustment. Moreover, in most cases traditional exports were subject to export taxes. Currently, there is a drawback regime, which refunds 5 percent of the FOB value of the good exported regardless of the actual amount of duty paid on imported inputs.

Agricultural sector policies

Domestic support policies

All price interventions in agricultural product and input markets were eliminated as part of the reform programme. All prices were to be established by the market under free competition and all state monopolies were abolished. Most reforms were completed in the period 1990-93. ECASA and ENCI were closed by 1992. The reforms yielded substantial changes in the provision of agricultural inputs and services, such as credit, fertilizers, and technical assistance, implying a transfer to the private sector of the role previously played by the Government.

Currently, agricultural support policies amount to only 5 percent of the total value of production in the sector. Emphasis has changed from subsidies on output and input prices to productive investment in rural areas. Outlays have been concentrated on research and development (R&D) and on infrastructure (irrigation projects, rural roads, electrification). The sharp increase in the outlay on infrastructure, which more than quadrupled from 1995 to 1997, was a notable change in the pattern of support.

[5] JUNAC, 1995.

The Rural Road Rehabilitation and Maintenance Programme (PCR) has been implemented since 1996 and is a key component in the poverty reduction strategy for most of the Sierra region and part of Amazonia. The impact of this programme in terms of rural household incomes, through reductions in agricultural transaction costs and increasing employment opportunities in farm and non-farm activities, has been significant.[6]

Other agricultural development projects are being implemented through the National Fund for Compensation and Social Development (FONCODES) and the National Project for Basin Management and Soil Conservation (PRONAMACHS), focusing on land rehabilitation and technological improvements in poor areas.

Agricultural credit

After closing the Agrarian Bank, the Government created some ad hoc mechanisms for specific emergencies and promoted new financial schemes (Cajas Rurales) to be developed by the private sector, farmer's organizations, NGOs and other stakeholders in the rural areas.

In 1992, the Government provided funds through regional financial institutions (FONDEAGROS) to peasants and small and medium farmers to finance the 1992/93 planting season. Another financial scheme was the Rotating Fund programme, which was intended to offer credit in-kind to the poorest farmers at real interest rates of between 3 and 10 percent. The experience with both schemes was disappointing. FONDEAGRO lost almost 90 percent of its capital in five years (1992-96) and the Rotating Funds, which began operations in 1997, had lost around 95 percent of their capital by 2000.

Although the amount of credit provided by formal financial intermediaries to the agricultural sector has gradually recovered and surpassed the levels of the mid- 1980s, its composition and clientele has change significantly. In the late-1980's around 85 percent of credits to the agricultural sector were provided by the Banco Agrario and the rest by the private commercial banks; nowadays the core of financing (around 86 percent of the total) to the sector is from commercial banks. The rest is divided between Cajas Rurales (7.5 percent), Municipal Banks (3.5 percent) and Rotating Funds (3 percent). The number of small farmers (less than 10 ha) clients of the formal financial system has fallen dramatically from 184 920 in 1989 to 21 457 in 2000.[7]

Social welfare policy

The harsh structural adjustment programmes initiated in 1991 required a social safety net in order to mitigate the impacts of economic policies on the poor. The safety net initiated in the early 1990s was provided in the form of food and health programmes for the extremely poor, with support from multilateral financial institutions. They were a central feature of the structural adjustment programmes.

The original goal of these programmes was only to provide a temporary floor of support for the very poor. However, funding increased substantially during the 1990s. The safety net system is based on two institutions: the National Fund for Compensation and Social Development (FONCODES) and the National Food

[6] Escobal and Ponce, 2002.

[7] See Salaverry, 2001.

TABLE 5
Expenditures on poverty reduction programmes, 1993-2000 (million nuevos soles)

	1993	1994	1995	1996	1997	1998	1999	2000
FONCODES	337	451	501	458	648	635	731	827
PRONAMACHS	-	-	-	158	95	149	199	270
PRONAA	58	98	213	198	190	196	300	300
Other	452	650	1 200	1 824	1 723	2 204	2 245	2 260
Total	847	1 199	1 914	2 638	2 656	3 184	3 475	3 657

Source: INEI, 2002 and 1998-99, CUANTO, 2002.

Programme (PRONAA). FONCODES focuses mainly on social infrastructure (basic health, sanitation, and education) and economic infrastructure (roads, small irrigation, and electricity). PRONAA focuses on delivering school meals and setting up soup kitchens in marginal urban areas and rural areas.

Other poverty programmes are PANFAR, which targets the most vulnerable families with nutritional supplements and nutrition education; PACFO, supplemental feeding and weaning targeted at 80 percent of infants in five poor regions; the National Wawa Wasi Programme (babycare centres); the Glass of Milk Programme; and international NGO feeding and nutrition programmes (Table 5).

FONCODES funds and other assistance programmes were managed with community participation in rural areas where the poor are concentrated, and focused on small-scale social and economic infrastructure.

In the early 1990s the strategy to combat extreme poverty set a target a 50 percent reduction by the year 2000 (the number of extremely poor was 4.5 million in 1995).

In agriculture, projects targeting the poor include: (i) the National Project for Basin Management and Soil Conservation (PRONAMACHS) for managing natural resources in the rural Andes (ii) the Land Titling and Registration Project (PETT); and (iii) a project for improving rural roads.

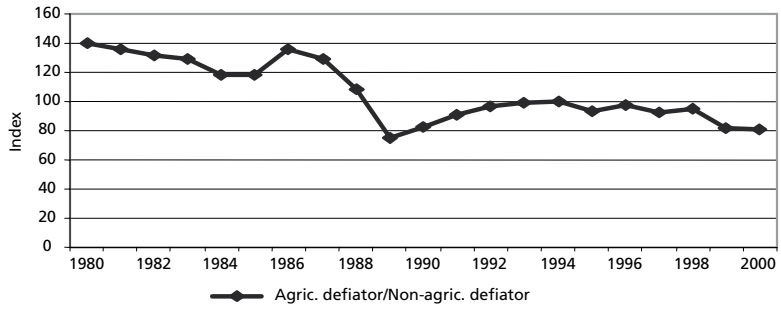
Concluding remarks

The reforms appear to have had a positive impact on economic growth in the first half of the 1990s. The average annual GDP growth rate in the 1990-95 period was 5.3 percent. Growth in the second half of the decade was lower at 2.4 percent, and was affected by climatic problems and exogenous shocks - the economic crises in Asia, Brazil and Russia and the 1997/98 El Niño. This pattern of weak growth continued into the new millennium (2000-02) leading to high unemployment and increased poverty.

CONSEQUENCES OF REFORMS: INTERMEDIATE VARIABLES

In order to evaluate the impact of reform policies on the agricultural sector, the effect on the agricultural terms of trade and then on prices of specific groups of products is investigated, differentiating between products according to their market structure. The impact on small producers will depend on the price behaviour of their production basket, their possibilities of substitution, and their capacities to access productive resources to confront the change. Large producers, on the other hand, are more resilient to external shocks.

FIGURE 1
Agricultural terms of trade, 1980-2000



Source: Computed by authors from World Bank Development Indicators Database.

Trends in international and domestic prices

Despite positive world market trends in food prices during the second half of the 1980s, agricultural producers faced deteriorating domestic terms of trade during the pre-reform period (Figure 1).[8] The main causes can be found in government policies that directly depressed agricultural prices, subsidized their consumption and provided preferential exchange rates for agricultural imports. Agricultural policy changes made in early 1986 initially improved the main agricultural prices through the setting of relatively high procurement prices, but afterwards the generalized price control system worked against agricultural products, especially those considered essential goods.

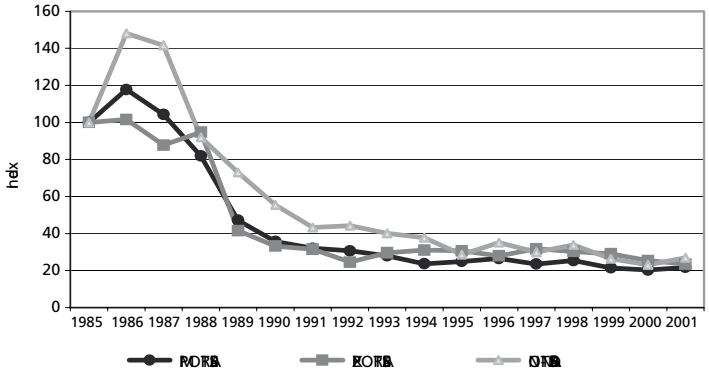
Adjustments to basic food product prices were much more delayed than to prices of other products and they were the last to be liberalized when the system ended. Direct distribution of basic agricultural products (wheat, maize, rice) at less than its procurement price plus handling cost and imports at preferential exchange rates, both through ENCI and ECASA, helped to sustain relatively low food prices. This caused agricultural prices to run behind other prices in the economy. In 1990, when price controls were lifted and generalized food subsidies were eliminated, relative agricultural prices increased but fell again in the late 1990s to the low levels of 1989.

Given the high inflation that affected the economy during the late pre-reform period, caution must be exercised in estimating and interpreting real prices derived with the use of the Consumer Price Index. Besides the frequent and erratic relative price changes which characterized the hyperinflation period, the CPI methodology used by the National Statistical Institute had a bias that overestimated changes in the cost of living in times of high inflation.[9] To overcome this problem, annual average

[8] The agricultural terms of trade express the relative price of agricultural products with respect to all other products in the economy. Estimation of this indicator is based on the relationship between the Agriculture Value Added deflator and the Non-Agriculture Value Added deflator, taken from World Bank Development Indicators Database.

[9] For a discussion on this point see Escobal, 1994.

FIGURE 2
Agricultural real domestic price trends, 1980-2001



Source: Estimates by the authors from Ministry of Agriculture data

real prices are estimated using monthly price and CPI data and weighting them by the corresponding monthly production data.

Agricultural real prices increased with the demand boom of 1986/87, especially for non-tradables, but fell abruptly between 1987 and 1990 before stabilizing at a very low level (Figure 2). On average, agricultural prices fell from the base index of 100 in the mid-1980s to a range of 20 to 40 in the 1990s.

After 1990, the decline in real prices slowed and in some case prices even rose again, especially in the case of exportables which benefited from a moderate increase in world prices in the early 1990s, particularly for coffee, and from short lived real depreciation episodes. The price of importables recovered for a while as a result of the abrupt adjustment made at the beginning of the reform in the previously controlled prices of maize, wheat and milk. Non-tradables maintained a relatively better price than tradable products.

Relative prices within the agricultural sector

Changes in relative prices between agricultural products affected planting decisions at the farm level. There was a reduction in the relative price of cotton with respect to rice and yellow maize between pre-reform (1985-88) and post-reform periods (1993-96). This could have been one of the causes of the shift away from planted areas of cotton at the farm level in the northern coastal region. Changes in rice prices relative to yellow maize and plantain could help to explain the increased share of rice area within the total area harvested in the Amazonian region (Table 6).

Decomposition of price changes

Price decomposition was undertaken to analyse the extent to which the main trade reforms have affected agricultural domestic prices (see Annex). The conclusion is that the index of domestic prices is better explained by the RER variable and by real world prices. The tariff levels are less important because tariffs became relevant only

TABLE 6
Changes in relative prices of selected agricultural goods, 1985-88 and 1993-96

In terms of	Rice		Yellow maize		Plantain		Potatoes		Cotton		White maize	
	1985-1988	1993-1996	1985-1988	1993-1996	1985-1988	1993-1996	1985-1988	1993-1996	1985-1988	1993-1996	1985-1988	1993-1996
Rice	1.00	1.00	0.99	1.13	1.33	1.72	1.68	1.25	0.25	0.30	1.16	1.15
Yellow maize	1.01	0.89	1.00	1.00	1.34	1.52	1.70	1.11	0.25	0.27	1.17	1.02
Plantain	0.75	0.58	0.75	0.66	1.00	1.00	1.27	0.73	0.19	0.17	0.87	0.67
Potatoes	0.59	0.80	0.59	0.90	0.79	1.37	1.00	1.00	0.15	0.24	0.69	0.92
Cotton	4.05	3.33	4.01	3.76	5.37	5.72	6.81	4.17	1.00	1.00	4.70	3.82
White maize	0.86	0.87	0.85	0.98	1.14	1.50	1.45	1.09	0.21	0.26	1.00	1.00

Note: Average nominal prices for the period from row products divided by average price of selected products shown in column.
Source: Authors' computations from FAOSTAT and Ministry of Agriculture data.

in the post-reform period (non-tariff barriers were abolished). In the pre-reform period, import licenses and prohibitions were the most important commercial policy variable, but its restrictive power was eroded by multiple exemptions and generous quotas. These effects are not captured by the variable used here.

The above analysis develops the link between policy reforms and prices at the aggregate level. The price decomposition equation is also estimated for three commodities: rice, maize, and coffee. From these results it can be asserted that a depreciation of the sol had a substantial impact on rice and maize prices, but less effect on domestic coffee prices. For rice, the GDP variable is even more important than the exchange rate, reflecting the low import content of domestic supply while for maize the case is the reverse. Domestic price of coffee depends mainly on the world market price, which is to be expected, given its characteristic as an exportable product.

Effects on agricultural output and value added

In this section, the findings from the price analysis are related to evidence of changes in output levels. These are presented on an annual basis by changes in area and in yield, the aim being to establish a link between prices (and non-price factors) and output by examining the nature of the output response (or lack of it).

In assessing the ability of producers to respond it is important to recognize the agroclimatic context within which they operate as illustrated in Box 1.

After a short lived boom during the early pre-reform years (1985-88), especially for non-tradable agricultural goods, agricultural production gradually collapsed until reaching its lowest production per capita in 1992 (Table 7).

Agricultural sector growth picked up after 1992 despite persistent negative price trends. On aggregate, agricultural production was highly inelastic with respect to

TABLE 7
Index of net per capita production, 1985-2000 (1994=100)

	1985	1986	1988	1990	1992	1994	1996	1998	1999	2000
Total agriculture	93.0	94.3	104.5	89.6	85.3	100.0	111.8	115.3	128.6	129.9
Food	88.6	89.8	101.5	87.5	85.2	100.0	110.5	116.5	129.7	130.0
Cereals	85.2	82.6	105.2	77.3	63.3	100.0	90.8	108.5	129.1	120.3

Source: FAOSTAT, 2002.

BOX 1
Agroclimatic conditions

Peru is divided into three topographic regions: the Pacific coast, 11 percent of the total area, the Andean highlands (Sierra) with 31 percent of the territory, and the Amazonian region (the Amazon basin) covering around 58 percent of the country. Most of the arable land is in the coastal region and most agricultural output comes from the river valleys there. Agriculture in the Sierra is more of a subsistence nature, and agriculture in the Amazon basin is only in the initial phase of development.

Of the total surface area, the agricultural area represents 24 percent. There is potential for further expansion of the agricultural area but at high environmental cost. The forest cover encompasses most of the territory (70 percent), including the tropical rainforest of the Amazonian region and some parts of the Andean region.

	Land use (million hectares)			Population (thousands)	
	1985	2000		1985	2001
Agricultural area	30.9	31.3	Coast	10 246	13 855
– permanent crops	0.4	0.5	Sierra	7 784	8 974
– arable land	3.4	3.7	Amazonia	1 485	3 518
– permanent pastures	27.1	27.1	Total	19 516	26 347
Forest	84.8	97.2			
Other lands	12.8				
Total area	128.5	128.5			

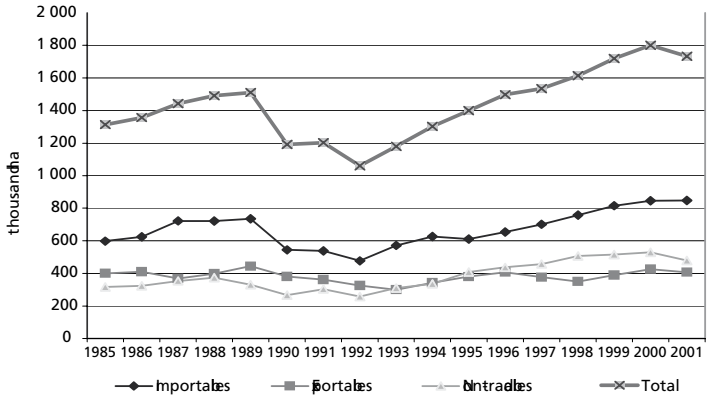
Source: INEI, FAOSTAT (2002) and CUANTO, 2001.

For its latitude, Peru's climate should be tropical, with abundant vegetation. But this type of climate is only found in the Amazonian region. The Andes constitutes perhaps the most important factor accounting for the climatic diversity. It divides the country in two: the wet tropical forest in the east, and the arid zone in the west. Agriculture is vulnerable to the vagaries of climate, such as the El Niño phenomenon. There is a high risk of drought, volatile water supply, and dependence on irrigation systems, especially on the coast.

prices and profitability, given the low opportunity cost of its main productive factors (land and labour). Agricultural GDP grew by an annual average of 1.5 percent during the pre-reform period, by an average of 4.5 percent during the five years after the reform, and by 5.9 percent in the last 1995-2000 period.

The increase in output is explained mainly by increases in yields in the period 1985-2001, and particularly in the 1990s. Increases in area played a smaller role. During the 1990s, yields in potatoes increased at a rate of 4.1 percent per annum, rice at 2.4 percent and maize at 1.7 percent. Export products also obtained yield increases of over 3.5 percent per year.

FIGURE 3
Area harvested of main crops, 1985-2001



Increases in yields seem to be explained by better than expected weather conditions through most of the 1990s, with satisfactory rainfall. Another factor that should have positively influenced yields, especially in the Sierra, was the increased support provided through special government programmes on infrastructure and technology, small-scale irrigation works, and measures to increase crop and livestock productivity. These projects have resulted in significant poverty alleviation in the rural Sierra.[10]

Figure 3 shows that areas cultivated increased for 1992. One of the main factors contributing to increases in the cultivated area could be the cessation in the mid-1990s of guerrilla activities, which had been affecting the rural areas since the early 1980s.

The most dynamic products in the post-reform era were exportables: asparagus, garlic and onions, all with about 12 percent annual average growth during the decade (Table 8). These are all new developments in the commercial agriculture of the coast. Poultry (8.8 percent) and rice (8.9 percent) accounted for the bulk of growth in the importable product group. By contrast, output of some traditional exports, especially sugar cane and cotton, was almost stagnant or decreased. Within the non-tradables, there was exceptional growth for potatoes (11.8 percent) and cassava (10.6 percent).

Effects on imports and exports

The value of agricultural trade more than doubled in the five year period after the reforms (Figure 4). Exports grew by 13.8 percent per year, after declining in 1985-90. Imports increased continuously at a rate of 6.8 percent during the pre-reform period and accelerated up to 14.8 percent per year during the second half of the 1990s. Both exports and imports decreased at the end of the decade reflecting the impact of the recession and also lower international prices.

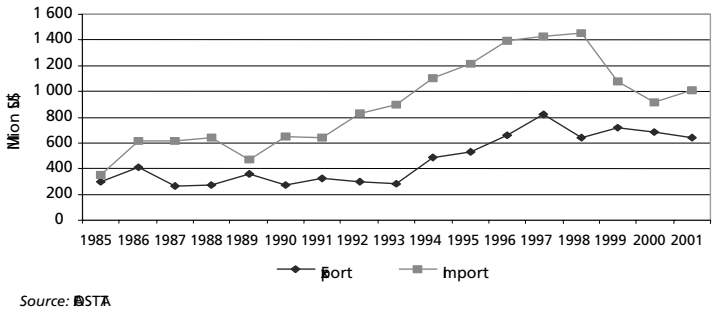
[10] World Bank, 1996.

TABLE 8
Production value of key agricultural products, 1985-2001 (million nuevos soles, at 1994 prices)

Products	1985	1990	1995	2001
Exportables	1 397	1 256	1 394	1 752
Sugar cane	564	469	490	557
Coffee green	290	260	309	517
Asparagus	19	69	129	219
Cotton	468	385	349	215
Garlic	21	31	65	128
Onions	35	42	52	116
Non-tradables	1 792	1 664	2 401	2 805
Potatoes	623	462	947	1 068
Alfalfa	642	759	796	841
Plantains	209	204	309	421
Cassava	165	130	186	292
White Maize	153	109	163	183
Importables	1 669	1 820	2 448	3 758
Poultry	533	652	1 089	1 650
Rice paddy	316	348	411	735
Milk total	454	436	480	622
Yellow Maize	201	197	200	437
Grapes	51	54	80	125
Oranges	49	55	78	98
Apples	65	78	110	91
Total main products	4 858	4 740	6 243	8 315

Source: FAOSTAT, 2002 and CUANTO, 2002.

FIGURE 4
Evolution of agricultural trade, 1985-2001 (US$ million)



Source: FAOSTAT

The trends in both exports and imports seem to reflect the impacts of the economic slowdown that began with the Asian crisis of 1997. For the recent period, the macroeconomic evolution seems to be a more important explanatory variable for trade flows than the impact of trade liberalization undertaken as a result of the structural reforms and the Uruguay Round trade agreement.

TABLE 9
Main agricultural imports, 1985-2001 (US$ million)

	Maize	Milk	Soybean oil	Rice	Sugar	Wheat	Total
1985	36	33	26	3	0	128	225
1990	72	42	29	109	61	125	439
1993	75	79	52	111	91	181	589
1995	139	108	60	69	91	286	753
1997	153	122	97	148	102	245	867
2000	97	68	52	27	47	171	462
2001	98	69	80	17	56	202	523

Source: FAOSTAT; CUANTO, 2002.

TABLE 10
Main agricultural exports, 1985-2001 (US$ million)

Products	1985	1990	1995	2001
Coffee green	144.7	98.2	278.4	180.1
Vegetables processed	6.3	22.1	71.9	95.5
Asparagus	2.3	5.1	23.9	64.1
Mangoes	1.5	2.2	6.9	26.8
Sugar	24.1	36.5	30.2	16.8
Onions	-	-	-	14.0
Beans dry	1.5	1.0	11.9	11.0
Cocoa butter	13.6	7.7	7.4	6.8
White Maize	0.7	2.1	4.1	5.0
Cotton lint	51.8	30.3	7.1	4.7
Total sample	246.5	205.2	441.8	424.8
Percentage of agricultural exports	82.4	74.6	82.6	66.

Source: FAOSTAT, 2002 and CUANTO, 2002.

It is noteworthy that the chronic agricultural trade deficit turns into a significant surplus in the food trade balance if exports of fishing products are included.

Six products make up 95 percent of the food import basket: wheat, yellow maize, milk, soybean oil, rice, and sugar (Table 9). The commodities with above average import growth in 1985-2001 were soybean oil (8.7 percent), maize (8.0 percent), and rice (7.1 percent). Food import increases in the 1990s were a lagged response to the decline in per capita food production from 1988 to 1992. At the start of the reform era, problems with foreign exchange availability and income contraction contained food import demand. Dependence on donated food imports increased.[11]

Agricultural exports have diversified in the last fifteen years. In 1985, there were only 70 items in the agricultural export list. Many new products have been added to the list including asparagus, mangoes, onions and beans. In the year 2000, there were 180 items.

In summary, trade and related reforms have substantially changed the incentive framework in the agricultural sector and have impacted negatively on agricultural prices. Even though the estimates could be somewhat exaggerated, the magnitude of the agricultural relative price decline is so large that there is no doubt about its

[11] See Riordan *et al*., 1994.

TABLE 11
Index of net per capita production (1994=100)

	1985	1986	1988	1990	1992	1994	1996	1998	1999	2000
Total agriculture	93.0	94.3	104.5	89.6	85.3	100.0	111.8	115.3	128.6	129.9
Food	88.6	89.8	101.5	87.5	85.2	100.0	110.5	116.5	129.7	130.0
Cereals	85.2	82.6	105.2	77.3	63.3	100.0	90.8	108.5	129.1	120.3

Source: FAOSTAT, 2002.

profound impact on sector profitability. The main reasons are the appreciation of the real exchange rate and the fall in agricultural world prices. However, after a relatively short slump in production, agriculture resumed growth within an adverse policy environment (lower border protection, reduced credit availability, higher real interest rates and real input prices).

CONSEQUENCES OF REFORMS: TARGET VARIABLES

National food security

The food security situation has passed through extreme changes in the last twenty years. Food supply has often been inadequate to provide the calories considered sufficient for a healthy life. In some instances it has been the result of climatic phenomena, such as El Niño in 1983; but in others, economic mismanagement has disrupted food production and eroded import capacity.[12]

The lack of food availability was particularly serious in the early 1990s, due to a substantial decrease in per capita food production, especially cereals. Food production per capita decreased by about 16 percent from 1988 to 1992, and cereals by 40 percent (Table 11). Food imports did not compensate for this reduction due to the scarcity of foreign exchange and low levels of effective demand for food by the population due to the severity of adjustment policies. As a result, the levels of calorie availability fell bellow 2 00 calories per person per day in 1990-92.

However, in the second half of the 1990s, the recovery of domestic food production and increased imports overcame the food availability problem, and satisfactory progress was achieved on nutrition. The 1997/98 El Niño had a moderate impact, mainly on the northern and central coast.

After 1992, food imports grew at an annual rate of 2.5 times the growth rate of agricultural production, thus increasing their share of national food supply to around 34 percent, before declining to about 30 percent in the late 1990s in response to the domestic economic recession and import substitution through increased national food production (Table 12). Between 1988-90 and 1998-00, dependency on imports increased in wheat (0.86 to 0.91), maize (0.33 to 0.48), sugar (0.23 to 0.38) and soybeans (0.40 to 0.88).

The sudden improvement in food availability has made Peru stand out as one of the apparent liberalization success stories. The proportion of undernourished decreased from 40 percent of the population in the early 1990s to only 11 percent

[12] An excellent analysis of the food security situation in Peru can be found in Riordanet *et al*., 1994.

TABLE 12
Food import dependency 1985-2000

Period average	Calories per capita per day		Imported calories (%)
	Total	Imported	
1985-87	2 102.4	626.5	30
1988-90	2 141.1	566.3	26
1990-92	1 979.5	681.0	34
1994-96	2 341.2	837.9	36
1998-00	2 598.5	785.5	30

Source: FAOSTAT.

TABLE 13
Prevalence of undernourishment

People undernourished:	1979-81	1990-92	1998-2000
- Number (in millions)	4.9	8.9	2.9
- Proportion of total population (%)	28	40	11

Source: FAO, 2002.

TABLE 14
Food balances pre- and post-reform periods (per capita per day)

Product	1988-1990			1998-2000		
	Calories	Proteins (g)	Fat (g)	Calories	Proteins (g)	Fat (g)
Grand total	2 141.1	52.7	44.5	2 598.5	64.8	48.7
Vegetal products	1 815.9	31.6	21.0	2 262.9	42.5	25.3
Cereals	869.9	22.2	4.1	1 052.6	26.9	4.9
Starchy roots	234.8	3.7	0.5	353.9	5.4	0.7
Sugar & sweeteners	342.3			377.2		
Pulses	48.3	3.3	0.3	74.1	5.1	0.5
Treenuts	1.5	0.0	0.1	1.6	0.0	0.1
Oilcrops	8.3	0.3	0.7	31.1	2.1	1.8
Vegetable oils	127.4	0.0	14.4	140.0	0.0	15.8
Vegetables	24.2	1.0	0.2	41.3	1.6	0.3
Fruits	86.6	0.5	0.7	121.5	0.6	0.8
Stimulants	3.3	0.4	0.1	3.5	0.3	0.2
Spices	0.4	0.0	0.0	1.9	0.1	0.1
Alcoholic beverages	68.7	0.2		63.2	0.3	
Miscellaneous	0.1	0.0	0.0	1.1	0.0	0.0
Animal products	325.2	21.1	23.5	335.5	22.3	23.5
Meat	74.0	8.3	4.4	96.8	10.6	5.8
Offals	7.7	1.2	0.2	8.4	1.4	0.3
Animal fats	111.8	0.0	12.4	97.3	0.0	10.8
Milk	78.0	4.4	4.1	87.2	4.7	4.5
Eggs	13.5	1.0	0.9	16.9	1.3	1.1
Fish, seafood	40.1	6.1	1.5	29.0	4.4	1.1

Source: FAOSTAT, 2002.

later in the decade (Table 13). No other country managed to achieve this kind of improvement in nutrition indicators in such a short time.

A breakdown of food availability by food products for the pre- and post-reform periods shows the changes in consumption structure through the 1990s (Table 14).

The population has increased the consumption of carbohydrates (grains and potatoes), pulses, edible oils and poultry meat, and reduced consumption of red meat and fish. Most of these changes followed the same pattern as changes in domestic production.

Household level food security

Household level food security needs to be assessed against an understanding of the demographic and poverty context.

The rate of population growth has been declining, from 2.2 percent in the 1985-90 period to only 1.7 percent in 1995-2001. The total population is now about 26 million. Population growth is therefore not a major food security challenge. Recent population growth rates are quite manageable and food supplies (domestic and imported) have kept pace with population growth.

Besides greater food availability, one key factor in increasing food access has been the reduction in general poverty during the post-reform period, following an initial increase at the start of the reforms (Table 15). The domestic economic crisis in the late 1980s and early 1990s raised the proportion of poor people to around 57.4 percent in 1991, while economic recovery afterward gradually reduced it to around 50 percent in the late 1990s. However, in recent years, the economic recession triggered by the Asian and Brazilian crises and its negative impact on employment and aggregate demand seems to have had a significant effect on family incomes.

The incidence of extreme poverty, which is one of the most important indicators of food security, fell substantially in the 1990s, pointing to significant increases in food security. In the country as a whole the number of people with insufficient income to buy the minimum food basket, or the minimum number of calories per capita per day, decreased from 27 percent in 1991 to 15 percent in 1997. However, from 1998 to 2001 the situation deteriorated again, as the incidence of extreme poverty rose to over 24 percent. The deterioration was particular severe in the Sierra and Amazonia regions.

Extreme poverty is highest in the Sierra and Amazonian regions, and is even higher in the rural areas of these regions. 61 percent and 44 percent of the rural people in the Sierra and Amazonia, respectively, did not have enough income to cover their

TABLE 15

Poverty incidence, 1991-2001

(% of total population)	1991		1994		1997		2001	
	Poverty	Extreme poverty	Poverty	Extreme poverty	Poverty	Extreme poverty	Poverty	Extreme poverty
Urban	52.2	20.7	50.4	13.0	48.9	7.6	n/a	n/a
Coast	n/a	n/a	51.9	12.2	58.3	7.6	37.5	7.6
Sierra	n/a	n/a	51.6	14.6	37.7	7.7	43.2	18.3
Amazonia	n/a	n/a	43.0	12.0	44.2	7.2	49.4	34.9
Rural	70.8	46.8	65.6	36.2	64.8	31.9	n/a	n/a
Coast	n/a	n/a	63.4	26.5	52.8	23.6	60.3	19.7
Sierra	n/a	n/a	64.7	37.7	68.1	32.6	80.1	60.8
Amazonia	n/a	n/a	70.1	38.6	64.9	36.4	73.4	43.7
Total country	57.4	26.8	53.4	19.0	50.7	14.7	49.8	24.4

Source: ENNIV, 1991, 1994, 1997; ENAHO, 2001.The surveys are not strictly comparable.

essential food needs in 2001. Loreto, Amazonas, Cajamarca, Pasco, Ucayali are the provinces (departments) with the highest incidence of extreme poverty, whilst Huancavelica, Pasco, Puno, Ayacucho, and Loreto have the highest incidence of general poverty. Both the general poverty and the extreme poverty indices are high in those departments in which large parts of the population speak their native language rather than Spanish (Quechua, Aymara, and Amazonian dialects).

Poverty in rural areas has been higher than in urban areas. The percentage of poor people in rural areas is over 60 percent in all regions. In absolute terms, the total poor population in the urban areas grew significantly over the years and exceeded that of the rural areas in 2000. Due to the concentration of the population in cities the actual number of poor people is higher in the urban areas.

Relating agricultural sector performance to household food security

Reforms in the agriculture sector can be analysed in terms of how they have been translated into changes in the incomes of small farm households. This section considers the case of small farmers with landholdings below 5 hectares, because they constitute the great majority of farmers (over 70 percent of total producers), and face a higher risk of food insecurity. The data used comes mainly from three sources: (i) the Agricultural Census (INEI) of 1994; (ii) the Statistical Office of the Ministry of Agriculture; and (iii) a small farmers survey in selected regions. The Departments of Piura (Coast), San Martin (Amazonia), and Cusco and Puno (Sierra) were selected as being representative of the socio-economic and geographic diversity within the small farm sector.

Income composition in small farm households

Changes in the relative importance of different sources of farm household income have occurred since the reforms. The main activity in the rural areas and the main source of income for rural households is agriculture, although other sources of rural employment and income are growing in importance.[13] The proportion of household labour dedicated to agricultural activities has decreased since the reforms in favour of non-agricultural activities within the household (textiles, handicrafts and other). The proportion of labour allocated to wage-employment increased in 1994 but returned to their pre-reform levels in 1997 (Table 16).

The rural household income structure derived from the labour allocation for 1997, results in an even higher role for non-agricultural activities due to their higher monetary return (Table 17).

The results of a 2003 survey of small farmers produced very similar results in terms of the relative importance of the various sources and their differences between regions. The survey also suggests that non-agricultural incomes are particularly important for farmers with less than one hectare, independently of crop and region.

Although the crop portfolio has not varied much through the decade, the use of family labour (as opposed to hired labour) has intensified and the importance of income diversification strategies has increased. This was needed in order to confront falling agricultural prices, falling wages, and the price increases of industrial products.

[13] Reardon *et al.*, 1998.

TABLE 16
Labour allocation of rural households, 1985-1997 (percent of households)

Year	1985-1986	1994	1997
Self-employed:	90.4	87.4	90.5
Agricultural activities	75.8	62.3	64.7
Non-agricultural activities	14.6	25.1	25.8
Wage-employed:	9.6	12.6	9.5
Agricultural activities	4.3	6.2	4.8
Non-agricultural activities	5.3	6.5	4.7

Source: Escobal *et al*., 2002.

TABLE 17
Composition of rural household income (1997)

Region	Income, non-agriculture self-employment (%)	Income, non-agriculture wage employment (%)	Income, agriculture on-farm (%)	Income, agriculture off-farm (%)	Total income
Coast	14.5	6.6	67.6	11.4	100
Sierra	34.8	18.3	41.6	5.3	100
Amazonia	26.3	10.3	56.5	6.9	100
Rural Peru	29.7	14.6	49.0	6.7	100

Source: Escobal *et al*., 2002.

TABLE 18
Agricultural holdings according to farm size, 1994

Category	Criteria	Area	Agricultural units	
			Number	%
Below subsistence	Productive potential insufficient for food provision for family.	< 0.99 ha	423 263	34.5
Subsistence level	Productive potential exceeds food requirements, but is insufficient to generate a revolving fund.	1 to 2.99 ha	544 287	44.3
Commercial	Unit is able to generate a surplus above food needs and maintain working capital.	3 to 5 ha	260 790	21.2
Total			1 228 340	100.0

Source: INEI, 1994. Classification adapted from Schejtman, 1998.

The structural adjustment policies have not created incentives for small commercial farmers or peasants. The economic environment generated by those policies may have led to increased use of family labour and/or an increase in the proportion of output consumed by the farm household.

Income from agricultural output
The reform programmes have affected farmer's income directly though their impact on the relative prices of the products and services they sell and buy, and indirectly, through their effect on national income and aggregate demand for the products of the sector. The magnitude of these impacts can differ between farm households depending on characteristics, such as its status as net food producer or consumer; its production mix between tradable and non-tradable products; and the specific combination of products within the production basket.

Producers of tradable goods are much more closely linked to the world market and more directly affected by changes in trade related policies. A combination of reduced border protection with domestic currency appreciation should have depressed domestic prices of tradable goods relatively to non-tradable goods. Prices of the latter mainly depend on the dynamism of domestic demand, but could be affected indirectly by trade measures through their impact on some tradable substitutes in production and consumption. Most small farmers in the Sierra region concentrate on non-tradable products, while the coastal farmers produce mostly tradable goods.

However, given that agricultural products in the same categories described have been subject to different degrees of specific government interventions in the pre-reform period and that their effective implementation has varied between regions, the impact of trade reform measures would depend greatly on the specific composition of the production basket and the location of the small farm household.

Real prices for production baskets of selected small farm households

To follow the impact of the reform package on farm income, production baskets for small farm households in the selected regions have been identified according to the average product composition registered in the 1994 Agricultural Census. The four crops most cultivated by small farm units in each region were included in a simplified production basket.

The composition of the production basket in the Sierra differs totally from the baskets of the Coast and Amazonian regions, which have many common items (Table 19). Three of the four main products produced by small farmers in Piura in the Coast region (yellow maize, cotton, and rice) were tradable goods, while in the Sierra in Cusco (white maize, potatoes, and lima bean) and Puno (potatoes, quinua, and lima bean) much of the production basket consists of non-tradables. In San Martin, its main products were equally divided between tradable (yellow maize, rice) and non-tradable items (plantain and cassava).

Real price indices for small farm products in the selected regions were estimated for the period 1985-2000, using the production baskets and weights assigned to them according to their relative importance in the total volume of production of the corresponding region.

The demand-push policies plus generous price support measures for some staples in the early pre-reform period resulted in substantial increases in average farm prices, but for a short period only. During 1985-87, real prices of the small farmer's production baskets in Cusco and Puno, consisting mainly of non-tradable crops, increased by around 40 percent with respect to the initial year. Small farmers in San Martin also enjoyed real price increases of similar magnitude, but due mainly to an additional incentive through the pan-territorial price support setting by the state marketing agencies: ENCI (for yellow maize) and ECASA (for rice) gave an implicit transport subsidy for Amazonian production, most of which was brought for processing or consumption to the coast. This explains why basic products in San Martin had higher local price increases than the same products in Piura during that period.

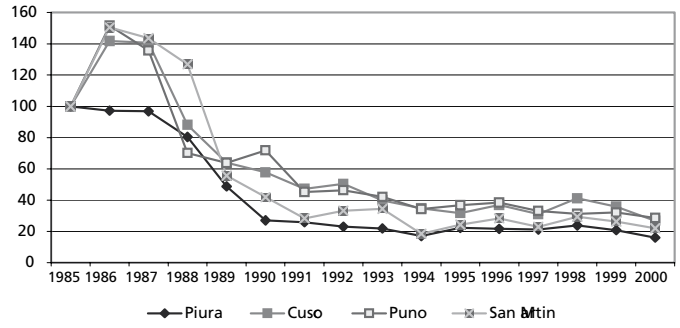
From 1988 to 1991, real price indices of all regional agricultural production baskets dropped abruptly relatively to all other prices in the economy. The main factors that help to explain this are: (i) the relaxation of general price freezing, established

TABLE 19
Small farm agricultural production basket in selected regions, 1994

Department/products	Farm units*	Farm area (ha)
Piura (Coast)	**52 150**	**51 303**
Yellow maize	17 101	14 052
Cotton	2 380	3 443
Rice	6 213	6 354
Plantain	11 490	6 497
Cusco (Sierra)	**97 469**	**66 898**
White maize	45 831	19 710
Potatoes	58 396	18 913
Wheat	18 296	5 446
Lima bean (Haba)	30 670	6 376
Puno (Sierra)	**116 436**	**84 945**
Potatoes	107 706	27 709
Barley	75 006	20 692
Quinua	42 533	7 775
Lima bean (Haba)	54 273	8 415
San Martin (Amazonia)	**17 146**	**22 519**
Plantain	10 433	6 845
Yellow maize	8 408	6 290
Rice	3 567	3 848
Cassava	7 332	3 677

* Corresponds to the number of small farms (less than 5 has) that have transitory crops.
Source: Authors' computation from INEI, 2004 and Ministry of Agriculture data.

FIGURE 5
Price indices for small farm product baskets in selected regions, 1985-2000



Source: Authors' computation, from data from Ministry of Agriculture, Agricultural Census 1994, and INEI.

in 1986, which set free the repressed inflationary forces in most other sectors of the economy, while some degree of control remained on basic agricultural products; (ii) the extremely cheap foreign exchange for food imports that helped to maintain relatively low domestic prices, even when world food prices were rising; and (iii) the practical dismantling of the agricultural price support and marketing system.

In much of the post-reform period, with liberalized agricultural trade and reduced direct government intervention in agriculture, regional prices have behaved mainly as a function of domestic supply and demand and, in the case of tradable products, as a function of the real exchange rate and world prices, as shown in the section above. However, some price intervention has been exercised by the Government to cope with situations of critical excess supply in potatoes and rice, through increased purchases by PRONAA.

In short, real prices faced by small farmers were drastically reduced by the pre-reform policies, and have not recovered since. Prices for small farmers from Cusco and Puno were less affected than those from Piura, possibly due to the former's greater involvement in the production of non-tradables compared to the latter's focus on tradables. In between lay the San Martin prices, which grew a much more balanced mix of tradable and non-tradable products. In addition, given the high percentage of the production of small farmers in Puno and Cusco whose household consumed their own production, these price changes will have little effect on their real income.

Production trends for small farm products in selected regions

Growth in the main products of the selected regions has been irregular, but with a positive trend in most during the post-reform period. This follows the general trend observed earlier for overall agricultural production (Table 20).

There was a general increase in yields, although in some cases it was not the main factor explaining production growth. Exceptionally good weather in the main production areas after 1992 and improved technical assistance from FONCODES and PRONAMACHS, as well as investment in rural roads, could have influenced this positive trend.

Puno had an extraordinary increase in production volumes, close to a 20 percent annual average during the 1990s, especially based on increases in planted area, mainly using land previously under natural pasture. Improved weather conditions after the 1992 drought and increased use of improved varieties and cultivation practices

TABLE 20

Production, area harvested and yield indices in selected regions, 1985-2000 (index numbers)

		1985	1987	1988	1990	1991	1992	1994	1995	1997	1998	2000
Piura	Production	100.0	80.4	115.0	127.3	89.4	79.9	97.8	100.1	98.6	52.4	104.8
	Area	100.0	109.7	104.1	120.3	92.7	105.6	94.5	82.1	86.7	63.0	93.4
	Yields	100.0	73.3	110.5	105.9	96.5	75.6	103.4	121.8	113.7	83.2	112.1
Cusco	Production	100.0	87.1	118.4	69.4	86.2	79.9	149.7	134.9	102.2	98.9	121.3
	Area	100.0	119.8	120.0	95.1	106.7	91.0	118.8	105.5	100.9	104.8	117.5
	Yields	100.0	72.8	98.7	73.1	80.8	87.8	126.0	127.9	101.3	94.3	103.2
Puno	Production	100.0	55.0	97.0	23.9	71.5	31.8	148.0	117.3	135.3	158.8	201.0
	Area	100.0	83.8	115.4	38.2	98.2	52.2	119.9	112.8	128.4	144.3	143.7
	Yields	100.0	65.7	84.1	62.6	72.9	60.9	123.4	104.0	105.4	110.0	139.8
San Martin	Production	100.0	110.5	124.1	83.0	77.3	62.5	79.9	72.5	124.6	159.8	160.7
	Area	100.0	108.0	114.9	64.1	55.9	49.7	58.4	48.1	82.3	104.5	106.5
	Yields	100.0	102.3	108.0	129.5	138.4	125.9	136.9	150.8	151.3	152.9	150.9

Source: Authors' computation, from Ministry of Agriculture data.

TABLE 21
Trends in real gross income per hectare in selected regions 1985-2000* (index numbers)

	1985	1986	1987	1988	1990	1991	1992	1994	1995	1997	1998	2000
Piura	100.0	93.0	71.0	88.8	28.6	24.9	17.4	17.6	27.1	24.2	19.9	18.1
Cusco	100.0	145.5	102.3	87.0	42.2	38.1	44.2	43.8	40.5	31.4	38.9	27.6
Puno	100.0	157.3	89.1	59.0	45.0	32.9	28.2	42.4	38.2	34.9	34.3	40.0
San Martin	100.0	151.5	146.8	137.0	54.3	39.3	41.9	25.4	36.6	34.8	44.8	33.3

Note: This index takes into account changes in prices of the simplified small farm product basket in each selected region adjusted by changes in average yields of the four crops included.
Source: Authors' computations from INEI, 1994 and Ministry of Agriculture data.

have also helped this significant production jump. Early in the decade, production volumes in Puno were extremely low due to weather problems in 1990 and 1992. Cusco had a moderate increase in production of the crops included in their small farm basket, reaching an average growth of around 3.6 percent per year during the decade, with a slightly higher contribution of yield increases during the first half of the 1990s. San Martin had an exceptional growth performance in rice production and a recovery of earlier levels of plantain production, which allowed the regional basket to grow at a rate close to 10 percent per year during the 1990s. This result is mainly due to the return to cultivation of land abandoned during the years of guerrilla activity in the region, prior to the mid 1990s. Piura was the only region with a falling trend in the production of small farm crops (-1.3 percent per annum) during the post reform period. The impact of El Niño in 1998 had much to do with this.

There is no information on how much of these production trends can be attributed to small farmers in those regions. However, it is possible to estimate the change in real income derived from one typical hectare planted in each of the regions with their respective product baskets, based on the changes in prices and productivity that occurred during the pre- and post-reform period. In 2000 a hectare on a small farm in Piura, that has kept pace with average yield changes in its region, obtained only around 18 percent of the real value of its production in 1985; and a hectare in Puno produces around 40 percent of the real value produced in 1985. Throughout the country, a significant proportion of this loss in the real production value per hectare happened in the pre-reform period (Table 21).

Real prices of agricultural inputs

Changes in net income per hectare depend on input use and prices. Most small farmers in the Sierra region (Cusco and Puno) used organic fertilizer but slightly more than one third of them have used chemical fertilizers (Table 22). They employ low-yielding native seeds, and only around 10 percent of the small farmers (or less) use improved seeds. Pesticide use is widespread, but is restricted to low price, broad spectrum insecticides that do not allow good pest and disease control. Recent cost structure studies of papa and white maize production in Puno, using low technology, estimated external inputs (seeds, fertilizers, pesticides) to be around 20 percent of the total cost per hectare.

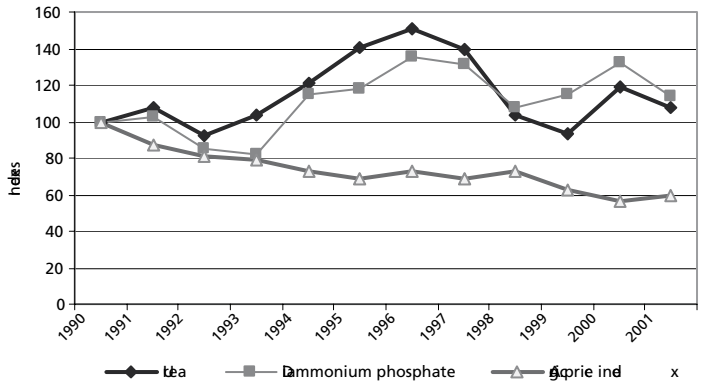
In the case of Piura, where there are more commercial farmers, the use of chemical fertilizer and improved seed is more widespread. In San Martin, the use of fertilizers

TABLE 22
Use of main agricultural inputs in small farms (less than 5 ha), 1994

	Improved seeds (%)	Organic fertilizer (%)	Chemical fertilizer (%)	Insecticides (%)	Herbicides (%)	Fungicides (%)
Piura						
No. of farms	21.1	33.7	45.0	39.4	8.6	9.8
Total area	17.6	25.3	34.1	31.0	7.7	9.0
Cusco						
No. units	10.5	81.0	36.3	38.1	9.5	22.6
Units area	10.2	65.6	30.3	33.3	9.3	21.4
Puno						
No. units	7.2	88.3	43.5	42.9	3.3	20.9
Units area	5.1	60.5	33.0	29.8	2.7	15.1
San Martin						
No. units	14.7	7.1	16.1	29.0	29.2	14.5
Units area	13.5	5.7	14.5	25.8	26.8	12.9

Source: INEI, 1994.

FIGURE 6
Agricultural input and output price trends, 1990-2001



in general is lower than in the other regions. In any case, changes in input prices will affect all regions with different intensity according to their input-use structure.

Prices of agricultural inputs have increased substantially in relation to agricultural prices. The price evolution for two main fertilizers against the average agricultural price index for the period 1990-2001 shows that while agricultural prices were falling input prices were going up, especially until 1996 (Figure 6).

Changes in net income per hectare have therefore been worse than those in gross income.

Off-farm labour income

Reliable information regarding rural wages was not available. However, the rural labour market is connected to the urban labour market through migratory

TABLE 23
Real legal minimum wages and employment, 1990-2000

	Real minimum wage	Employment index*	
	(1994 nuevos soles/per month)	Commerce	Services
1985	427.0	166.9	118.8
1986	453.8	172.3	121.3
1987	480.0	177.0	124.1
1988	417.9	178.4	125.3
1989	201.7	164.1	125.5
1990	188.0	160.6	124.6
1991	127.8	146.5	117.4
1992	127.9	122.5	104.5
1993	89.8	103.0	100.2
1994	116.3	94.6	104.3
1995	118.9	104.1	103.2
1996	122.7	119.7	110.3
1997	216.6	122.8	116.8
1998	239.1	130.7	121.1
1999	231.1	128.6	117.2
2000	256.5	129.7	115.6

Note: Employment index for the capital Lima. Minimum wages have national coverage.
Source: Statistical Office, Ministry of Labour as reported in INEI, 2002.

movements, and events and developments in the urban economy throw some light on performance at the rural level.

Employment in Lima fell sharply in the early 1990. From 1988 to 1993 employment in commerce and services, the sectors of most relevance to rural migrants, suffered reductions of 58 percent and 20 percent respectively, and did not recover much until the end of the 1990s. The percentage of under-employed increased and continued to stay at the same or higher level throughout the 1990s. The situation in the rural areas would have even been worse due to explosive increases in the supply of seasonal labour and low smallholder incomes, aggravated by the breaking up of the coastal cooperatives and the increased tendency to use family labour instead of seasonal workers.

The level of the real minimum wage fell notably in 1989, and remained low throughout the 1990s (Table 23).

Income transfers

A variety of assistance programmes were implemented during the reform and post-reform periods as part of a safety net for the more vulnerable sectors of the population (Table 24). It is estimated that between 1997 and 1998 social assistance reached 56 percent of total households in the country and 71 percent of rural households.[14] The degree to which these households have benefited from these programmes varies widely. At the national level, around 30 percent of beneficiary households received benefits from only one programme, whilst only 11 percent of them were receiving benefits from four or more programmes. Around 57 percent

[14] Estimates from INEI (2000), based on a sample of 4 756 households representing the 4.9 million households in the country.

TABLE 24
Beneficiaries and budgets of main food and nutrition programmes, 1998

Institutions	Programme	Budget ('000 nuevos soles)	Beneficiaries (no. of persons)
PRONAA	Proy. Wawa-Wasi	3 559	28 057
	Child feeding programme	19 973	244 954
	PROSIERRA	2 986	24 354
	School feeding programme	61 250	745 443
	Young at risk programme	782	17 141
	Comedores populares	54 012	842 686
FONCODES	Complementary feeding programme	10 526	50 000
	School breakfast	137 348	1962 500
Min. of Health	PANFAR	54 732	401 031
	PACFO	64 709	240 922
	PROMARN	780	4 378
	PANTBC	10 695	94 938
CARITAS	PRODESA	6 093	55 378
CARE	NIÑOS	1 877	7 083
ADRA OFASA	Child nutrition	6 404	95 180
PRISMA	Kusiayllu	3 431	25 844
Municipalities	Glass of Milk programme	285 124	5 212 436
TOTAL		724 279	10 052 325

Source: INEI, 2000; ENAHO, IV, 1998.

of the beneficiaries derived benefits from the food assistance programmes. Only 68 percent of the beneficiary households are considered poor.

The Glass of Milk programme has been the most widespread, reaching about 5.2 million people in 1998. Although it existed in the pre-reform period, it was strengthened in the early stages of reform. The total budget in 1998 for food programmes, including public and private funds, was around 724 million, nuevos soles, equivalent to US$240 million.

The incidence of these food transfers in kind on the beneficiary's food and total budgets varies greatly by their location and their income level. Average households from the rural areas tend to benefit more than urban households, due to the fact that they have greater access to the programmes and lower total and food expenditures. The food transfers as a proportion of average rural household expenditure on food ranges from 9.4 percent in the Coast to 15.5 percent in the Sierra. For extremely poor household beneficiaries the proportion ranges from 19.1 percent on the Coast to 30.3 percent in the Sierra.

The financial situation facing most small rural farmers deteriorated sharply during the late 1980s and did not improve with the policy reforms. This is no surprise, given the downward trend in the prices of the small farm production basket, the upward trend in agricultural input prices, combined with depressed real wages and employment. These adverse trends were slightly compensated for by production increases in the Sierra (Puno and Cusco) and the Amazonian region (San Martin), but not in the case of Piura, where production fell after the reform, especially in 1998 as a result of the El Niño event.

However, the social safety net initiatives and associated transfers have played an important role in helping vulnerable households to cope with economic hardship

TABLE 25
Impact of food transfers on household total and food expenditures, 1998

Region	Consumption expenditures		No of beneficiaries per household (no. of persons)	Food rations cost		Amount transfered as % of:	
	Total (nuevos soles per day)	Food (nuevos soles per day)		Unit (nuevos soles)	Total (nuevos soles)	Total expenditures	Food expenditures
Lima Metropolitan	51.99	28.99	3.95	0.46	1.81	3.48	6.24
Urban Coast	38.22	22.82	3.33	0.51	1.71	4.48	7.49
Rural Coast	28.98	19.70	4.02	0.46	1.86	6.41	9.43
Urban Sierra	34.69	20.72	3.11	0.55	1.72	4.95	8.28
Rural Sierra	18.73	13.48	4.05	0.52	2.09	11.14	15.49
Urban Amazonia	40.45	23.26	3.04	0.53	1.61	3.99	6.93
Rural Amazonia	24.97	17.02	4.10	0.43	1.75	6.99	10.25
Total	32.20	19.90	3.75	0.50	1.88	5.82	9.42

Source: INEI, 2000, with data from ENAHO, IV, 1998.

and food insecurity. In 1997 these transfers accounted on average for 21 percent and 9.7 percent, respectively, of the income of the lowest and second lowest deciles of national income distribution. Amongst the rural population the proportion was 19.8 percent and 15 percent, respectively, for the first and second lowest deciles.[15]

Additionally, the substantial reduction in agricultural real prices allowed the non-farming poor and food-deficit farmers to maintain or even increase their access to food. Minimum wage-earners were able to buy on average 2.4 times more food in 1998-2000 than in 1985-87, even though their real salary decreased in the same period by almost 47 percent. Food deficit farmers were insulated from changes in prices of those products used almost entirely for their own-consumption (like tubers, vegetables, dairy products, meat and eggs) and benefited from cheaper real prices in their supplemental food purchases.

All the above factors are consistent with the hypothesis of a substantial improvement in food security following the policy reforms in the early 1990s.

POLICY LESSONS

Peru's drastic economic and trade policy reform programmes have not apparently been successful in stimulating development in the rural economy. There is a wide-ranging debate about the impact of macroeconomic adjustment, trade liberalization and market deregulation on agricultural production and income growth, and about its differential impacts by products, regions and type of producer. This issue continues to be a high priority in the national policy agenda, not only due to the chronic crisis currently affecting the agricultural sector, but also because of the potential implications for agriculture of the ongoing trade negotiations within the WTO and the Free Trade Area of the Americas agreement and the upcoming negotiations for a bilateral Free Trade Area with the United States.

Despite the unfavourable incentive framework (lower prices and border protection, reduced credit availability, higher real interest rates and real input prices), the

[15] See CUANTO, 1999, Table 9.26.

agricultural sector had an impressive GDP growth during the post-reform period. This reflects in part, a recovery of the early pre-reform levels of agricultural production. Many factors have been mentioned to explain this sectoral recovery. Some of them are of a temporary nature ("good" weather), or a "one off" impact (increased area planting due to pacification). Others are real and sustainable growth factors (improved seeds, exploitation of export market opportunities), but their impact has tended to benefit commercial farmers almost exclusively.

A very positive aspect of the reforms was the inclusion of a compensatory programme to alleviate the adjustment cost on the poor, with an increasing amount of funds oriented towards these programmes. Peru followed a strategy of emphasizing the provision of food and nutrition, as well as basic health, sanitation and education to targeted sections of the population. It is estimated that between 1997 and 1998, social assistance programmes reached more than 56 percent of households, with particularly strong coverage for rural households. There were some targeting problems, however, with only about two-thirds of the beneficiary households being considered poor.

Low agricultural real prices allowed non-farm poor and food-deficit farmers to maintain or even increase their access to food. Maintaining the relatively low price of the basic food basket for consumers has helped to reduce poverty during he post-reform period, and especially the incidence of extreme poverty, which has fallen sharply.

However, during 1998-2001, the economic situation in Peru deteriorated dramatically, with an increase in extreme poverty from 15 to almost 25 percent of the population. In short, the gains in food security in the mid-1990s did not prove to be sustainable. Furthermore, the situation of most small rural farmers, which had deteriorated sharply during the late 1980s, did not improve with the subsequent policy reforms. Their plight and that of the agricultural sector and the rural sector as a whole remains a major policy challenge.

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ANNEX

Method of price decomposition

This technique aims to identify the relative importance of the different variables affecting the domestic price of tradable goods. Its basic formulation is that in any period the following identity holds:

$$P_d = P_w * E * (1+t) * (1+c) \qquad (1)$$

where P_d is the domestic price of a product, P_w its world price, t is the *ad valorem* import tariff, and c represents all other costs that affect the import price. In order to decompose the impact on the domestic price in terms of percentage contribution of each of the components in the equation (1), it is estimated taking the first-order differences of logs. The variable "c" is estimated by the differences between the changes in the domestic price and the changes in the world price, exchange rate, and import tariff rates.

First the effects of the trade policy variables on domestic agricultural prices at the aggregate level are estimated. The endogenous variable is the real domestic agricultural price index RDP. The explanatory variables are the index of real exchange rate (RER), a trade-weighted index of real world agricultural prices (RWP), and a time-series of trade-weighted average tariff rates for agricultural imports (T).[16] In order to separate the pre-reform period a dummy variable: zero for period 1986-89 and one for 1990-2001 is included.

The results were as follows:

Log (RDP) =	0.6676* log (RER) +	0.66353* log (RWP)	-0.471* log (T)-	0.124* (D)
t-statistics	(4.409)	(3.854)	(-1.677)	(-0.901)
R^2= 0.75	DW = 1.6573	Observations=16		

The most important variables are the Real Exchange Rate and the World Price Index; the tariff rate has a negative sign and the reform dummy variable is non-significant.

The above analysis develops the link between policy reforms and prices at the aggregate level. The price decomposition equation is also estimated for three commodities: rice, maize, and coffee. Per caput GDP is used as a proxy variable for changes in domestic income. The results of the regressions are:

RICE

Log RDPR = -12.5885 + 0.3630 *log(RWP)	+1.3460 *log(RER)	+2.1352*log(GDP)	
t-statistic	(-5.04)	(2.03)	(12.36)
R2 = 0.899	Observations= 21		

[16] The index of real international prices is deflated by the United States producer price index.

MAIZE

Log RDPM = -3.3316 + 0.2029 *log(MWP) +1.1951*log(RER) +0.3738*log(GDP)
t-statistic (-2.85) (1.93) (13.60) (1.31)
R^2 = 0.926 Observations = 21

COFFEE

Log RDPC = -7.7964 + 0.9308 *log(CWP) +0.4481*log(RER) +1.3279*log(GDP)
t-statistic (-2.31) (3.32) (2.90) (1.46)
R^2 = 0.785 Observations = 21

Comparative results from price decomposition analyses across the case study countries are provided in Annex B of the Synthesis chapter. The results in Annex B present the change in the domestic price as a percentage change with respect to previous period. The case study analyses vary in that some present results as a percentage change with respect to a base period. Whilst the interpretation of results in the case study narrative holds irrespective of the end points compared, the results presented in Annex B should be used for comparative purposes.

Senegal

Abdoulaye Diagne, François Joseph Cabral, Ben Omar Ndiaye, Mamadou Danskh and Malick Sane[1]

EXECUTIVE SUMMARY

Pre-reform

On independence in 1960, Senegal inherited an economy specialized in groundnut monoculture and the exploitation of its mining resources. This structure obliged the country to export most of its production and to import a major part of its consumption needs.

Many marketing functions were subsequently nationalized. The state set prices and the private sector was heavily regulated. The system that prevailed during the two first decades of independence showed signs of weakness by the end of the 1970s. The necessity of supporting parastatal organisations had a destabilizing effect on agriculture as well as on the country's fiscal position, and drove the Government to start reforming the economy.

The reforms

Reforms of the agricultural sector transferred to the private sector functions previously reserved for the public sector and parastatals, such as the distribution of inputs, the marketing of agricultural products and agricultural credit. It also entailed a reduction of input subsidies and production subsidies, reform of the price system to encourage the substitution of local cereals for imported cereals, and the liberalization of agricultural markets. Structural Adjustment Programmes for the agricultural sector (PASA) were initiated in 1994 in a stabilized macroeconomic environment, and liberalization was reinforced by the 1994 devaluation.

Impact on intermediate variables

During the period 1984-92, cereals recorded an increase in the real producer price. This is more apparent for rice (6.9 percent) than for millet/sorghum (0.1 percent), and was largely attributable to policies and other effects and to small changes in the real exchange rate. The combined effect of these factors was greater than the fall in world prices. The same trend occurred during the period 1993-2000, but the increase in real producer price was more pronounced. A 48 percent depreciation of the exchange rate largely explains this improvement.

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In spite of the positive impact on the real producer price of policies and the depreciation of the real exchange rate, there was a decrease in the real producer price of groundnuts and cotton in 1984-92. However, in the following period, their prices increased. The effect of the depreciation is amplified by the accompanying policies. Together these outweigh the impact of the large fall in world prices.

The production of Senegal's two main crops, groundnuts and millet/sorghum, fell during 1984-92. The reforms generated failures in input distribution and agricultural marketing. An effective private sector able to fulfil the functions previously undertaken by the state did not emerge. In the subsequent period, devaluation and agricultural reforms led to improved price incentives and a growth in foreign and domestic demand for locally produced products, explaining the positive impact on the production of groundnuts and millet/sorghum during this period. However, the contribution to total exports of groundnut products has fallen.

In 1994, the devaluation of the CFAF and the increase in world prices induced an 118.6 percent increase in exports between 1993 and 1994. The evolution of the imports of cereals was strongly influenced by rice imports. The latter increased from 67 percent of total food imports in 1985-93 to 69 percent in 1994-98.

Impact on target variables

An examination of the food balance between the periods 1988-90 and 1998-2000 demonstrates a relative improvement of the situation. The daily per capita consumption of calories increased from 2 213.3 to 2 256.8, an increase of 1.96 percent.

The contribution of local production to the coverage of cereal requirements has been falling. Between 1980 and 1983, it was 59 percent but in 1994-2000 it fell to 50 percent. The growth of supply has not kept up with growth in demand created by population growth.

Almost 40 percent of households were unable to obtain a calorific intake of 2 400 calories in 1992. In 1994/1995, the proportion of households living below the food security threshold was 34.3 percent. Rural households suffered more food insecurity than the urban population. Disparities can also be seen according to the gender of the household head. Food insecurity was lower in households headed by women, than in those headed by men.

Policy lessons

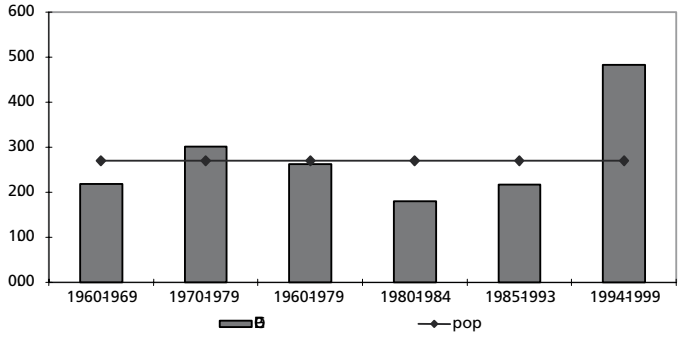
Initial reforms depressed agricultural supply, but the reforms brought about by the devaluation of the CFAF have had a positive impact on the main crops. However, while there have been some benefits from reform, the implementation of accompanying measures appears necessary to combat food insecurity: in particular, targeting the most affected categories of households and zones and measures to reduce agricultural supply rigidities are also needed.

INTRODUCTION: CONTEXT AND NATURE OF THE REFORMS

The role and level of development of the agriculture sector

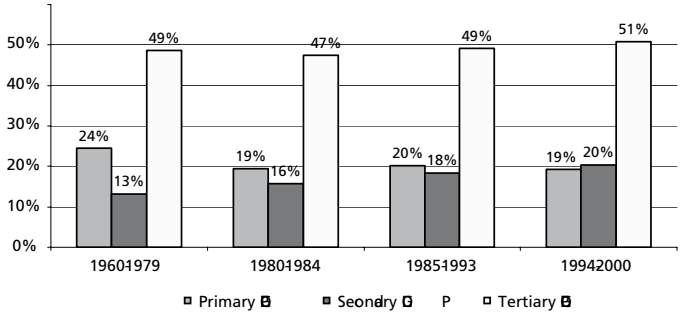
The performance of the Senegalese economy was comparatively weak before the devaluation of the CFA Franc (CFAF) in 1994. The growth rate has remained below

FIGURE 1
Economic and demographic growth rates, 1960-1999 (percent per annum)



Source: Calculations from Direction de la prévision et de la statistique (DPS).

FIGURE 2
Relative contribution of the different sectors to GDP, 1960-2000



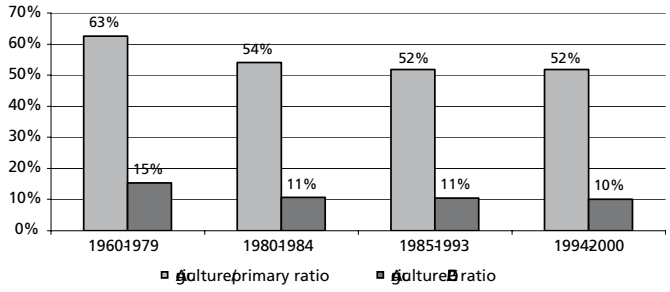
Source: Calculations from Direction de la prévision et de la statistique (DPS).

the demographic growth rate of 2.7 percent, except during the period 1970-1979, when growth reached 3.0 percent, and then again during 1994-2000 (Figure 1).

The service sector contributes close to half of GDP (50.8 percent) compared to 49 percent in 1960-79. The contribution of the secondary sector was 12.5 percent between 1960 and 1979, rising to 20.3 percent during 1994-2000. The contribution of the primary sector has declined from 24.0 to 19.3 percent during the same period.

The relatively small contribution of the primary sector does not reflect its importance in the economy. Agriculture contributes more than half of the output of the primary sector, representing 15 percent of GDP during the period 1960-79, and 10 percent between 1994 and 2000. This sector also contributes 30 percent of the intermediate inputs used by industry. The oil industry, a strong consumer of

FIGURE 3
Share of agriculture in GDP, 1960-2000



Source: Calculated from Direction de la prévision et de la statistique (DPS).

groundnuts, accounts for 12 percent of the secondary sector. Agriculture employs more than 60 percent of the population. In rural areas, 86.4 percent of the active population is employed in the sector, compared with 11.3 percent in urban areas (ESAM[2], 1994/1995).

Groundnuts and millet occupy 86 percent of the cultivable area. Millet covers 1 050 762 hectares on average per year, followed by groundnuts at 864 524 hectares. Maize, rice and cotton are much less important at 89 047 hectares, 74 000 hectares and 37 048 hectares respectively. In terms of production levels the most important crops are groundnuts and millet with an average of 710 381 tonnes and 654 000 tonnes, respectively, in the period 1980–2000. Next is rice (153 333 tonnes), maize (98 476 tonnes) and cotton (35 333 tonnes).

Agricultural imports and exports also play an important role in external trade. Groundnuts and cotton account for almost all the exports of the sub-sector while agricultural imports are dominated by rice.

Degree of openness of the economy prior to the reforms

With independence in 1960, Senegal inherited the fragile economic structures implemented during the colonial period. The country specialized in groundnut monoculture and mining (phosphates). This made it necessary for the country to export most of its production and to import a major part of its consumer requirements.

At independence, Senegal adopted African socialism as the model for its development strategy. This led to intervention by the state in all economic sectors – private sector activities were heavily regulated.

In agriculture, state-controlled corporations were established to promote modern production methods and to diversify agricultural production. The Agricultural Marketing Office (OCA) was set up to purchase farm output, distribute inputs, and import rice. The Regional Development Assistance Centres (CRAD) supported the development of co-operatives and liaised between these and the OCA. The National

[2] Enquete sénégalaise auprès des ménages (ESAM), Ministère de l'économie et des finances.

Office of Cooperation and Assistance for Development (ONCAD) was created to coordinate the functions of OCA and CRAD.

The setting of prices was governed by two systems: the administrative regime where the state set prices, and a regulatory regime where all price changes by private operators had to be approved by the state. The Multipurpose Role Expansion Centres (CERP) functioned in coordination with OCA and CRAD to provide technical advice on agriculture, health, forestry, livestock and co-operatives. A bank sponsored by the Government and the co-operatives, the National Bank of Development of Senegal (BNDS), was created to support access to credit for farmers.

Preferential prices paid by the French for the purchase of Senegalese groundnuts ended in 1967. The Technical Assistance and Cooperation Corporation (SATEC), a private institution created in 1964, was transformed into the Agricultural Development and Extension Society (SODEVA), mandated to support producer adoption of modern technologies. In order to promote the marketing of groundnuts, the Senegalese National Oilseeds Marketing Corporation (SONACOS) was set up to serve as an intermediary between ONCAD and the private corporations that were developing in the groundnut sector.

Motivations for the reforms

Despite the establishment of these institutions, the system that had prevailed during the two first decades of independence showed signs of weakness by the end of the 1970s. The agricultural sector was not performing well, and the system was draining fiscal resources.

The Government introduced Stabilisation Programmes in 1979. This was followed by the Economic and Financial Recovery Plan (PREF) in 1980-84 and the Medium and Long Term Economic and Financial Adjustment Programme (PAMLT) in 1985-92. These programmes were built around the following principal objectives:

- to stabilize the internal and external financial situation;
- to increase domestic savings;
- to stimulate investment in the productive sectors;
- to liberalize trade;
- to reduce the role played by the state in the economy.

Macro and sectoral components and the policy instruments used.

Trade policies

In the context of the WTO Agreement on Agriculture, Senegal committed itself to a uniform consolidated ceiling rate of 30 percent for import tariffs plus additional taxes and levies that could reach 150 percent. These commitments theoretically allowed tax levels of up to 180 percent. Previous import licences, notably for dairy and certain other product categories, as well as import quotas, were eliminated and replaced by temporary surcharges. In addition to customs duties, there was an additional surtax on sensitive products. For example, 20 percent surcharges are applied on imported rice, bananas, onions and potatoes, 10 percent on millet, sorghum and wheat and 44 percent on sugar.

On 1 July 1999, the Government published the reference values for milk, tomatoes, sugar, vegetable oils and chicken meat (Cabinet d'Etudes et de Conseil SARR, 1999).

TABLE 1
WTO bound duties and taxes on agricultural imports

Categories	Products	Consolidated tax ceiling		Applied tax		
		Consolidated tariff (%)	Other duties (%)	Taxes (%)	Surtaxes (%)	Total taxes (%)
Cereals	Rice	30	150	15	20	35
	Millet. sorghum			27	10	37
	Maize. wheat			20.5		20.5
Oils		30	150			27
Sugar		30	150			44
Animal products		30	150			31
Cotton, fibres, textiles		30	150			48
Fish, seafood		30	150			45
Fruits and vegetables	Banana	30	150	44.5	20	64.5
	Onion, potatoes			35	20	55

Sources: Customs statistics; General Direction of the Senegalese Customs.

In 1996, CFAF46 billion were generated annually from duties on agricultural products, rising to CFAF64 billion in 1997. The abolition of previous administrative import licences encouraged commercial private traders to engage in the marketing of agricultural products.

Senegal dismantled its customs duties system and put in place comparatively low tariffs. In the context of its policy reforms and its engagements with members of UEMOA in a custom union, Senegal has been engaged, since 2000, in a process of dismantling its tariffs which are now relatively low. This explains the applied rates being generally lower than the consolidated rates.

Sectoral policies

In 1984, the New Agricultural Policy (NPA) was adopted. The NPA followed PAMLT guidelines for the agricultural sector, which essentially involved transfer to the private sector of functions previously reserved for the public sector and parastatals (such as the distribution of inputs, the marketing of agricultural products and agricultural credit); the abolition of input subsidies and production subsidies; the reform of the price system to encourage the substitution of locally produced cereals for imported cereals; the liberalization of agricultural markets and the establishment of effective regulatory mechanisms. In 1985, private traders were authorized to take responsibility for the marketing of groundnuts. The NPA sought to promote activities that were commercially profitable without state intervention.

The reforms under the NPA were deepened in 1994 with a Structural Adjustment Programme for the agricultural sector (PASA). It was initiated in a stabilized macroeconomic environment and assisted by the 1994 currency devaluation. There was further liberalization of prices and domestic and foreign trade (agricultural inputs, rice, sugar, flour and vegetable oil). The monopoly of SONACOS in the purchase of groundnuts was eliminated; vegetable oil imports were liberalized; and the interest rate on agricultural credit was reduced from 12.5 percent to 7.5 percent in 1997-98. Imports of rice were liberalized (1992), administered pricing for domestically produced rice was abandoned, and SAED withdrew from processing and marketing.

Other policies

The Special Programme for Food Security (SPFS) and a Regional Programme for Food Security (PRSA) were adopted in 1995. The SPFS aimed to encourage a participative approach to the adoption and the management of small rural projects. Adopted in 1999 by WAEMU (West African Economic and Monetary Union) with the support of the FAO, the SPFS testifies to the desire on the part of the eight member states of the Union to reinforce their cooperation to take advantage of their agricultural potential, increase food production, intensify the trade of agricultural products and improve access to food, particularly for the poorest people.

CONSEQUENCES OF REFORMS: INTERMEDIATE VARIABLES

In assessing the effects of reform on output incentives, the relationship between changes in the international price and changes in the domestic price of commodities are investigated in relation to other possible drivers, such as the exchange rate, improvement in the efficiency of domestic marketing systems etc. It is therefore difficult to isolate policies that have been beneficial or harmful to agricultural performance.

Trends in international and domestic prices

Millet and sorghum

The average real producer price index (1995=100) over the period 1970-79 was 76.65 against 91.98 for groundnut. The relative price of millet/sorghum in comparison with groundnuts was 0.83 (100 kg millet was worth 83 kg of groundnuts). The stabilization policies (1980-84) and subsequent adjustment policies (1985-93) had a favourable effect on the relative price of millet in comparison with groundnuts, 0.95 and 0.96 during the periods 1980-84 and 1985-93 respectively, but fell slightly (0.94) during 1994-2000 (Table 2).

The average real producer price of rice was 91.25 in the period 1970-79. The relative price of the paddy was therefore estimated at 0.99, i.e. 100 kg of rice paddy for 99 kg of groundnuts. During the period 1980-84, this fell to 0.97, but paddy became comparatively more profitable, with a relative price of 1.10 between 1985 and 1993. After 1994, the relative price fell to 0.89 as a result of the removal of protection.

TABLE 2
Real producer prices, 1970-2000

	1970-1979	1980-1984	1985-1993	1994-2000
Groundnut	91.98	72.64	76.38	95.0
Cotton	80.21	69.11	73.32	85.4
Millet	76.65	67.61	70.44	89.2
Rice	91.25	70.62	83.94	85.0
RPPCOT/RPPGN	0.87	0.95	0.96	0.90
RPPMI/RPPGN	0.83	0.93	0.92	0.94
RPPRI/RPPGN	0.99	0.97	1.10	0.89

RPPGN: real producer price of groundnut, PPRCOT: real producer price of cotton, PPRMI: real producer prices of millet, PPRRI: real producer price of rice.
Source: Calculations of the author from agriculture statistics of the Ministère de l'agriculture, 2002.

TABLE 3
Decomposition of the variations of the domestic real producer price

Product	Period	Change in relation to pre-reform reference period (%):			
		Variation of real domestic producer price	Variation in world price	Variation in exchange rate	Changes in policies and other effects
Rice	1980-83		Reference period		
	1984-92	6.9	-55.6	1.4	61.2
	1993-98	37.7	-56.4	49.2	44.9
Groundnut	1980-83		Reference period		
	1984-92	-2.3	-45.7	1.4	42.1
	1993-00	18.4	-68.7	49.2	37.8
Millet,	1980-83		Reference period		
sorghum	1984-92	0.1	-51.4	1.4	50.1
	1993-00	7.0	-69.8	49.2	27.6
Cotton	1980-83		Reference period		
	1984-92	-1.9	-49.5	1.4	46.2
	1993-00	18.6	-71.0	49.2	40.3

Source: Calculations of the authors from agriculture statistics of the Ministère de l'agriculture, 2002.

During the period 1970-79, the relative price of cotton to groundnuts was 0.87. After a net improvement in the two following periods, this relative price fell back to 0.90 in 1994-2000.

Decomposition of price changes

The analysis of variations in the domestic real producer price is based on the reference period, 1980-83 (Table 3). During the period 1984-1992, cereals recorded an increase in the real producer price. This is more apparent for rice (6.9 percent) than for millet/sorghum (0.1 percent). This was largely attributable to policies and other effects and to small changes in the real exchange rate. The combined effect of these factors was greater than the fall in world prices. The same trend occurred during the period 1993-2000, but the increase in real producer price is more pronounced. A 47.9 percent depreciation of the exchange rate largely explains this improvement.

In spite of the positive impact of policies and the depreciation of the real exchange rate, there was a decrease in the real producer price of groundnuts and cotton in 1984-92. However, in the following period, their prices increased 18.4 percent and 18.6 percent, respectively, in relation to the reference period. The effect of the depreciation is amplified by the accompanying policies. Together these outweigh the impact of the large fall in world prices.

Fertilizer consumption

During the period 1964-1969, fertilizer consumption increased to an average of 77 400 tonnes per year (Table 4). During the period 1969-1980, consumption fell to 70 200 tonnes. In the early 1980s, in spite of policies to encourage the use of fertilizer, annual consumption fell to an average of 53 400 tonnes. During the period 1984-93, the adjustment policies resulted in further strong falls in fertilizer consumption. Furthermore, the PAMLT also coincided with a period of decreased rainfall. The shock of the CFAF devaluation in 1994 depressed fertilizer consumption further, while the agricultural reform programme in 1996-2000 coincided with even lower consumption levels.

TABLE 4
Evolution of the total consumption of fertilizers, 1960-2000 ('000 tonnes)

	1960-1964	1964-1969	1969-1980	1980-1984	1984-1993	1994-1996	1996-2000
Consumption	-	77.4	70.2	53.4	57.33	34.66	25.5

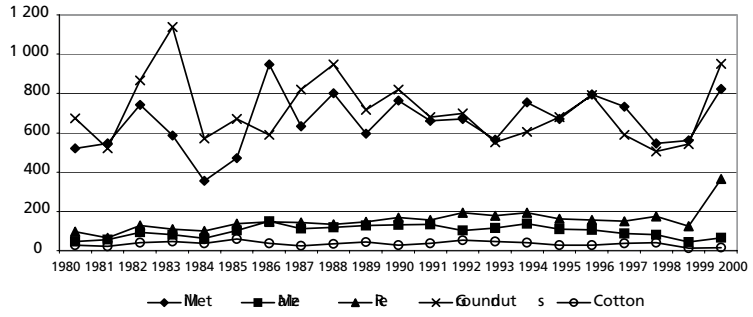
Source: Ministère de l'agriculture. Statistiques agricoles, 2000.

BOX 1
Agroclimatic conditions

Of the 3.8 million hectares of cultivable area, only 2.4 million hectares are actually cultivated. Water resources are estimated to be 35 billion m^3/year. Of the 8 percent of irrigable land, only 13 percent is effectively irrigated, 87 percent remaining untapped.

Loss of soil fertility led to a 15 percent fall in the cultivated area between 1988 and 1989.

FIGURE 4
Evolution of production ('000 tonnes), 1980-2000



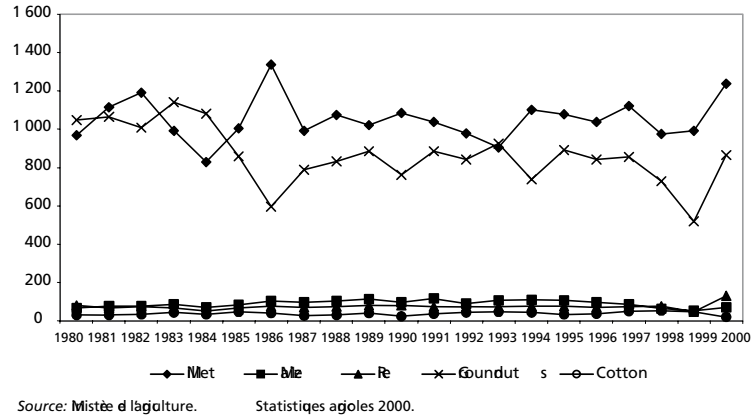
Source: Ministère de l'agriculture. Statistiques agricoles 2000.

Effects on agricultural output and value added

In this section, the findings from the price analysis are related to evidence of changes in output levels. In assessing the ability of producers to respond it is important to recognise the agroclimatic context within which they operate, as illustrated in Box 1.

During the first phase of the reform period (1984-93), the production of millet declined because of reductions in area combined with stagnant yields (Figures 4 and 5). After initial increases in output, groundnuts also fell during this period, largely explained by declining yields. Output of maize and cotton was fairly stagnant and rice output increased.

FIGURE 5
Evolution of cultivated areas ('000 ha), 1980-2000



Source: Ministère de l'agriculture. Statistiques agricoles 2000.

TABLE 5
Evolution of yields 1970-2000 (kg per hectare)

	1970-1979	1980-1984	1985-1993	1994-2000
Groundnut	777	703	892	863.3
Cotton	984.5	1 018.4	1 118.9	715.1
Millet	536.2	534.2	643.7	645.0
Rice	1 224.1	1 501.2	2 104.3	2 097.6

Source: Ministère de l'agriculture, 2000.

In the following period (1994-2000) millet production rose in response to increases in the cultivated area as did the production of groundnuts. The trend in cotton, rice and maize production was largely downwards, although rice output rose sharply in 2000.

Senegalese agriculture is not intensive in its use of capital. Rice yields have more than doubled over the last two decades, due to major research efforts, expanded irrigation and the adoption of high yielding seed varieties combined with fertilizers. However, yields of other crops have not increased much. Cotton yields have actually declined. Yields of rice averaged 2 054 per kg/ha, maize 1 087 kg/ha, cotton 960.4 kg/ha, groundnuts 837.5 kg/ha and millet 618 kg/ha during 1980–2000 (Table 5).

At current yields and prices, millet/sorghum is not attractive to the producer as a cash crop, and is primarily grown for own consumption. Restoration of soil fertility, accompanied by the selection of varieties adapted to different climatic conditions and regular renewal of seed stocks would help improve productivity.

Rice is produced mainly for domestic consumption. Substantial increases in output through area expansion are unlikely to be economically viable because of the high investment cost in irrigation, although further yield improvements could still be achieved on existing land.

The average production of groundnuts in 1996-98 was 530 000 tonnes, on an area of 700 000 hectares. Output has fallen over the last two decades, owing to a

decrease in cultivated area (notably in the "Groundnut basin") and lower yields. The groundnut market is now liberalized, but remains organized within the framework of an intra-industry agreement. The needs of the domestic market, estimated at about 150 000 to 200 000 tonnes per year, should grow in the future at the same rate as demographic growth.

Demand in the European export market has remained stable during recent years. A support fund was also put in place with the assistance of the Government and the European Union (STABEX funds) to help stabilize prices..

Studies show that yields could be improved by about 50 percent if a seed industry were to be established. The average production of edible groundnut in the period 1996-98 rose to 45 000 tonnes on an area of 53 500 hectares, a strong increase in area and in production in comparison with the preceding decade. Financial profitability for the producer is currently very low. Edible groundnut is marketed at practically the same price as the oil groundnut, whilst input costs are higher.

Cotton is supervised by SODEFITEX, which provides input credits and technical support, and buys cottonseed at a fixed price. The international prices of cotton are currently at an historic low, but estimates by the World Bank predict an increase in the long term. Export opportunities are therefore substantial. At current yields, the production of cotton is only slightly profitable for the producer (significantly less than for groundnut), but it is the only crop for which there exists a guaranteed price and a supply of inputs on credit. The financial situation of SODEFITEX is however weak: the cost of the fibre has risen to CFAF750 per kg (against a projected price of CFAF650 in 2000). To this loss, must be added the poor repayment performance of the input credit system. Cotton does, on the other hand, have a comparative advantage, less than groundnut under current market conditions, but practically of the same order in the long term. The profitability of the system requires an improvement in yields and a drastic adjustment in the cost structure of SODEFITEX.

In summary, the New Agricultural Policy (NPA) led to depressed production of groundnuts and of millet/sorghum. The reforms led to failures in input distribution and the marketing of agricultural products. The emergence of an effective private sector able to fill the functions previously the responsibility of the state did not occur. Devaluation and the measures geared towards the agricultural sector under PASA allowed an improvement of price incentives and a growth in foreign and domestic demand for locally produced products, explaining the positive impact on the production of groundnuts and millet/sorghum.

Effects on imports and exports

Agricultural imports represent one third of total imports, while agricultural exports are about 80 percent of total exports. Groundnuts alone constituted 52 percent of agricultural exports in 1998. Senegal remains a net importer of agricultural products and this position did not improve during the reform period. The evolution of the ratio of food imports to agricultural exports testifies to this. Between 1986 and 1990, the value of imports represented on average 1.7 times the value of exports. The period 1991-93 is marked by an increase in this ratio to 2.7 and by 1995-98 it was 4.2 (Office d'Etudes, 1999). The agricultural trade deficit increased between from 4 percent of GDP in 1990-94 to 10 percent of GDP in 1995-98.

TABLE 6
Agricultural exports and imports, 1985-1998 (in percent)

	Exports			Imports		
	Groundnut/ agricultural exports	Cotton/ agricultural exports	Groundnut and cotton/agricultural exports	Cereals/food products	Rice/food products	Rice/cereals
1985	62	19	81	40	26	65
1986	65	07	72	36	26	71
1987	68	06	74	31	22	71
1988	74	08	82	36	28	77
1989	72	05	78	40	28	71
1990	80	04	84	39	21	53
1991	70	15	86	34	22	64
1992	62	22	84	30	19	64
1993	45	26	71	30	20	66
1994	71	15	86	31	19	61
1995	54	29	83	43	30	69
1996	59	20	80	46	34	74
1997	51	28	79	37	26	71
1998	52	21	73	41	29	71
Average						
1985-93	67	12	79	35	23	67
1994-98	58	23	80	39	27	69

Source: FAO statistical yearbook. Various issues.

The exports of groundnut products have fallen. They amounted to 67 percent of the value of agricultural exports during the period 1985-93, and 58 percent between 1994 and 1998. The devaluation of the CFAF in 1994 and the increase in world prices induced a 118.6 percent increase in exports between 1993 and 1994. On the world market, groundnut oil is in strong competition with refined vegetable oils that benefit from export subsidies. On the domestic market, liberalization in 1995 resulted in import and price falls. Surcharges of 44 percent on imports were implemented in response to this, but imports increased, nevertheless.

Cotton is the second most important agricultural export in Senegal. The value of cotton exports increased by 12 percent between 1985 and 1993, and 23 percent during the period 1993-98. Close to 80 percent of cotton fibre produced in Senegal is exported, but since the liberalization of the sector in 1984, parallel markets have become more attractive for producers, creating supply difficulties for SODEFITEX.

Five products represent close to 80 percent of food imports: cereals (rice and wheat), dairy products, refined sugar, vegetable oils (rape oils and soya oils) and fruit and vegetables. Grains represent a third of food imports. These represented 35 percent of the value during the period 1985-1993, and attained an average ratio of 39 percent between 1994 and 1998. The increase in the import of cereals is strongly influenced by rice imports. The latter increased from 67 percent of total food imports in 1985-93 to 69 percent in 1994-98.

CONSEQUENCES OF REFORMS: TARGET VARIABLES

National food security

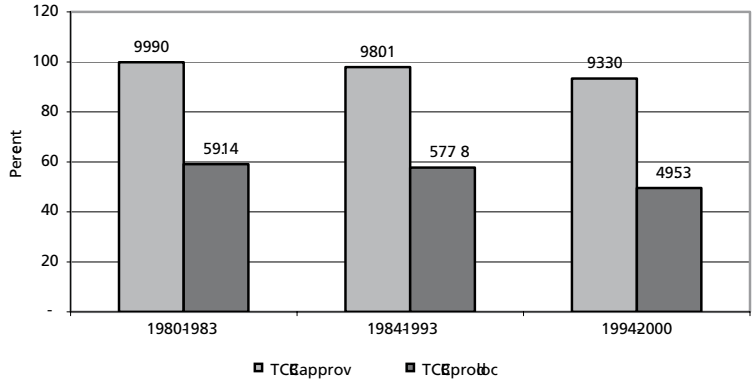
On the whole, the food situation improved between the periods 1988-90 and 1998-2000 (Table 7). The quantity of calories consumed per day by individuals increased

TABLE 7
Food situation, 1988-2000

Product	1988-90			1998-2000		
	Calories per capita per day	Protein per capita per day (g)	Fats per capita per day (g)	Calories per capita per day	Protein per capita per day (g)	Fats per capita per day (g)
Grand total	2 213.3	68.8	48.43	2 256.8	64.2	67.47
Vegetable products	2 011.7	49.78	37.63	2 057.5	44.32	56.64
of which, cereals (excluding beer)	1 491.4	40.73	8.76	1 330.6	36.61	6.63
Animal products	201.58	19.03	10.81	1 99.29	19.87	10.84

Source: FAOSTAT.

FIGURE 6
Coverage of cereal requirements, 1980-2000 (percent)



TCEapprov=Total cereal availability from domestic production and imports
TCEprobc=Cereal availability from domestic production

Source: Ministère de l'agriculture. Statistiques agricoles 2000.

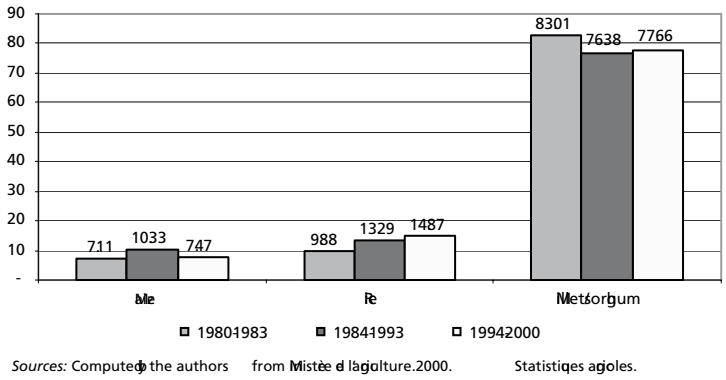
from 2 213.3 to 2 256.8, an improvement of 1.96 percent. On the other hand, the average consumption of proteins fell from 68.8 g per day to 64.2 g between the two periods, a decrease of 7.2 percent. However, the consumption of fats has increased from 48.43 g to 67.47, an increase of 39.3 percent

The increase in the consumption of calories is largely due to increases in the consumption of vegetable products. Calorific intake from cereals has, on the other hand, fallen from 1491.4 g to 1330.56 g, a decrease of 10.78 percent.

An analysis of data on per capita cereal availability (domestic production plus imports) suggests that cereal availability before the start of reform (1980-83) covered 99.9 percent of the amount required to meet the FAO minimum nutrition standard of 185 kg per capita per year (Figure 6). However, coverage fell to 98 percent between 1984 and 1993 and to 93 percent after devaluation and the implementation of PASA (1994-2000).

The contribution of local production to the coverage of cereal requirements has been falling. Between 1980 and 1983, it was 59 percent. During 1984-93, the level

FIGURE 7
Contribution of the principal cereals to local production, 1980-2000 (percent)



Sources: Computed by the authors from Ministère de l'agriculture. 2000. Statistiques agricoles.

declined to 58 percent and in 1994-2000 it fell to 50 percent. The growth of supply has not kept up with growth in demand created by population growth.

Millet/sorghum contributes most to locally produced grain supplies, although the contribution of rice is growing.

Household level food security

Despite the improvement of the real producer price under the reforms, disparities are significant in the distribution of agricultural income between different categories of farmers. Average real income per head for small farmers growing millet/sorghum, paddy, groundnut, maize and cotton was CFAF52 100 per year during the period 1970-79, compared to CFAF186 769 for medium-sized farmers and CFAF512 611 for large farmers. During the period 1980-84, income fell for all categories of farmer, whilst in the following two periods all categories of farmer saw their incomes improve (Table 8). The real income of the small farmers represents less than one-third of that of the medium sized farmer and about one-tenth of that of the large farmers.

The impact of agricultural policies and commercial reforms on rural households is analysed from data of two surveys that were carried out in the 1990s: ESP and ESAM I'S. ESP was carried out in 1992 and gives an idea of the position that prevailed before the wave of reforms that accompanied the devaluation. ESAM I'S was conducted in 1994/95 and captures the immediate effects of the devaluation shock on different categories of household.

Determination of the threshold of food insecurity

The food insecurity threshold is defined as the food expenditure that allows a minimum consumption level of 2 400 calories a day per adult-equivalent. ESP expenditure data reveals that 42.53 (Table 9) percent of households were unable to meet this minimum level of consumption in 1992. In 1994/95, the proportion of households living below the food security threshold was 34.3 percent. In 1992,

TABLE 8
Average real income of farmers, 1970-2000 (in CFAF)

	1970-1979	1980-1984	1985-1993	1994-2000
Small farmers				
Millet	20 289	17 830	22 384	28 402
Maize	3 702	2 789	5 168	4 952
Paddy	3 265	3 099	5 163	5 211
Groundnuts	23 149	16 541	22 068	26 565
Cotton	1 694	1 510	1 760	1 310
Total	52 100	41 768	56 543	66 441
Medium size farmers				
Millet	72 733	64 155	66 841	84 642
Maize	13 272	9 997	18 527	17 752
Paddy	11 704	11 108	18 508	18 682
Groundnuts	82 986	59 296	79 111	95 231
Cotton	6 074	5 413	6 310	4 697
Total	186 769	149 970	189 296	221 004
Large farmers				
Millet	208 859	183 540	230 419	292 375
Maize	14 401	10 847	20 102	19 261
Paddy	33 609	31 899	53 148	53 648
Groundnuts	238 301	170 272	227 172	273 462
Cotton	17 441	15 545	18 119	13 488
Total	512 611	412 102	548 961	652 233

Sources: Computed by the authors from Ministère de l'agriculture. 2000.

TABLE 9
Incidence of food insecurity, 1992 and 1995

States	ESP (1992)	ESAM (1994/1995)
Dakar	15.09	2.54
Other urban centres		11.36
Rural	57.32	52.06
Total	42.53	34.33

Sources: Computed by the authors from the data in Enquête sur les priorités (EPS), and Enquête sénégalaise auprès des ménages (ESAM).

rural households suffered most from food insecurity (57 percent in Table 9). This proportion was 15.09 (Table 9) percent for the urban population. During the period 1994/95, the proportion of households not obtaining the calorific ration was 52.1 percent in rural locations. Amongst urban households, 11.4 percent of households in cities other than Dakar were below the threshold, while in Dakar this proportion was 2.5 percent.

Strong disparities in food insecurity exist between regions (Table 10). In 1992, six of the ten regions have rates above the national average. These were Kolda (78.62 percent), Fatick (70.68 percent), Kaolack (61.68 percent), Tambacounda (60.76 percent), Ziguinchor (53.11 percent), Louga (42.78 percent). In Esam I'S (1994/95), it appears that the number of regions where the rate is greater than the national average increased to seven. The regions concerned are: Fatick (62.90 percent), Kolda (58.89 percent), Kaolack (54.76 percent), Ziguinchor (48.29 percent), Thiès (41.82 percent), Diourbel (37.99 percent), and Tambacounda (36.19 percent).

TABLE 10
Incidence of food insecurity by region, 1992 and 1995

Regions	ESP (1992)	ESAM (1994/1995)
Dakar	15.11	3.34
Ziguinchor	53.11	48.29
Diourbel	30.72	37.99
Saint-Louis	18.03	32.25
Tamba	60.76	36.19
Kaolack	61.68	54.76
Thiès	35.75	41.82
Louga	42.78	14.49
Fatick	70.68	62.90
Kolda	78.62	58.89
Total	42.53	34.33

Sources: Computed by the authors from the data in Enquête sur les priorités (EPS), and Enquête sénégalaise auprès des ménages (ESAM).

TABLE 11
Incidence of food insecurity according to the gender of the household head, 1992 and 1995

Household head	ESP (1992)	ESAM (1994/1995)
Male	45.38	36.26
Female	21.91	23.64

Sources: Computed by the authors from the data in Enquête sur les priorités (EPS), and Enquête sénégalaise auprès des ménages (ESAM).

Contrasts can also be seen according to the socio-professional category of the household head. Although the typology of the groups is not the same for the two surveys, it appears that the self-employed represent the socio-professional group most seriously affected. With ESP (1992), the incidence in this category was 49.2 percent. With Esam I'S (1994/95), it is estimated at 52.5 percent for the agricultural self-employed, compared with 23 percent for the non-agricultural self-employed. In 1994/95, after the agricultural self employed, food insecurity affects most the households headed by the unemployed.

Disparities also exist according to the gender of the household head. In the two surveys, food insecurity is lower in the households headed by women (Table 3.5). One plausible explanation is that the category of households headed by women is composed essentially of widows and divorcees who profit more from transfers.

POLICY LESSONS

As a result of the mediocre performance of agriculture in the 1970s, the impoverishment of the rural areas became acute. This largely justified the design, in 1994, of the PASA. During the implementation of the PASA four major reforms were undertaken: completion of the programme to liberalize prices and foreign and domestic trade in agricultural products and inputs; withdrawal of the state and winding up of the monopolies; reduction of interest charged on agricultural credit and the use of land as a means of collateral for loans; and Government measures to better coordinate the early warning systems and to address crises due to natural disasters, in order to improve food security.

In spite of the positive impact of domestic policy reform, particularly changes in the real exchange rate which offset significant falls in world commodity prices, the production of groundnuts, cotton and millet/sorghum fell during the early period of reform. This occurred because the reforms generated failures in input distribution and in the marketing of agricultural products. The emergence of an effective private sector able to fulfil the functions previously undertaken by the state did not occur. Although the NPA depressed agricultural supply, the series of reforms led by the devaluation of the CFA franc, in particular the PASA, appear to have had a positive impact on the two main crops (millet/sorghum and groundnuts). In 1994, the devaluation of the CFAF and the consecutive increase of the world prices induced an increase of groundnut exports of 118.6 percent between 1993 and 1994, though this expansion was shortlived.

One of the constraints to increased agricultural output is heavy dependence on erratic rainfall. Only 13 percent of irrigable arable land is actually irrigated; the remaining 87 percent is not farmed. There has been a decline in soil fertility on the land in which production is concentrated. The agricultural sector is confronted by several other constraints: demographic growth rate of 2.7 percent, greater than that of agricultural production; absence of appropriate price incentive policies; weak marketing and high transactions costs; high costs of inputs and constraints linked to the availability of agricultural credit.

Between 1988-90 and 1998-2000, there was a relative improvement in the national food balance. The quantity of calories consumed per day by individuals increased, but, as the contribution of domestic supply to total availability of cereals fell so the value of imports increased from 1.7 times the value of exports, to a ratio of 2.7. The evolution of cereal imports was strongly influenced by the increase in rice imports.

Surveys of household supplies show that a substantial proportion of the population are unable to meet their nutritional requirements. Food insecurity exists in the regions that are most seriously affected by poverty. While the demand for agricultural products has soared, the supply has not increased significantly. Ultimately it is the increase in food imports and aid that is helping to bridge the cereals deficit.

Rural households suffered more food insecurity than the urban population. However, the breakdown of the producer price shows that the liberalization reforms induced by the devaluation of the CFA franc, on the whole, brought about an improvement in the producer prices of groundnut, cotton, millet/sorghum and rice. This improvement certainly led to a comparative rise in household expenditure of rural households compared with urban households.

Disparities are significant in the distribution of agricultural income between different categories of farmers. At the level of the occupational/social categories, food insecurity is much more marked among the self-employed and among the agricultural self-employed. Differences can also be seen in the incidence of food insecurity by the gender of the household head, with surveys indicating that food security was better in the case of households headed by women. However, a finding of concern is that, while male-headed households improved food security over time, female-headed households experienced a worsening of food insecurity.

Empirical analysis of Senegal has provided an overall picture of some of the most problematic issues in terms of food security. While there have been some benefits from reform, the implementation of accompanying measures appears necessary

to combat food insecurity. In particular, targeting the most affected categories of households and zones would make it possible to combat food insecurity more effectively. Accompanying measures to reduce agricultural supply rigidities are also needed.

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United Republic of Tanzania

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EXECUTIVE SUMMARY

Pre-reform

In 1967, Tanzanian development policy shifted from the goal of achieving maximum economic growth to the goal of equitable growth. The private sector was replaced to a large extent by parastatals. Some agricultural estates were placed under public management, smallholder farming was collectivized, and cooperatives were given monopoly control over marketing. For the first six years of this period the economy performed reasonably well, but by the mid-1970s the country was experiencing serious problems.

The reforms

A National Economic Survival Programme (NESP, 1981/82) and a Structural Adjustment Programme (SAP, 1982/83 to 1984/85) were formulated in the early 1980s, but only partially implemented due to an inadequacy of resources. The ERP I (1986-89), supported by the World Bank and the IMF, was successful in improving the economy, but there was a worsening trend in the provision of social services (education, health, water and nutrition). The ERP II (1989-92) maintained added explicit recognition of the social dimensions of reform and the need to address poverty. Sectoral reforms included liberalization of food and cash crop marketing and of agricultural input distribution; deregulation of prices; exchange rate adjustment and rationalization of the tariff structure. However, the real exchange rate began to appreciate again after 1993. A summary of the instruments of reform and their impact on food security is presented in the Annex.

Impact on intermediate variables

The market-determined producer prices of food in the early 1990s were substantially higher in real terms than the official procurement prices of the 1980s, and were significantly affected by the 1991/92 drought in southern Africa. However, real producer prices of food have fallen by 40-60 percent since 1993. The reduction in producer prices for maize, wheat, and rice has been larger (55-60 percent) than those for non-tradable crops (World Bank, 2001) due to appreciation of the exchange rate. Since 1993, real producer prices for all the major export crops have fallen between 25 and 70 percent, in spite of some reduction in marketing margins due to privatization and in spite of stable world prices for most crops. The main explanation for the falling producer prices is the appreciation of the real exchange rate since 1993.

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The output of maize, rice and wheat appears to have stagnated in the 1990s after experiencing relative growth during the 1980s. This is consistent with the drought and the fall in real prices due to the appreciating exchange rate. By contrast, the output growth of non-tradable crops does not appear to have slowed noticeably during the 1990s. Export crop production expanded in the late 1980s and early to mid-1990s, reflecting the higher prices achieved as a result of real exchange rate devaluation. However, in the last few years prices have plummeted for a number of crops, which is expected to have a negative impact on production in the coming years.

Impact on target variables

Despite its potential, agricultural output has scarcely kept up with population. Food deficits occurred in 6 out of the last 15 years. Food production and crop production both increased between the periods 1980-1992 and 1993-2000, but food production per capita decreased by 13 percent.

Between 1991/2 and 2000/01 the percentage of the population falling below the food poverty lines fell from 22 percent to 19 percent, and in the case of the basic needs poverty line, from 39 to 36 percent. The incidence of poverty is greater in rural areas, but has also fallen. Nevertheless, the reduction in the incidence of poverty has been small and the absolute number of people below the basic needs poverty line has risen from 8.8 million in 1991/92 to 12.5 million in 2000/01.

Some health and nutrition indicators have worsened between the periods before and after 1992. The incidence of malnutrition amongst children under five has increased by 4 percent and life expectancy has dropped by 8 percent. Per capita daily calorie intake has declined from 2 146 in 1988-90 to 1 916 in 1998-2000. Per capita consumption of protein and fat has also declined.

Policy lessons

Under reform the role of public institutions in the supply of inputs and the marketing of crops has been left to the private sector. However, the efficiency and capability of the private sector to carry out such a role has been shown to be low: there is no incentive to commit resources for longer term investment in such things as storage facilities, processing plants, quality assurance systems, marketing capabilities and farmer support programmes. Since infrastructure difficulties lead to very high transport costs private traders have concentrated business in areas with better infrastructure. Other areas have been deprived of marketing and support services. As a result many smallholders make only limited use of agricultural inputs and agricultural productivity remains low.

Despite liberalization, gaps in the policy, legislative, regulatory, and institutional framework continue to exist in Tanzania. The government has yet to formulate a comprehensive agricultural marketing policy and a set of supportive strategies.

INTRODUCTION: CONTEXT AND NATURE OF THE REFORMS

The role and level of development of the agriculture sector

It is estimated that 79 percent of the economically active population of Tanzania is engaged in the agricultural sector and that some 60 percent of the population in rural areas fall below the poverty line. Crop production accounts for most of the

agricultural production of rural households, with the exception of the relatively small nomadic populations inhabiting the dryer areas. Of total production in the export and food crops sectors, 80 percent derives from smallholder production. Annual growth rates of the agriculture sector increased from 3.2 percent during 1986-91 to 3.8 percent during 1992-2001, but with population growth at 2.8 percent per annum in 2001, this has been insufficient to pull the majority of the rural population out of poverty. Production levels are far below potential and the sector's contribution to both GDP and export earnings has been sluggish.

In 1996/97 there were about 4.4 million smallholder households and 1 039 large and medium-sized agricultural holdings. Most of the smallholders (in about 8 000 villages) are engaged in subsistence cultivation of food crops and in cash cropping. Each household works on an average holding of less than two hectares. Of these, 38 percent sold no product at all, consuming all output within the household (ERB, 2001).

The nature of agricultural activity varies greatly from district to district, in some cases because of ecological conditions, in others governed by differences in recent economic history. In some areas production is capital intensive and conducted on a large scale, (for example, in the production of tea, sisal and sugar cane); in other areas it is still small scale and predominantly concentrated on food production. In some areas, although still small scale and labour intensive, a large proportion of activity is directed towards producing export crops, such as coffee, cotton and cashew nuts.

The preferred staples in Tanzania are maize and rice. Maize is grown on four out of every ten acres of cultivated land. More than 80 percent of rural households grow maize and of these 26 percent sell maize (ERB, 2001). Ruvuma, Iringa, Rukwa and Mbeya regions are known as the "big four" maize producers. Use of fertilizers and improved seed have made them leaders in both yield (average 1.96 tonnes, more than double the national average) and output (40 percent of total production between 1985/93 and 1998/99).

In all, about 60 percent of the maize produced is retained for home consumption and only 40 percent marketed. At present, surplus production in years of good harvest is exported both officially and informally to neighbouring countries (Ackello-Ogutu and Echessah, 1997). On average, 572 000 tonnes of rice were produced yearly for the period covering 1981/82 to 2000/2001. Morogoro, Mbeya, Mwanza and Shinyanga account for 63 percent of total rice production over the same period.

Tanzania has 16.4 million cattle, 11.64 million goats, 3.5 million sheep and about 47 million chickens. However, the livestock sub-sector suffers greatly from disease, which hampers efforts to revive the export of livestock and its products.

The country has a capacity to process 500 000 litres of milk per day, of which plants of the former Tanzania Dairies Limited (TDL), which has been privatized, can process 309 000 litres. The estimated production capacity of milk is 900 million litres. Recent studies show that by the year 2010 the demand for milk will be 1.5 billion litres per annum compared to the supply of only 1.33 billion litres.

Degree of openness of the economy prior to the reforms

In 1967, Tanzanian development policy shifted from the goal of achieving maximum economic growth to the goal of equitable growth, whereby satisfying the basic needs of all its citizens was a top priority. The objectives were based on principles of socialism and self-reliance, as spelt out in the Arusha Declaration of 1967.

Production sectors were restructured and the private sector was replaced to a large extent by the state (parastatal) sector. From 1967 onwards, the Government exerted comprehensive control over the economy, nationalized the main commercial and financial businesses, placed some agricultural estates under public management, collectivized smallholder farming, and displaced private agricultural traders by giving agricultural cooperatives monopoly control over marketing For the first six years of this period of government takeover, the economy performed reasonably well on the surface. However, due to over-concentration on social investments, some signs of economic imbalance appeared, and problems became acute in the mid-1970s when production stagnated and earlier achievements were eroded.

In 1961, cooperatives were introduced for marketing maize and other food crops. The Government established the National Agricultural Products Board (NAPB) in 1963 to control and regulate food crop; the National Milling Company (NMC) in 1968 to manufacture and process agricultural products; and the General Agricultural Products Export (GAPEX) Company to handle major agricultural export crops including cashew, coffee, cotton, pyrethrum, tea, and tobacco and livestock products.

The NMC expanded in 1975 to include procurement, transport, export, import, and storage of all grains and the maximum permissible grain transfer by private individuals was lowered to 100 kg. In 1976 cooperative unions were abolished and their functions taken over by the NMC. Through the NMC, the Government maintained a monopoly in the trade of all the main cereals, including maize, and applied pan-territorial pricing, setting producer and consumer prices regardless of transport costs. Consumer maize prices were subsidized and minimum producer prices were guaranteed. The NMC was also responsible for managing emergency food reserves and exporting surplus production. Prior to the late 1980s, private sector agricultural marketing hardly existed, except in the case of perceived non-strategic products, such as fruits and vegetables. The pan-territorial pricing system and transport and input subsidies promoted maize production and agricultural development in the southern highlands comprised of Rukwa and Ruvuma regions, over 1 000 km from the main domestic market of Dar es Salaam.

Severe inefficiencies in the cooperatives' system of distributing agricultural inputs and production were reflected in heavy operating losses. The Government temporarily sustained such losses through subsidies. However, the cooperative structure eventually collapsed, and with it many of the services that farmers took for granted.

Motivations for the reforms

From the end of the mid-1970s to the early 1980s, the socialist approach engendered many problems that culminated in severe economic crises. The crisis can be attributed to several factors, external and internal including drought, the oil crisis, the war with Uganda and the general world recession. The productivity of public investment was falling, domestic savings were eroding, the confidence of the private sector was in decline, and with tight controls on foreign exchange, the black market premium on foreign exchange ballooned to more than 100 percent. Also, with fewer funds, all forms of maintenance lapsed. Roads and other infrastructure deteriorated substantially.

Macro and sectoral components and the policy instruments used

The transition from the old to the new economic policy regime has involved efforts to move from a restrictive public sector-led economy to a liberalized, market-led and private sector-oriented economy.

In a period of home-grown reform, the NESP (1981/82) and the SAP (1982/83 to 1984/85) were formulated but only partially implemented because of inadequate resources. Real GDP growth declined from an annual rate of 2 percent between 1976 and 1980 to 1.8 percent between 1981 and1985 (Wangwe and Tsikata, 1999). The NESP and the SAP both failed to address the underlying distortions in the economy.

Post-1986-to present policy reform regime

In the first sub-period of genuine reform (1986-1991/92), the World Bank linked structural adjustment loans (SALs) to a broad set of policy changes including exchange rate reform, debt reduction, trade liberalization, subsidy reductions, and tax and institutional reform. This regime was adopted in the Economic Recovery Programme (ERP I, 1986/87-1988/89) and the Economic-Social Action Programme (ESAP or ERP II, 1989/90-1991/92).

While ERP I was successful in improving key economic indicators in the short-term, a worsening trend in the provision of social services (education, health, water and nutrition) threatened longer-term growth prospects. ERP II maintained the objectives of ERP I but added explicit recognition of the social dimensions of reform and the need to address poverty.

In the second sub-period of reforms (1993 onwards), reform efforts have focused on restructuring the public sector to serve a private sector-led, market-oriented economy. Reforms affecting agriculture included liberalization of food and cash crop marketing and of agricultural input distribution; deregulation of prices; exchange rate devaluation; trade and interest rate policy reforms. The measures were intended to reverse tariff and trade policies that had an anti-agriculture and anti-export bias.

GDP per capita increased at a rate of 1.6 percent per annum between 1990 and 2001. The rate of inflation decreased from 32 percent in 1990 to 4 percent in 2001, the balance of payments position has been improving and foreign direct investment (FDI) inflows have been rising (Table 1). However, it is generally agreed that the private sector response to the reform measures has been slow because of poor infrastructure, a complex and ambiguous tax regime and a poorly functioning legal framework.

Exchange rate policy

The most important reforms in terms of their immediate impact on economic activity were the liberalization of exchange rate transactions and foreign trade. In 1994 the official and unofficial foreign exchange markets were unified under a flexible, market determined regime. The exchange rate adjustment has been substantial, with the shilling being devalued from TSh17 to the US dollar in March 1986 to over TSh 600 in October 1995 and TSh 1 040 in March 2003.

Between the 1960s and the mid-1980s the Government maintained a fixed exchange rate under which the REER gradually appreciated. The Tanzanian shilling was consistently overvalued between 1980 and 1985, a situation that was accentuated by the increasing strength of the US dollar.

TABLE 1
Trends of macro economic indicators, 1990-2001

Indicators	Years											
	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Population (million)	23.9	24.6	25.3	26	26.7	27.5	28.3	29.1	30	31.1	31.9	32.9
GDP factor cost (million US$), Current terms	3 846	4 445	4 226	3 879	4 170	4 866	5 953	7 043	7 719	7 879	8 357	8 710
Real GDP growth (%)	5	6	4	4	3	3.6	4.5	3.5	4	4.7	4.9	5.7
Per capita real GDP growth (%)	2.2	3.2	1.2	1.2	0.2	0.8	1.7	0.7	1.2	2	2.2	3.1
Per capita income (US$) (nominal)	160.9	180.7	167	149.2	156.2	176.9	210.3	235.6	257	260	262.6	263.4
Inflation rate (%)	32	34	24	24	27	27.4	21	16.1	12.8	7.9	5.7	4.0
Savings deposit rate, average (%)	26	26	26	24	25	21.1	16.7	15.1	7	8	6	4
Lending rate average (%)	26	26	30	30	31.5	35.5	33.5	26.5	26	22	23	21
Public gross fixed capital formation/GDP (%)	11.4	9.7	9.9	8	6.5	3.6	3.8	3.2	3.6	3.3	6.5	5.8
Private gross fixed capital formation/GDP (%)	16.7	18.9	19.1	18.6	20	17.6	14.2	12.9	13.8	13.2	12.4	12.3
Private gross fixed capital formation/Total (%)	59.4	66.1	65.9	69.8	75.6	82.8	78.9	80.1	79.2	79.8	65.4	67.6
Gross domestic savings/ GDP (%)	10.00	12.00	10.00	3.00	1.00	3.00	8.00	7.00	6.00	6.00	6.00	5.00
Services as % of total exports	43.8	29.3	29.7	41.4	44.6	46.1	41.3	39.6	47.7	54.2	50.1	47.8
Current account balance, (%)	-14.5	-16.6	-16.8	-26.3	-17.1	-13.3	-7.7	-7.9	-12.3	-10.1	-4.6	-4.7
Current account balance (US$ million)	-558.9	-736.1	-708.1	-1022	-711	-646.4	-461.2	-555.1	-946.6	-793.4	-382.0	-413.5
Current account balance/ GDP (%)	-13	-15	16	-21	-14	-11	-6	-6	-9	-7	-6	-7
FDI inflow (US$ million)	-	2.9	12	20	50	150.9	148.5	157.8	172.2	516.7	463.4	327.2
FDI stock (US$ million)	93	93	105	125	175	325	473	631	803	987	1180	1404
Foreign reserves (weeks of imports)	6.8	8.2	12.4	6	9.5	6.6	11.3	16.5	13.4	18	24	26

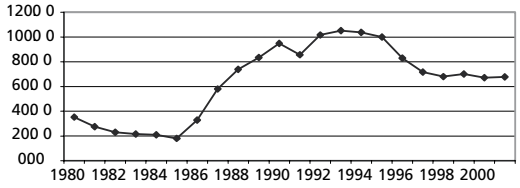
Source: Computed from data from Bank of Tanzania publications and NBS, 2002.

However, a sharp devaluation of the real effective exchange rate (REER) took place during the 1986-1990 period, due to a combination of low inflation and successive adjustments of the nominal exchange rate under the fixed exchange rate regime. This significantly increased price incentives for producing tradable commodities, such as wheat, rice and maize. However, after 1993 the REER began to appreciate again, removing some of the previous incentive gains in the tradable commodities sector (Figure 1).

Trade liberalization measures

These included the removal of quantitative restrictions (except in the case of sensitive goods), tariff reductions and rationalization of the tariff system. According to the World Bank (1996), there were 20 tariff rates, and the maximum tariff was 200 percent prior to June 1988, reduced to four tariff rates by 1990, and the maximum tariff rate had fallen to 50 percent by July 1994.

FIGURE 1
Real effective exchange rate, 1980-2001



Source: FAOSTAT database, 2003.

Impediments to exports were removed, including abolishing the surrender requirements on foreign exchange receipts from non-traditional exports; eliminating the licensing and registration requirements for exports; reducing the number of export items subject to permit and allowing private participation in traditional exports.

A duty drawback scheme was introduced in 1986, but is yet to function well despite efforts to streamline it. An export retention scheme was introduced to allow exporters to retain varying degrees of export receipts. Export retention for traditional exports and non-traditional exports is now 100 percent of receipts. Restrictions on current accounts regarding international payments and transfers were eliminated. Export volume rose by a total of over 50 percent between 1986 and 1994, although the impact of export receipts on the external accounts was offset by deterioration in the terms of trade. The revival of traditional and non-traditional exports coincided with the depreciation of the exchange rate as well as with measures introduced to deregulate agricultural exports.

Agricultural sector policies and strategies

Sectoral reforms took the form of liberalizing marketing, processing, external trade and the distribution of inputs; reducing the power of agricultural marketing boards; and eliminating subsidies on transport, maize flour and fertilizers.

After March 1987, private traders were allowed to trade freely in food and in 1989 the single channel marketing system through the NMC was abandoned in favour of a liberalized food marketing system. The NMC became a buyer of last resort, before collapsing in the early 1990s due to mounting financial losses. In 1992, the cooperative unions also disengaged from the marketing of staple food crops. The participation of the private sector in food crop trade increased rapidly. In 1990/91, the government stopped prescribing the farm gate prices of food crops and announced indicative prices until 1993/94.

From 1991 to 1995, fertilizer and other input subsidies were phased out and input markets were opened up to private traders. Taxes and import duties on almost all agricultural inputs (including fertilizers and agrochemicals) were removed. The budget savings associated with the elimination of input subsidies and loss-making commercial activities were not, however, redirected to public support for

TABLE 2
Extents, pace, thrust and sequence of reforms in Tanzania

Reform	Extent	Pace	Thrust	Sequence
Fiscal balance & management	Moderately comprehensive	Slow	Most committed	3
Monetary policy	Moderate	Moderate	Moderately committed	5
Exchange rate policy	Comprehensive	Moderate	Less committed	3
Financial sector policy	Moderate	Slow	Less committed	5
Market deregulation	Less comprehensive	Slow	Less committed	1
Price reforms	Comprehensive	Fast	Most committed	4
Import liberalization	Comprehensive	Fast	Most committed	1
Export promotion policies	Less comprehensive	Slow	Most committed	5
Civil service reforms	Less comprehensive	Slow	Moderately committed	2
Public enterprise reforms	Less comprehensive	Slow	Least committed	5
Social sector reforms	Less comprehensive	Slow	Least committed	1*

Note: Sequencing is expressed in numbers with "1" denoting the much earlier (1985/86) years and "5" the latest (1993-1996) years of reforms.* Reforms initiated early but implementation more recently.
Source: Wangwe, Musonda and Kweka, 1997.

the agricultural sector. Government expenditure on agriculture has fallen in both absolute and real terms and as a percentage of total expenditure.

Despite the reforms, many challenges still remain. Poor governance, outdated legal and regulatory frameworks, and a lack of appropriate institutions are hindering private sector development.

Food commodity taxation

District authorities are able to levy a produce cess on the traded crop value. The burden of this tax falls mainly on produce that is traded through formal markets. Although no upper limit for the cess has been prescribed, it does not usually exceed 10 percent of farm prices.

The pace of the reforms and their completeness and sequencing

Privatization of publicly owned enterprises and parastatal restructuring has in many cases been limited and slow, as has downsizing of the civil service. However, the liberalization of goods, inputs and money markets and of trade/import liberalization and the removal of price controls have been comprehensive and rapid (Table 2).

CONSEQUENCES OF REFORMS: INTERMEDIATE VARIABLES

In assessing the effects of reform on output incentives, the relationship between changes in the international domestic commodity prices are investigated in relation to other possible drivers such as the real exchange rate, improvements in the efficiency of domestic marketing systems, etc. Many of the reforms that have been implemented simultaneously or/and sequentially are aimed at removing structural bottlenecks that impede the proper functioning of the market mechanism. It is therefore difficult to isolate policies that have affected agricultural performance.

Trends in international and domestic prices

Food crop prices were decontrolled as soon as Tanzania launched its adjustment process in the mid-1980s. Real prices for maize increased sharply in the early 1990s

TABLE 3
Real producer prices for maize 1990/91–1998/99 (constant market prices 1998-99 TSh/kg)

Year	1990-91	1991-92	1992-93	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99
Price	106	279	298	256	181	165	138	117	118

Source: Figures supplied by MAFS, 2001.

TABLE 4
Trends in selected crop prices pre-and post 1992 (1990/92 to 1993/99)

	Pre-1992 (Average)	Post-1992 (Average)	Change (%)
TOT index (Agri/ Industry) 1992=100	95	98	3.2
Real producer prices (food) TSh/kg (weighted average of maize, rice and wheat)	36.6	32.6	-10.9
Real producer prices (export) TSh/kg (weighted average of coffee, tobacco, cotton and cashew nuts)	137.3	165.7	20.7
Farmers share of consumer price (%)	43.37	75.23	73.5
Maize prices	63.05	87.9	39.4
Rice prices	30.8	38.4	24.7
Sorghum prices	36.25	99.4	174.2
Farmers' share in export prices (%)	45.46	50.98	12.1
Cashew nuts	55.7	64.7	16.2
Arabica coffee	57.0	58.5	2.6
Robusta coffee	53.0	45.7	13.8
Tea	49.6	34.5	30.4
Fire cured tobacco	49.4	74.9	51.6
Flue cured tobacco	38.2	56.5	47.9
Lint cotton	36.0	51.2	42.2
Pyrethrum	24.75	21.8	11.9

Source: United Republic of Tanzania and World Bank, 2000; and computed from data from various government papers.

and peaked in 1993/94 due to a combination of severe drought and the withdrawal of the NMC and cooperatives from crop marketing, but fell again in the following years (Table 3). The government still intervenes to restrict movement across internal and external boundaries, especially during anticipated food shortages.

Comparing the pre- and post-reform periods (1990/92 to 1993/99), the average real producer prices (TSh/kg) of key food crops (maize, rice and sorghum) have declined by a weighted average of 11 percent. This is attributable to several factors, including the appreciation of the real exchange rate, increased supply following good weather, and export restrictions on food grains (particularly maize). On the other hand, the farmers' share of the consumer price for the same selected grain crops (maize, rice, and sorghum) has increased.

The real producer prices and farmers' share of export prices of cash crops has indicated mixed results (Table 4). One of the explanations for the improvement of their share in some crops (cashew nuts, tobacco, cotton, arabica coffee) is greater competition from the private sector against the cooperatives that still play a dominant in the marketing of some crops. The decline in the farmer's share of the export price for other crops (robusta coffee, pyrethrum and tea) reflects the increased transactions costs associated with regulation by crop marketing boards that have maintained their activity. For instance, the Coffee Board requires all exporters to purchase coffee from the coffee auctions administered by the coffee authorities.

TABLE 5

Decomposition of producer price variations, 1980-2001 (percentage changes)

	Cotton				Tea				Coffee			
	Producer Prices	Border prices	Exchange rate	Other factors	Producer prices	Border prices	Exchange rate	Other factors	Producer prices	Border prices	Exchange rate	Other factors
1980	9.7	5.4	-0.1	4.4	0	-4.3	-0.1	4.3	3.6	-11.5	-0.1	15.2
1981	2.8	-8.8	0.6	11.1	0	-1.7	0.6	1.1	-3.9	3.6	0.6	-8.1
1982	6.3	-21.9	5.8	22.4	0	13.3	5.8	-19.1	11.6	1.6	5.8	4.2
1983	10.4	6.4	11.7	-7.7	0	8.1	11.7	-19.8	17.9	2.9	11.7	3.3
1984	10.6	-1.6	16.2	-4	27.1	-26.1	16.2	36.9	34.5	4.5	16.2	13.8
1985	14.6	-13.1	-4	31.7	0	2.4	-4	1.7	-0.7	-5.8	-4	9.1
1986	19	-9.7	49.6	-20.9	16.6	-0.7	49.6	-32.3	65.6	-8.4	49.6	24.4
1987	11.4	19.3	20.9	-28.8	7.7	-0.6	20.9	-12.6	30.1	0	20.9	9.2
1988	6.1	-7.1	17.4	-4.3	19.1	7.5	17.4	-5.8	28.4	-21.1	17.4	32.1
1989	6	7.7	18.7	-20.4	11.5	-4.5	18.7	-2.7	32	0.6	18.7	12.7
1990	9.8	3.6	1	5.2	13.1	1	1	11.1	18.4	-11	1	28.4
1991	16.6	-3.1	7.5	12.1	10.3	-1.5	7.5	4.2	8.2	5.3	7.5	-4.6
1992	23.2	-12.2	15.6	19.9	21.7	-1.5	15.6	7.6	29.1	34.1	15.6	-20.6
Average 1980-92	11.27	-2.70	12.38	1.59	9.78	-0.66	12.38	-1.95	21.14	-0.40	12.38	9.16
1993	-6.7	13.8	13.9	-34.4	20.6	-4.6	13.9	11.3	26.7	-0.1	13.9	12.9
1994	12.5	9.1	5.3	-1.9	0	3.7	5.3	-9	72.3	-11.7	5.3	78.7
1995	17.6	-8.7	5.5	20.8	4.6	16.5	5.5	-17.5	34.1	11.9	5.5	16.7
1996	22.2	-0.7	-0.2	23.1	4.1	-7.8	-0.2	12.2	-12.4	-14.5	-0.2	2.3
1997	-7.6	-8.2	2	-1.3	0	3.5	2	-5.5	2	-9.3	2	9.3
1998	7.6	-9.2	2.6	14.2	0	-0.8	2.6	-1.8	2.6	-17.7	2.6	17.7
1999	1.1	4.7	5	-8.5	0	-12.2	5	7.2	8.8	-8.7	5	12.5
2000	-23.3	34.4	3.9	-61.5	0	3.2	3.9	-7.1	1.9	19.1	3.9	-21.1
2001	17.6	-4.4	3.6	18.4	0	2.5	3.6	-6.1	3.5	24.5	3.6	-24.6
Average	4.56	3.42	4.62	-3.46	3.26	0.44	4.62	-1.81	15.50	-0.72	4.62	11.60

Note: Comparative results from price decomposition analyses across the case study countries are provided in Annex B of the Synthesis chapter. The results in Annex B present the change in the domestic price as a percentage change with respect to previous period. The case study analyses vary in that some present results as a percentage change with respect to a base period. Whilst the interpretation of results in the case study narrative holds irrespective of the end points compared, the results presented in Annex B should be used for comparative purposes.

Source: Calculated from data of the Marketing Development Bureau; IMF Database; World Bank, 2001.

Price decomposition

Prior to trade reforms there were no significant links between border prices, real producer prices and the exchange rate. After the reforms, this link can be seen, albeit with time lags.

The market-determined producer prices of food in the early 1990s were substantially higher in real terms than the official procurement prices of the 1980s. The prices were significantly affected by the 1991/92 drought in Southern Africa and associated maize exports from Tanzania. However, real producer prices of food have fallen by 40-60 percent since 1993. The reduction in producer prices for maize, wheat, and rice has been larger (55-60 percent) than those for non-tradable crops (World Bank, 2001) due to appreciation of the exchange rate.

Since 1993, real producer prices for all the major export crops have fallen between 27 percent and 70 percent (Table 5). This has occurred in spite of some reduction in marketing margins due to privatization and in spite of stable world prices for most crops. The main explanation for the falling producer prices is the appreciation of the real exchange rate since 1993.

Market integration

A large proportion of food crops are still consumed within the household or locality that produces them. Nevertheless, maize markets have developed rapidly since liberalization, although they are still quite volatile. There is a reasonable level of market integration between major rural and wholesale markets, with maize being readily transported from surplus to deficit areas. Dar es Salaam is the main destination for maize, as well as rice and beans. Traders are aware of the prices in different wholesale markets. Although there may be a relatively small number of traders operating in any individual wholesale market, they face competition from traders coming in from other regional centres and from Dar es Salaam. Margins are generally not high and spatial marketing margins are decreasing over time for previously regulated tradable food crops, such as wheat, rice and maize.

However, poor communications, storage and marketing infrastructure and high transport costs remain an obstacle to improved marketing, especially in remoter rural areas; and private traders have tended to concentrate their activities in those areas with better infrastructure facilities. Poor roads are probably one of the most limiting factors to agricultural growth. Only 5.5 percent of roads are paved. Only about 14 percent of unpaved roads are in good condition, only about 25 percent are in fair condition, while the remaining 61 percent are in poor condition.

The withdrawal of the public sector and cooperatives from crop marketing has made it harder for some farmers to find outlets for their crops, especially in areas that the private sector has been reluctant to enter. A lack of price information has also put some farmers at a disadvantage when dealing with traders.

Effects on agricultural output and value added

The overall production trend of most of the export crops recorded positive growth during the 1981-99 period (Table 6). For instance, cashew nuts, coffee, tea, tobacco and sisal expanded their growth while cotton and pyrethrum registered negative growth. The positive growth reflected the higher prices achieved as a result of real exchange rate devaluation since the mid-1980s. However, in the last few years,

TABLE 6
Trends in annual production of cash crops, 1980/81-1998/99 (million tonnes)

Year	Cashew	Coffee	Cotton	Pyrethrum	Tea	Tobacco	Sisal
1980/81	56.5	66.6	184.8	2	20	16.6	73.8
1981/82	44.3	55	133.1	1.9	15.5	16.2	60.6
1982/83	32.6	53.5	128.2	1.6	17.4	13.6	46.2
1983/84	47.6	49.1	140.7	1.4	15.3	11	38.3
1984/85	32.5	49	155.1	1.5	16.8	13.4	32.3
1985/86	20.5	52.8	108.2	1.4	15.5	12.6	30.2
1986/87	16.5	41.5	216.9	1.2	14.1	16.5	33.2
1987/88	24.3	49.1	253.7	1.4	13.8	12.9	33.3
1988/89	19.3	57.8	191.7	1.3	15.9	11.6	33.3
1989/90	17	53.4	112.5	1.6	20.2	11.8	32.2
1990/91	29.8	44.8	141	1.7	18.1	16.4	33.7
1991/92	41.2	48	267	2.2	19.5	23.3	36
Average annual growth rate 1981-92	0.03	-0.02	0.11	0.02	0.01	0.5	-0.6
1992/93	39.3	59.6	300.2	2	21	23.3	24.3
1993/94	46.6	34.2	140	0.5	22.3	25.8	29.6
1994/95	63.4	42.5	122.3	0.5	25.3	22.6	28.9
1995/96	81.7	52.3	250.2	0.4	21.2	28.4	25
1996/97	63.4	44.3	252.9	0.4	19.8	35.4	30
1997/98	99.9	38	208.2	0.4	26.2	52	15.3
1998/99	110	42.7	105.4	0.1	25	37.8	24
Average annual growth rate 1993-99	0.177	0.017	-0.021	-0.256	0.046	0.097	0.002

Source: United Republic of Tanzania, Economic Survey, 2001.

TABLE 7
Production of selected food crops (million tonnes)

Year	Maize	Wheat	Sorghum	Millet	Rice	Potatoes	Pulses	Banana	Cassava
1981	1 402	59	287	200	309	240	315	608	1 403
1982	1 740	59	295	207	386	230	322	598	1 345
1983	1 712	72	267	202	328	246	340	698	1 385
1984	2 013	67	392	322	413	255	378	745	1 086
1985	2 670	97	383	300	417	277	432	777	1 533
1986	2 224	71	363	250	510	335	251	792	1 124
1987	2 423	75	423	199	782	319	379	792	1 399
1988	2 528	81	409	217	767	337	385	801	1 271
1989	2 227	105	537	223	735	996	384	823	1 730
1990	2 331	83.	750	249	405	290	424	750	1 566
1991	2 226	64	587	262	392	256	311	793	1 777
1992	2 267	83	719	424	640	258	397	798	1 708
Average 1981-1992	2 147	76	451	254	507	337	360	748	1 444
1993	2 188	59	473	435	654	283	279	733	1 802
1994	2 874	75	838	342	622	448	374	650	1 492
1995	2 648	83	872	585	806	418	467	640	1 498
1996	1 831	91	498	347	549	477	368	604	1 426
1997	2 684	111	563	235	849	637	462	835	1 758
1998	2 451	82	561	194	778	569	528	751	1 795
1999	2 009	32	598	219	782	798	673	702	1 780
2000	2 698	72	691	206	323	950	682	752	1 721
Average 1993-2000	2 423	76	637	320	670	573	479	708	1 659

Source: United Republic of Tanzania, Economic Survey, (various years).

TABLE 8
Area under cultivation of food crops, 1981–2000 ('000 hectares)

Year	Maize	Wheat	Sorghum	Millet	Rice	Potatoes	Pulses	Banana	Cassava
1981	1 260	39	356	345	299	117	561	313	655
1982	1 409	36	397	327	220	104	608	290	723
1983	1 247	40	486	301	257	99	578	291	742
1984	1 320	33	490	357	297	95	579	280	524
1985	1 576	44	446	346	266	98	596	262	666
1986	1 484	57	409	301	315	189	326	266	640
1987	1 675	61	492	312	409	181	561	271	757
1988	1 669	578	477	275	385	199	526	256	735
1989	1 631	52	487	146	289	307	580	226	590
1990	1 848	50	856	386	369	232	565	252	604
1991	1 908	44	683	309	307	198	595	265	684
1992	1 565	61	642	391	377	216	534	270	657
Average 1981-1992	1 549	48	518	316	316	169	551	269	665
1993	1 612	35	728	411	397	221	541	281	693
1994	1 764	55	690	304	394	293	537	248	585
1995	1 637	60	666	473	513	290	529	241	588
1996	1 564	57	622	354	439	287	502	241	664
1997	2 088	100	596	268	655	372	701	335	745
1998	1 764	58	660	196	474	284	620	253	656
1999	1 870	72	736	252	517	417	815	304	810
2000	1 582	52	692	201	324	522	642	290	661
Average 1993-2000	1 735	61	674	307	464	335	610	274	675
Average growth (%)	12	27	30	-3	47	98	11	2	2

Source: MAFS (Ministry of Agriculture and Food Security), 2001.

prices of a number of export crops have plummeted, which is expected to have a negative impact on production in the coming few years. Strong growth in cashew nuts, tobacco and tea has offset declines in coffee, cotton and pyrethrum. The major problem facing the sector is declining productivity as a result of low levels of input use and declining soil fertility.

The production of food crops has grown over the last two decades although output appears to have become more volatile during the 1990s (Table 7). The output of maize, rice and wheat appears to have stagnated in the 1990s after experiencing relative growth during the 1980s. This is consistent with the severe drought of the early 1990s and the fall in real prices experienced by these commodities after 1994 due to the appreciating exchange rate. By contrast, the output growth of non-tradable crops does not appear to have slowed noticeably during the 1990s. In general, output growth in food crops is more closely associated with increases in area cultivated than with increasing yields (Tables 8 and 9).

Input use

Since liberalization, the use of agricultural inputs has substantially declined. The number of farmers using fertilizers increased from 7 percent in 1971 to about 27 percent in 1991, but has been falling continuously since then. Actual consumption

TABLE 9
Trend of yields of food crops (yields per hectare, kg)

Year	Maize	Wheat	Sorghum	Millet	Rice	Potatoes	Pulses	Banana	Cassava
1981	1 113	1 517	807	581	1 032	2 052	561	1 946	2 141
1982	1 235	1 642	744	635	1 760	2 216	529	2 068	1 859
1983	1 373	1 791	55	671	1 274	2 493	588	2 403	1 866
1984	1 525	2 028	800	903	1 396	2 701	653	2 669	2 074
1985	1 694	2 253	860	871	1 573	1 825	726	2 966	2 304
1986	1 512	1 261	887	831	1 621	1 780	771	2 979	1 759
1987	1 447	1 237	860	638	1 912	1 767	676	2 925	1 850
1988	1 515	1 406	859	790	1 991	1 699	733	3 750	1 731
1989	1 365	2 035	1 103	1 081	2 544	3 249	663	3 643	2 932
1990	1 262	1 664	876	906	1 100	1 253	752	2 974	2 593
1991	1 167	1 456	873	852	1 279	1 303	531	3 000	2 600
1992	1 448	1 376	1 121	1 084	1 701	1 201	745	2 960	2 600
Average 1981-92	1 388	1 639	862	820	1 599	1 962	661	2 857	2 192
1993	1 358	1 716	793	1 060	1 648	1 284	517	2 609	2 600
1994	1 630	1 382	1 217	1 127	1 580	1 531	696	2 623	2 552
1995	1 617	1 396	1 279	1 236	1 571	1 441	883	2 659	2 547
1996	1 171	1 387	817	981	1 251	1 665	735	2 503	2 149
1997	1 300	1 067	1 116	900	1 468	1 678	700	2 422	2 265
1998	1 400	1 400	900	1 000	1 600	2 000	900	3 000	2 700
1999	1 100	500	800	900	1 500	1 900	800	2 300	2 200
2000	1 706	1 382	1 201	1 000	1 958	1 819	1 064	2 594	2 605
Average 1993-2000	1 410	1 279	1 015	1 025	1 572	1 665	787	2 589	2 452

Source: MAFS (Ministry of Agriculture and Food Security), 2001.

figures are difficult to obtain, but it appears that consumption increased from around 80 000 tonnes per year in the 1970s to a peak of 127 000 in 1990-92, before plummeting after that – the estimate for 1998/99 was just 63 000 tonnes (World Bank and IFPRI, 2000). The main reason for this was the end of the state-controlled distribution system and associated subsidies which increased the real price of fertilizer, making it harder to access and less affordable. Until 1988/89, the Government was the principal importer and supplier of most inputs through parastatal agencies and co-operative unions. With liberalization, the distribution system was largely privatized.

In the past, maize production used a great deal of fertilizer. However, the experience of the seed market has some parallels with that of the fertilizer market. In the 1980s, a parastatal, TANSEED, monopolized seed production and imports. The system was characterized by poor seed quality, inadequate supply, and persistent losses by TANSEED. With liberalization in the early 1990s, seven seed companies entered the market, marginalizing TANSEED. The competition has resulted in a greater choice of seed varieties. About 27 percent of Tanzanian farmers use improved seed of one crop or another.

A fundamental constraint to input use is the lack of credit. There is still no organized credit system and, in the absence or the weakening of cooperatives and crop boards, the Government has been unable to help traders and agricultural food processors enforce credit agreements with farmers. In a bid to rectify constraints on input use, the Government in 2000 set aside TSh100 million to launch an Agricultural Input Trust Fund.

With the removal of fertilizer subsidies and the end of fertilizer supplies on credit through the cooperatives, the profitability of applying fertilizer to maize and other food crops has been greatly reduced, especially in the Iringa, Mbeya and Rukwa Regions. Interviews with farmers suggest that many producers may have switched away from cash crops, such as cotton, to food crops because cash crops require more intensive use of inputs.

Effects on imports and exports

Table 10 shows that while Tanzania's exports remain dominated by seven primary agricultural commodities (coffee, cotton, cashew nuts, cloves, tea, tobacco and sisal) which have traditionally constituted more than half of the value of total exports, non-agricultural exports have improved, especially in the mineral sub-sector and in tourism. The average contribution of primary exports was 75 percent during 1984-86, before declining to 57 percent in 1996, as the share of non-traditional merchandise exports picked up (World Bank, 2001). Tanzania's export sector is vulnerable to climatic changes and fluctuations in world market prices.

The value of exports increased dramatically between 1985 and 1999 in response to better prices arising from the depreciating real exchange rate, export incentive schemes and the emphasis given to non-traditional exports. The rise in exports continued even after the real exchange rate began to appreciate in 1994. However, in 1996 exports peaked and then began to fall again, possibly in a delayed response to the real exchange appreciation.

TABLE 10

Exports by major category, 1985-1999 (US$ million)

Year	Coffee	Cotton	Sisal	Tea	Tobacco	Cashew nuts	Cloves	Total traditional	Total merchandise exports	Agri. % of total exports
1985	93	26	4	16	14	10	49	212	271	78
1986	164	31	5	14	14	13	15	256	290	88
1987	90	37	5	13	12	11	6	174	254	68
1988	71	65	4	15	13	2	8	177	270	66
1989	98	77	4	17	13	3	0	212	395.2	54
1990	82	76	17	38	13	5	0	231	407.8	57
1991	76	62	2	22	2	16	0	179	340	53
1992	58	95	1	24	2	22	0	203	370	55
Average 1985-92	91.5	58.625	5.25	19.875	10.375	10.25	9.75	205.5	324.75	65
1993	96.08	78.38	3.33	30.03	17.07	23.31	0	248	431	58
1994	115.36	105.12	5.12	39.52	20.56	51.16	0	337	519	65
1995	142.6	120.15	6.31	23.36	27.13	64	0	384	683	56
1996	136.11	125.33	5.32	22.42	49.24	97.77	0	436	764	57
1997	119.28	130.38	9.12	31.83	53.64	91.08	0	435	753	58
1998	108.74	47.63	6.78	30.43	55.39	107.32	0	356	589	61
1999	76.63	28.25	7.26	24.37	43.44	98.94	0	279	541	52
Average 1993-99	110.78	86.73	6.06	27.72	34.60	67.97	1.21	335.06	575.59	59
Change in averages (%)	21	48	15	39	233	563	-88	63	77	-9

Source: Bank of Tanzania (various publications and years).

TABLE 11
Trade in food grains, 1985-1997 ('000 tonnes)

Year	Maize		Rice		Wheat*
	Exports	Imports	Exports	Imports	Imports
1985	0	6.1	0	321.9	21.8
1986	0	93.8	0	83.5	53.5
1987	90.8	0	0	52.3	33.7
1988	19.4	0	0	19.5	28.8
1989	30.3	0	0	0	30
1990	57	0	5	2.6	40
1991	0	2.2	0.4	0	19.7
1992	6.1	24.5	0.5	65.5	33
Average 1985-92	40.72	31.65	1.97	90.88	32.56
1993	16.4	6.7	0.8	69.8	51
1994	5.6	27.7	6.2	48.2	69
1995	28	64.3	0	8	45
1996		44.6	0	119.2	28
1997		77.5	0	110.1	52
Average 1993-1997	7.53	44.16	3.50	71.06	49.00
Change (%)	-81	40	78	-22	50

Note: averages are calculated on the available data during specific years. Zeros means data of certain crops were not available/ gaps in those years. However, the years are arranged chronologically to accommodate available data catering for accessed crop data.
*no exports of wheat
Source: Statistics from the Tanzania Revenue Authority (TRA), Customs Department, various years.

The increasing volume of maize imports in relation to exports points to domestic production and marketing constraints. Many of the main maize production areas are far from domestic markets and ports.

CONSEQUENCES OF REFORMS: TARGET VARIABLES

National food security

Per capita intake of calorie, proteins and fats

The per capita daily intake of calories, protein and fat has declined since the late 1980s (Table 12).

The self-sufficiency ratio

Despite Tanzania's potential to produce more agricultural crops, agricultural growth has scarcely kept up with population growth. Over the last 15 years food production has averaged 7.1 million tonnes and food deficits occurred in 6 out of the last 15 years (MAFS, 2001). Estimates for 2001/02 point to 95 percent of total domestic food requirements (8.1 million tonnes) being met by domestic production (7.7 million tonnes) (MAFS, 2001). Tanzania has a high self-sufficiency ratio in starchy root crops, sugarcane, vegetables, oil crops, tree nuts, offal, stimulants, fish, spices and aquatic products.

Food production index

Food and crop production both increased between the periods 1980-92 and 1993-2000. However, food production per capita decreased by 13 percent in the 1990s, as a result of population growth (Table 13).

TABLE 12
Per capita calorie, proteins and fats intake, 1988-90 and 1998-2000

Year	1988-90	1998-2000
Per capita calorie intake	2 145.7	1 916.1
Percentage of requirement, 2 400 calories/per day/per person	89	80
Change between 1988-90 and 1998-2000 (%)		-1
Per capita protein intake	53.9	46.46
Change between 1988-90 and 1998-2000 (%)		-14
Per capita fat intake	31.51	30.88
Change between 1988-90 and 1998-2000 (%)		-2

Source: Calculated from Food Balance Sheets, FAO, 2003.

TABLE 13
Food and crop production indices, 1980-2000

Year	Food production per capita index (FPPCI)	Food production index (FPI)	Crop production index (CPI)	Growth of FPPCI (%)	Growth of FPI (%)	Growth of CPI (%)
1980	102	74	79			
1991	97	100	101	-5	35	28
1992	89	95	94	-8	-5	-7
Average 1980-92	96.00	89.67	91.33	8	-6	-3
1993	88	97	94	-8	8	3
1994	84	96	92	-5	-1	-2
1995	86	101	99	2	5	8
1996	85	103	103	-1	2	4
1997	79	94	89	-7	-9	-14
1998	83	104	99	5	11	11
1999	83	106	101	0	2	2
2000	81	106	101	-2	0	0
Average post-1992	83.625	100.875	97.25			
Change between the periods	-13	12	6	-1	2	1

Source: World Bank, 2002.

Food nutrition indicators

Some health and nutrition indicators have worsened since 1992. The incidence of malnutrition amongst children under five has increased by 4 percent and life expectancy has dropped by 8 percent (Table 14).

Household level food security

Sources of income and employment

The common basic grain crops such as maize and rice are not the only important contributors to household income. Sales of small quantities of cash crops such as coffee, cashew nuts, tobacco, and pyrethrum, as well as small livestock, are also key sources of cash. However, among the poorest households, sales of maize, sorghum and millet are often a necessity, even where this requires earning income off-farm in order to repurchase stocks later in the year at higher prices. Strong seasonal variations in basic grain prices are thus particularly harmful to this group.

Agricultural sales contribute about 65 percent of total household income. The sale of food crops accounts for about 41 percent of total income, the sale of cash crops,

TABLE 14
Health and nutrition indicators, 1980-2000

Year	Safe water, rural (% of rural population with access)	Safe water, urban (% of urban population with access)	Prevalence of anaemia among pregnant women (%)	Low-birth-weight babies (% of births)	Malnutrition prevalence (% of children under 5)	Death rate, crude (per 1 000 people)	Life expectancy at birth, female (years)	Life expectancy at birth, male (years)	Life expectancy at birth, total (years)
1980	...	...	...	...	...	15.44	51.78	48.26	49.98
1982	...	...	...	...	...	14.8	52.5	48.9	50.66
1985	...	...	...	12	...	14.2	52.62	49.2	50.87
1987	...	...	...	13	...	13.8	52.7	49.4	51.01
1988	...	...	...	13	...	...	...	...	...
1990	42	80	...	...	...	13.62	51.56	48.62	50.05
1991	...	...	...	8.6	...	...	...	...	...
1992	...	...	...	17	28.9	13.5	50.8	48.1	49.42
Average 1980-92	42	80	0	12.7	28.9	14.2	52.0	48.7	50.3
1994	...	...	...	...	...	...	...	...	...
1995	...	...	...	...	...	14.76	49.78	47.32	48.52
1996	...	...	...	...	30.6	...	...	...	...
1997	...	...	...	...	...	15.6	49.1	46.8	47.92
1998	...	...	59	...	...	...	...	...	...
1999	...	...	...	...	29.4	...	45.6	44.4	44.99
2000	42	80	...	...	...	17.16	44.93	43.8	44.35
Average 1994-2000	42	80	59	0.0	30.0	15.8	47.4	45.6	46.4
Change (%)	0	0	0	-100	4	11	-9	-8	-8

Source: World Bank Data Base, 2002.

TABLE 15
Sources of household cash income, 1991/92-2000/01 (percent)

	Dar es Salaam		Other Urban		Rural		Tanzania (Mainland)		Dar es Salaam	Urban	Rural	Tanzania
	1991/92	2000/01	1991/92	2000/01	1991/92	2000/01	1991/92	2000/01	Δ	Δ	Δ	Δ
Sales of food crops	1.7	2.8	20.7	13.8	48.5	48.9	41.4	40.6	65	-33	1	-2
Sales of livestock & livestock products	0.1	0.3	0.4	0.9	5.3	5.5	4.3	4.5	200	125	4	5
Sales of cash crops	1.2	0.6	8.3	7.4	25.6	20.5	21.6	17.2	-50	-11	-20	-20
Business income	26.8	31.1	26.8	30.3	6.1	8.1	10.4	13	16	13	33	25
Wages or salaries in cash	62.7	40.7	31.1	23.9	5.8	3.8	13.1	9.3	-35	-23	-34	-29
Other casual cash earnings	2.9	15.2	4.9	12	1.9	4.2	2.4	6.1	424	145	121	154
Cash remittances	1	4.8	2.1	5.4	1	3	1.1	3.5	380	157	200	218
Fishing	0.7	0.6	2	0.8	1.9	2.2	1.9	1.9	-14	-60	16	0
Other	3	3.9	3.7	5.3	3.9	3.6	3.8	3.9	30	43	-8	3
Total	100	100	100	100	100	100	100	100	0	0	0	0

Note: Δ = change
Source: Calculated from NBS (1991/92 and 2000/01)

TABLE 16
Per capita monthly income* by region and source, 2000/01 (TSh)

	Dar es Salaam	Other Urban	Rural	Mainland Tanzania
Employment in cash	15 251	7 936	1 261	2 982
Employment paid in kind	218	156	75	94
Non-farm self-employment	20 868	14 026	3 722	6 138
Agricultural income	431	3 923	7 387	6 510
Producers co-operatives	316	195	33	72
Interest & dividends	21	59	7	15
Rent received	408	365	59	122
Transfers	1 041	1 058	770	826
Other receipts	2 213	2 709	821	1 169
Total	40 767	30 426	14 134	17 928

* per capita income calculated for each household.
Source: NBS (2000/01).

TABLE 17
Unemployment rates by sex and geographical location, 1990/91-2000/01

	Dar es Salaam		Other urban		Rural		Dar es Salaam	Urban	Rural
	1990/91	2000/01	1990/91	2000/01	1990/91	2000/01	% change	% change	% change
Male	11	19	4	8	2	2	73	100	0
Female	39	35	7	15	2	2	-10	114	0
Total	22	26	6	10	2	2	18	67	0

Sources: National Bureau of Statistics, 1990/91 and 2000/01.

19.4 percent, and the sale of livestock and products, 4.4 percent. The food crop sub-sector contribution to overall household income dropped by an average of 2 percent between 1991/92 and 2000/01.

Per capita income is highest in Dar es Salaam, at nearly TSh41 000. It is lowest in rural areas at TSh14 134. Cash income from employment provides 7.8 percent (TSh1 261) of household income in rural areas.

The mean monthly income in 1993 from paid employment was TSh4 940 for all occupations, TSh5 350 for skilled agriculturalists or farmers, and TSh3 140 for paid employment in the agriculture sector. Income from paid employment has declined by about 60 percent between 1991/2 and 2000/01. The diversity of income sources has also increased substantially over the decade, particularly in rural areas.

The rate of unemployment increased in both Dar es Salaam (18 percent) and other urban areas (67 percent), possibly due to rural-urban migration.

Changes in household expenditures

Average consumption per person in rural areas is about 50 percent lower than in urban areas (Table 18). Rural farm households spend the highest proportion of income on food reflecting the inequalities between urban and rural areas in terms of income, and (up until the mid-1990s) the effect of food subsidies, which favoured urban areas.

The rural farm household's food expenditure (total) has increased 151 percent between 1991/92 and 2000/01. The increase may be attributed to the increase in

TABLE 18
Per capita expenditure for food* and total expenditure, 1991/92-2000/01 (nominal prices, TSh)

	1991/92				2000/01				Percentage changes reflecting reform impacts			
	Dar es Salaam	Urban	Rural	Total	Dar es Salaam	Urban	Rural	Total	Dar es Salaam	Urban	Rural	Total
Total food expenditure	3 910	3 223	2 186	2 409	10 668	7 989	5 492	6 137	173	148	151	155
Total expenditure	5 982	5 114	3 077	3 489	21 949	14 377	8 538	10 120	267	181	177	190
Percentage food/ total	65	63	71	69	49	56	64	61	-26	-12	-9	-12

* Food expenditure includes the amount spent on food materials used for living purposes during the reference period.
Source: Calculated from NBS (1991/92 and 2000/01).

general price levels of food items. The proportion of total expenditure spent on food fell between the two periods.

Poverty and inequality measures

Between 1991/92 and 2000/01, the percentage of the population falling below the food poverty line fell from 22 percent to 19 percent, and in the case of the basic needs poverty line, from 39 to 36 percent (Table 19). The incidence of poverty is greater in rural areas, but has also fallen. The reduction in the incidence of poverty has been small and the absolute number of people below the basic needs poverty line has risen from 8.8 million in 1991/92 to 12.5 million in 2000/01.

Inequality remains high or has worsened, as can be seen from the increasing Gini-coefficient and the reduction in the proportion of total expenditure accounted for by the poorest quintile (from 7 percent to 6.9 percent). On average, people in the top quintile spend six times more than those in the lowest quintile of the Tanzanian economy.

TABLE 19
Poverty and inequality, 1991/92-2000/01

	Dar es Salaam		Other urban		Rural areas		Mainland	
	1991/92	2000/01	1991/92	2000/01	1991/92	2000/01	1991/92	2000/01
Below Food Poverty line, % of population (head count ratio)	14	8 (-43)	15	13 (-13)	23	20 (-13)	22	19 (-14)
Below the basic needs poverty line, % of population (head count ratio)	28	18 (-36)	29	26 (-10)	41	39 (-5)	39	36 (-8)
Food poverty, % of population	3.4	2.3 (-32)	8.7	9.7 (11)	87.8	87.7 (0)	100	100 (0)
Basic needs, % of population	3.9	2.9 (-26)	9.4	10.0 (6)	86.7	87.2 (1)	100	100 (0)
Gini co-efficient	0.30	0.36 (20)	0.35	0.36 (3)	0.33	0.33 (0)	0.34	0.35 (3)
Expenditure by poorest quintile (in % of total expenditure)	7.8	6.7 (-14)	7.1	6.7 (-6)	7.2	7.1 (-1)	7.0	6.9 (-1)
Expenditure by richest quintile (%)	43.3	48.4 (12)	45.3	44.5 (-2)	41.6	42.2 (1)	43	44.2 (3)

Note: figures in parentheses indicate percentage change.
Source: NBS (1991/92 and 2000/01).

POLICY LESSONS

The rapid growth in prices and output seen in the early 1990s proved temporary. Few producers had the organization or information to participate effectively in markets. By the end of the 1990s, disillusion had set in, and calls for a reversal of liberalization policies were increasingly heard.

This study finds mixed results in terms of the impact of the reforms on household food security. Some households reported improvement from higher levels of earnings and access to cheap imported foods. However, others reported that food security has been worsened by policy changes and adverse climatic events, such as El Niño rainfall which also appears to have been critical in hindering food security. The relatively slow rate of economic growth appears to have been a major hindrance to improving the status of the poor and only a small reduction in the percentage of the population below the poverty line has been achieved. Tanzania established a Strategic Grain Reserve to purchase and store maize in times of surplus, with resale when necessary to meet local market shortages. However, this has not prevented deterioration in food security for many people.

Per capita calorie consumption has been declining, as demand for food increases relative to food supply. This is despite market deregulation which, through increased food trade, should have resulted in improved availability of food in scarce areas.

The supply of inputs and the marketing of crops previously undertaken by public institutions has been left to the private sector. The efficiency and capability of the private sector to fill this role has been impaired by several factors. For the private sector there is no incentive for committing resources for longer term investment in such things as storage facilities, processing plants, quality assurance systems, marketing capabilities and farmer support programmes. As a result, some smallholder farmers have failed to purchase the required quantity and quality of seeds, pesticides, equipment and chemicals due to the removal of subsidies. Educational crop promotion seminars and extension services for peasants have largely been weakened by cuts in the budgetary allocations for such activities.

Since infrastructure difficulties may lead to high transport costs, hence increased prices, private traders have concentrated business only in those areas with better facilities. Any area with ailing infrastructure has been deprived of marketing services.

Technological development in agriculture is poor, with rudimentary equipment and weak extension-research linkages. Removal of subsidies on inputs has led some smallholders to reduce their use, with detrimental effects on productivity and soil fertility. Input use is also inhibited by the difficulty of accessing farm credit, which further creates a problem for small and medium scale traders who cannot access credit to purchase stocks of produce and sell out of season at higher prices.

It is estimated that smallholders supply one half or more of total exports. However, a lack of inputs and support has discouraged cultivation of cash crops such as cotton and encouraged a movement into food crops, which do not require such high usage of expensive imported inputs and which can more easily be sold for cash. There has also been a lack of significant innovation in the crop purchase system and product improvement and differentiation. There is thus a need to diversify exports further and to raise the share of non-traditional exports, as the country still imports more than it exports.

Despite liberalization, gaps in the policy, legislative, regulatory, and institutional framework continue to exist. The government has yet to formulate a comprehensive agricultural marketing policy and a set of supportive strategies.

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ANNEX

Reforms, instruments and impact on poverty and food security in Tanzania

Policy reform	Instruments	Instruments provisions	Intermediate effect/ consequence	Provisions for intermediate effects	Impact on poverty and food security
Macro-economic	Exchange rate	Replacement of fixed by floating/ market based exchange rate system	Devaluation or rise in value of foreign currencies in relation to the local currency (TSh) leads to increase in producers prices of exports	Improved real incomes to the producers	Positive results for food security
		Increase in import prices	Reduction in the import volumes particularly inputs mix	Loss in income related to productivity	Negative impact on food security
	Monetary	Exporters retain their export proceedings	Exporters gain additional profit due to fluctuation in the rate of exchange	Farm household income raised	Positive results for food security
		Liberalizing interest rate resulted in high lending rate and low deposit rate (wide interest spread)	High lending rate led to poor access to loans and low deposit rate discouraged savings	Lack of capacity to invest and generate income	Negative impact on food security
	Fiscal	Rationalization of public expenditure through decline from costly interventions	Cut in recurrent expenditure associated with increase in development expenditure for infrastructural supplies	Improvements in rural income opportunities to producers including the poor	Positive results for food security
		Reduction in tax rates on economic activities	Expand economic activities	Reduce the deadweight loss associated with taxation for given revenue yield	Positive results for food security
		Tax exemptions and policy-related incentives	Increase in the use of capital equipment on the expense of labour	Reduced demand for labour leads to unemployment as well as reduction in wage income	Negative impact on food security

Policy reform	Instruments	Instruments provisions	Intermediate effect/ consequence	Provisions for intermediate effects	Impact on poverty and food security
Trade	Export and Import tariff	Commitment to liberalizing domestic and external trade	Abolition of export tariff and narrowing of tariff dispersions / bands	Improvement in trade creation and minimization of trade diversion for improved social welfare	Positive results for food security
	Non-tariff barriers (quotas, levies, licences)	Restrictions of imports	Limits trade creation as well as increasing trade diversion	Limitation of trade incomes and social welfare	Negative impact on food security
	Export subsidies, incentives and credit	Promotion of exports	Expand opportunities for receiving higher producer prices for their products	High income earning by producers	Positive results for food security
Agriculture	Output subsidies	Promote market operations without controls	Elimination of price supports	Loss of welfare due to increase in cost of living	Negative impact on food security
	Input subsidies	Reduction or removal of input subsidies	Low use of inputs especially fertilizers, insecticides, pesticides and other agrochemicals	Low yield and low productivity of labour results in low income earnings	Negative impact on food security
	Price controls	Reduce world market transmission of the instability due to unfavourable prices or terms of trade	Improvement in producer price stability and profitability	Increase in real income through favourable external and internal terms of trade	Positive results for food security
		Abandoning of price controls in favour of consumers resulting in raising producer prices	Reduction in the tax burden and rise in producer prices	Additional income and equality through fair income distribution	Positive results for food security
	Direct Payment	Prompt payment to farmers or crop producers	Address of lagging returns in agricultural sector	Availability of income to poor	Positive results for food security
	Research and extension	Ensure access to reliable information on higher-value technologies and markets for products	Improved harvests and productivity and sale	Improved status of income earnings	Positive results for food security
Institutional	State withdrawal from production, marketing and service provision	Reforming the role and reducing the size of public sector and state-owned enterprises / parastatals	Free public resources to provide base for investment in infrastructure such as roads and education and health facilities and extension services	Promotion of income opportunities and levels for improved welfare of the poor	Positive results for food security

Policy reform	Instruments	Instruments provisions	Intermediate effect/ consequence	Provisions for intermediate effects	Impact on poverty and food security
		Public import and sale of grain reserves at the time of harvests	Depressed producer prices and accentuated price volatility caused low production	Low income earnings	Negative impact on food security
		Elimination of monopoly marketing boards or crop authorities	Linking producer prices to the world market by reducing leakages through middlemen	Maximization of trade benefits and income to producers	Positive results for food security
		Dissemination of information on markets and better and more productive technologies	Reduction in costs pertaining to soliciting markets and technologies	Maximize savings and income	Positive results for food security
Political	State withdrawal from monopoly in decision and policy making	Allow people to participate with government in creating a framework of policies, laws and regulation within which the private sector operates	Public / state is caring about grassroots and private agent interests and priorities so long as they abide by the rules	Addressing poverty problems through implementation of grassroots priorities	Positive results for food security

Uganda

Jacob Opolot, Augustine Wandera and Yusuf Atiku Abdalla[1]

EXECUTIVE SUMMARY

Pre-reform
Policy in the pre-reform era was restrictive and regulatory in nature. Policy measures included export taxes, price regulation by state marketing boards, exchange rate controls, and the provision of subsidies and administered credit to the agricultural sector. Agricultural marketing was almost exclusively by government marketing boards. The economy was paralyzed by a series of external shocks during the mid 1970s. As a result of these shocks, GDP stagnated. The combination of declining production, the diversion of sales to parallel markets and reduced levels of import and export trade, all contributed to the erosion of the government's revenue base

The reforms
The first reforms were initiated in 1981 with the Stabilization and Structural Adjustment Programmes (SAPs) and emphasized trade and exchange adjustments as well as reduced public spending and the improvement of monetary and credit policies. This programme collapsed in 1984 after the IMF/World Bank cut off lending following Uganda's failure to meet the programme's benchmarks. The period was characterized by policy reversals and confusion.

The second more successful phase of reforms was launched in May 1987. The major reform measures with implications for the agricultural sector and food security included restrictive fiscal policies, exchange rate policy, monetary and credit policies and trade policy reform, in addition to sectoral level reforms involving institutional and domestic market reforms, and pricing policy, which aimed to improve the competitiveness and efficiency of agricultural markets.

Impact on intermediate variables
The real producer price of coffee increased by 82.5 percent between 1980 and 1984 while real international prices rose by only 15.5 percent. Movements in the real exchange rate accounted for 77.5 percent of the increase. Policy interventions acted to reduce domestic prices by 10.6 percent. The real producer prices for cotton, maize, beans and tobacco also rose, in spite of a fall in their international prices during the same period, and largely on account of exchange rate depreciation and policy interventions. Further depreciation of the exchange rate contributed again to

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improvement in producer prices in the 1984-87 period. In contrast to the previous period, world markets had a negative impact on the price of all commodities.

The negative impact on producer prices of international price movements from 1987 to 1993 was outweighed by other factors, including exchange rate movements. Between 1993 and 2000, real producer prices again rose for most commodities, largely because of improved infrastructure that helped reduce operating costs and mitigated the adverse impact of a fall in the international price of export crops. Over the period since 1981, there have been significant improvements in real domestic producer prices.

Growth in production during 1984-87 was lower than in the preceding period. Although some recovery was registered in 1987-93, annual growth was far below rates registered in 1980-84. The period 1993-2000 depicts mixed results, with coffee and cotton performing relatively well compared to the preceding period, while tobacco, tea, maize and beans registered lower growth rates compared to 1987-93. The performance of the export sector shows some improvement over the pre-reform period and, although it is still concentrated on a narrow range of commodities, some new export items have been introduced.

Impact on target variables

Despite moderate improvements in agricultural sector performance, food production is insufficient to satisfy national food requirements. Per capita food production in 2000 was almost half the 1975 level. Amongst the poor, a typical consumption basket yields only 1 373 calories per day per person. The proportion of the population receiving less than 60 percent of required calories rose from 32.1 percent in 1992/93 to 44.3 percent in 2000, and the proportion receiving less than 60 percent of the required protein and iron also increased. Child malnutrition indicators in rural areas improved slightly between 1995 and 2000. Stunting decreased from 40.3 percent to 39.9 percent, while wasting declined from 5.4 percent to 4.2 percent. The country's export earnings are not sufficient to meet the ever increasing import requirements. The fragility of the export sector is exemplified by the country's reliance on import support grants.

At the household level, the main source of food is own production. Income sources for rural smallholder households have changed only slightly. In 1992/93, agricultural income accounted for 75.4 percent of total rural household income, while wages and non-farm income sources accounted for 14.3 percent and 10.3 percent respectively. In 1999/2000, the share of agriculture in total household income declined to 67.6 percent, while wages and non-farm income sources rose to 15.6 percent and 16.8 percent respectively. Smallholder households have not been successful in diversifying income sources away from agriculture.

The profitability of all crops increased between 1994 and 1997. Coffee producers benefited most, with an average increase in gross margins of over 500 percent. Households producing coffee, tobacco and tea reported increases in their income levels. Cotton producing rural smallholder households reported mixed results. The food crop producers indicated increased incomes from the sale of maize and beans.

Economic reforms appear to have resulted in some positive results for food security: there has been some improvement in per capita availability of calories, the percentage of food secure households appears to have increased, and poverty trends

and human development indicators have also improved, with both rural and urban poverty declining (except in the Northern region, where the persistence of poverty appears largely the result of continued civil conflict).

Policy lessons

Trade policy reforms have resulted in increased agricultural output and farm household incomes, but the increase in incomes still falls short of the minimum income required to meet basic food requirements. Export earnings are insufficient to meet the rising import requirement including food. This makes the country food insecure at both national and household levels.

Rural smallholder farmers are still confronted with a number of problems that impede productivity and reduce profitability. These include lack of marketing infrastructure, information asymmetry especially on input and output prices, high post-harvest losses and financial constraints.

INTRODUCTION: CONTEXT AND NATURE OF THE REFORMS

The role and level of development of the agriculture sector

Agriculture is the mainstay of the Ugandan economy accounting for more than 40 percent of GDP, acting as a primary source of income for more than 80 percent of the population. It provides raw materials for the infant industrial sector, and foreign exchange for the importation of capital goods and machinery. The agricultural sector is dualistic in nature, having both monetary and non-monetary/subsistence components. The subsistence sector is still substantial and in 2001/02 accounted for 44 percent of total agricultural output, compared to 52 percent in 1991/92.

Monetary agriculture comprises cash crops, food crops, livestock, forestry and fishing. Food crops constitute the largest proportion of both monetary and non-monetary agriculture (Table 1).

Uganda has a total cultivable land of 16.7 million hectares, of which less than 7.0 million hectares (40 percent) are under cultivation. Although there is great

TABLE 1
Contribution of agriculture to total GDP, 1981-2001 (percent)

	1981/82	1988/89	1994/95	1995/96	1996/97	1997/98	1998/99	1999/00	2000/01
Total agriculture	54.8	54.2	47.3	45.7	44.2	42.2	41.7	41.8	41.3
Monetary agriculture	25.3	24.0	23.6	23.7	23.6	23.5	23.4	23.4	23.0
Cash crops	3.7	3.2	3.2	3.7	4.0	4.6	4.7	4.8	4.3
Food crops	10.9	11.2	12.4	12	11.5	12.2	12.3	12.3	12.5
Livestock	7.7	6.4	4.9	5.1	5.2	3.6	3.5	3.4	3.4
Forestry	0.8	1.0	1.0	1.0	1.0	0.6	0.6	0.7	0.7
Fishing	2.2	2.2	2.0	1.9	1.9	2.4	2.3	2.2	2.1
Non-monetary agriculture	29.5	30.2	23.7	22.0	20.6	18.7	18.3	18.4	18.3
Food crops	25.1	26.0	20.1	18.6	17.2	15.4	15.1	15.2	15.1
Livestock	3.1	2.8	2.4	2.3	2.4	1.9	1.8	1.8	1.8
Forestry	1.0	1.1	0.9	0.8	0.8	1.0	1.1	1.1	1.1
Fishing	0.3	03	0.3	0.2	0.2	0.3	0.3	0.3	0.3

Source: Uganda Bureau of Statistics, 1996 and 2002.

TABLE 2
Farming systems by agro-ecological zone

Agro-ecological zone/ Farming system	Percentage of agricultural population	Major crops/ Livestock
Teso System	6	Cotton, finger millet, sorghum, groundnuts, simsim, sweet potatoes cassava, cattle
Plantain/Coffee System	36	Robusta coffee, bananas, maize, beans, sweet potatoes, cassava, tea, horticultural crops, groundnuts
Plantain/Finger Millet/Cotton System	12	Bananas, robusta coffee, beans, millet, maize, cotton.
Northern System	10	Cotton, tobacco, simsim, sorghum, millet, groundnuts, cassava, cattle
West Nile System	8	Tobacco, cotton, arabica coffee, simsim, sorghum, finger millet, groundnuts, cassava.
Montane System	22	Arabica coffee, bananas, cotton, sweet potatoes, Irish potatoes, maize, beans, finger millet, rice, wheat
Pastoral System	6	Finger millet, cassava, sorghum, beans, maize, cattle, goats, sheep

Source: Government of Uganda, 1996.

potential for double cropping in most parts of the country, the cropping intensity is only 1.2. There is thus significant underutilization of land.

The most common mode of agriculture involves smallholder farming, which is undertaken by an estimated 3.0 million rural households, who on average own less than 2 hectares of land, but produce more than 90 percent of total food production. Smallholder agriculture is typically rainfed and characterized by the use of low-yielding seed varieties and inferior breeds of animals and fish; inappropriate technology, with the hand hoe and the machete being the most common tools; minimal use of complementary inputs such as fertilizers and other agro-chemicals; unreliable marketing systems; and high pre- and post-harvest losses.

Production is primarily for the farmers' own consumption, although marketing of farm output to generate income to satisfy other needs is gaining momentum. Crop production is the primary source of livelihood for 55 percent of the rural population, 19 percent depend on mixed farming, 3 percent on animal husbandry, 2 percent on fishing, and 22 percent on other work or enterprise. The agricultural sector is characterized by high dependence on family labour provided mainly by women and children.

Agricultural production is carried out on the basis of seven farming systems or agro-ecological zones, soil types and cropping systems (Table 2). The food security status of households varies from one agro-ecological zone to another.

Coffee has been the main foreign exchange earner since colonial times. Though its share in total agricultural exports declined from more than 80 percent in the early 1980s to about 31 percent in 2002, it is nonetheless the main source of livelihood for the majority of smallholders in the central and western regions of the country. Cotton is grown in five of the seven agro-ecological zones in Uganda and is an important source of income for smallholders. Although cotton production declined to its lowest levels during the 1970s and early 1980s, a revival is gradually taking shape. Tea growing is labour intensive, providing employment to a large number of

people. Tea out-growers are playing an increasingly important role in the expansion of the industry. Tea is also an important foreign exchange earner: in 2002, export receipts amounted to about 8 percent of agricultural export earnings.

Maize and beans are emerging non-traditional exports in regional cross-border trade, accounting for about 5 percent of total agricultural exports in 2002. These crops are not only a source of income for the smallholder rural farmers, but are also part of a typical consumption basket for the poor. It is estimated that close to one million people derive their livelihood directly or indirectly from the tobacco industry. This includes an estimated 50 000 families who subsist exclusively on the incomes derived from its sale. Tobacco is also an important foreign exchange earner, representing 12 percent of agricultural export earnings.

Both private and public investment is low in the agricultural sector and access to credit facilities in the formal financial market limited, since the current credit systems favour urban-based entrepreneurs while marginalizing the rural population. The only source of credit for the rural dwellers is the microfinance industry, which also discriminates against agriculture.

Degree of openness of the economy prior to the reforms

The policy measures deployed in the pre-reform era were restrictive, regulative and administrative in nature: export taxes, price regulation/controls by state marketing boards, exchange controls, and the provision of subsidies and administered credit to the agricultural sector. The state intervened in almost all aspects of agricultural production and marketing.

Agricultural marketing was almost exclusively by government marketing boards. The Coffee Marketing Board (CMB), Lint Marketing Board (LMB) and Produce Marketing Board (PMB), in collaboration with co-operatives, controlled agricultural marketing. The system was viewed by the government as the most effective way of collecting tax revenues from agricultural exports (Bibangambah, 1992).

Most of the agricultural support systems were either ineffective or delivered at high cost and were not sustainable without external support. The corruption and bureaucracy that was characteristic of the marketing boards increased overhead costs. Consequently, marketing boards absorbed a large percentage of world market prices, which resulted in low producer prices. At the same time, produce was often purchased on credit, which acted as additional tax to the farmer's income.

Motivation for the reforms

Following independence in 1962, Uganda initially experienced a period of considerable economic progress. Between 1963 and 1973, the annual average rate of real GDP growth was 6 percent. The country was also able to maintain a reasonable savings rate (averaging 13 percent of GDP) that permitted implementation of an ambitious investment programme, without undue pressure on domestic prices or the balance of payments. Although export volumes grew slowly, export earnings were more than adequate to cover import requirements, and the country maintained a current account surplus in most years.

However, during the economic and political turmoil of the 1970s and early 1980s, the economic infrastructure was almost completely destroyed. This affected both agricultural and industrial production. The economy was also paralyzed by a series of

external shocks during the mid 1970s. As a result, GDP stagnated, with particularly sharp falls of value added in the industrial and monetary agricultural sectors. The only sector that recorded steady growth was the subsistence sector, both to provide individual food security and to supply the thriving and lucrative parallel markets. The savings rate fell sharply and, with limited external capital inflows, investment fell to low levels. Little effort was made to maintain the existing infrastructure and productive assets.

The combination of declining production in the monetary economy, the diversification of sales to parallel markets and reduced levels of import and export trade, all contributed to the erosion of the Government's revenue base. Revenue collection was also affected by the impact of the over-valued exchange rate, by price controls on the value of goods being taxed, by poor financial performance and tax compliance of the parastatal sector, and by ineffective tax collection procedures. Despite these revenue problems little attempt was made to restrict the growth of government expenditure. With access to external assistance restricted, the Government increasingly resorted to borrowing from the central bank, which led to an uncontrollable pressure on domestic prices.

Macro and sectoral components and the policy instruments used

With a view to raising the rate of economic growth, the broad policy objectives of reform focused on the stabilization of the economy through the restoration of fiscal and monetary discipline (notwithstanding the demands for considerable outlays to rehabilitate the devastated infrastructure in this post conflict economy); the liberalization of consumer and producer prices in order to improve resource allocation and channel resources to the productive sectors of the economy; the progressive movement towards a realistic, market determined exchange rate; the strengthening of the balance of payments and the normalization of relations with external creditors; the removal of trade restrictions; the privatization and rationalization of state enterprises; and the liberalization of interest rates within a restructured and more efficient financial system capable of mobilizing savings and increasing investments.

The first attempt at coordinated policy reforms was made in 1981, when the Government received financial and technical support from the International Monetary Fund (IMF) and the World Bank. This marked the start of the Stabilization and Structural Adjustment Programmes (SAPs) and involved the implementation of policy reforms that emphasized trade and exchange rate adjustments as well as a reduction in public spending and the improvement of monetary and credit policies. This programme collapsed in 1984 after the IMF/World Bank cut off lending following policy reversals and the country's failure to meet the programme benchmarks.

The second and more successful phase of economic reforms was launched in May 1987. Since then, the adjustment programmes have typically consisted of a combination of demand-reducing policies (often associated with macroeconomic stabilization), in particular restrictive fiscal and monetary policies; and supply enhancing policies (often associated with structural adjustment), in particular trade and exchange rate policies aimed at improving economy-wide resource allocation and exploiting more fully the gains from international trade. The second reform

TABLE 3
GDP performance by sector, 1982-2002 (percentage growth rates)

Sector	1982/83	1987/88	1990/91	1998/99	1999/00	2000/01	2001/02
Monetary	6.5	9.0	7.3	7.5	5.2	6.2	5.9
Agriculture	5.0	5.7	5.6	6.6	5.3	4.3	5.5
Mining and quarrying	17.1	-11.3	106.0	5.9	4.8	5.9	7.8
Manufacturing	14.0	17.1	7.3	13.7	3.5	8.9	7.4
Electricity and water	-1.3	6.5	6.3	6.0	8.7	9.3	6.4
Construction	3.1	27.0	7.3	9.4	1.4	2.9	6.6
Wholesale and retail trade	9.2	12.0	7.1	9.2	1.9	6.3	6.4
Hotels and restaurants	12.3	12.7	14.6	7.3	5.3	6.1	5.4
Transport and communication	7.0	7.1	7.5	7.0	7.4	8.2	10.0
Community services	5.2	4.5	8.8	4.5	8.6	7.5	5.9
Non-monetary	5.6	5.1	0.9	5.3	6.2	5.4	4.3
Agriculture	6.0	5.4	0.6	4.9	6.0	5.0	3.8
Construction	2.1	6.1	3.4	2.6	2.5	2.4	2.2
Owner-occupied dwellings	2.7	2.7	2.9	8.5	8.0	8.0	7.0
Total GDP	6.2	7.6	5.2	7.0	5.5	6.0	5.6
Per capita GDP	3.5	4.8	2.3	4.3	2.9	3.5	3.3

Source: Uganda Bureau of Statistics, 2002; Government of Uganda (2002a).

period is divided into two episodes: movement towards liberalization (1987–93) and the complete liberalization of the economy (1993-2002).

Within the overall package of macroeconomic stabilization and structural adjustment programmes, the major reform measures with implications for the agricultural sector and food security include restrictive fiscal policies, exchange rate policy, monetary and credit policies, trade policy reform, and, at the sectoral level, market and pricing policy reforms. Agricultural policy reforms were intended to improve the competitiveness and efficiency of agricultural markets. The basic premise was that improving the incentive structure for smallholder farmers through higher prices and better functioning markets would lead to a positive supply response thereby raising agricultural output, income and the food security status of the smallholder farmers.

The economy has enjoyed relatively buoyant growth rates over the last 20 years, averaging about 6 percent annually (Table 3).

Prudent macroeconomic management has improved stability. From the volatile trend in consumer prices during the 1980s, which led to a headline annual inflation rate of 250 percent in 1987, inflation has declined to less than 10 percent per annum. The savings and domestic investment rates, although still low, have maintained an upward trend.

Macro-economic reforms

Fiscal policy

The Government has consistently pursued fiscal discipline since the inception of the reform programme. The overall objective has been to reduce the fiscal deficit to a sustainable level by increasing the tax base/revenue and reducing government spending. The expenditure cuts have reduced agriculture's share of government expenditure, which has stagnated at around 0.8 percent of total recurrent expenditure since 1997/98. The sector has also been affected by the unsystematic removal of subsidized inputs.

Exchange rate policy
Since 1981, exchange rate policy has focused on devaluing the real exchange rate so as to restore confidence in the shilling (U Sh), reduce price distortions, and shift resources from speculative to productive activities such as agriculture. Devaluation has been brought about by nominal currency devaluations combined with fiscal and monetary policy measures aimed at curbing the resulting inflation in order to avoid real exchange rate appreciation.

Monetary policy
Monetary policy has, since 1993, moved from the use of direct to indirect instruments.[2] Financial sector liberalization began in 1992. Interest rates, the exchange rate, and flows of credit and capital are now market determined. Banks have been privatized and barriers to new entrants reduced, thus eliminating the direct role of Government in the allocation of commercial finance. In 1998/99 the Co-operative Bank, which was largely viewed as an agricultural bank, was closed. Microfinance institutions were expected to take over from the public sector in the provision of financial services to the rural and urban poor. Nevertheless, credit is still inaccessible to a large majority of rural smallholder farmers who subsist primarily on agricultural production. Financial sector reforms have led to a reduction of the flow of credit to the agricultural sector.

Trade policy reforms
Uganda's commitment to trade liberalization has ensured that the export sector remains as open as possible. The key reforms here have been easing licensing requirements and eliminating quantitative restrictions. Trade taxes have continued to be lowered or even eliminated, as in the case of export taxes, and their structure simplified. Trade policy is increasingly being shifted from quantitative restrictions and other non-tariff instruments to more transparent taxes and tariffs. Since 1986 tariff reforms have sought to balance the aims of increasing fiscal revenues, improving export incentives, and protecting domestic producers. A vital goal for trade liberalization has been to reduce the anti-export bias and ensure that no excessive protection results from the tariff system.

Uganda has implemented the tariff reductions approved by the Common Market for Eastern and Southern Africa, and continues to harmonise its overall tariff structure. The tariff structure was rationalized within the 10-50 percent range in 1992, and within the 10-30 percent range in 1994.

Improvement in rural infrastructure
Although over the last ten years, the Government has invested substantial resources in opening up rural areas through the construction and maintenance of rural feeder roads, much still remains to be done. At the moment, it is estimated that 25 percent of feeder roads are impassable during the rainy season. This limits the

[2] The indirect financial and monetary policy instruments used are treasury bills, Bank of Uganda bills, cash reserve requirements, bank rate, rediscount rate, repurchase agreements (REPOS) and reverse REPOS, and foreign exchange deals largely in the form of spot transactions.

ability of smallholders to market their produce, and increases the operating costs of middlemen, thereby depressing farmgate prices.

Issues related to market infrastructure have also not been adequately addressed in the reform process. At the moment, although rural markets are operational in most parts of the country, such markets do not have the minimum facilities, such as roofed structures to guard against rain and weather, and lockable secure storage.

Sectoral institutional, pricing and domestic market reform

At the sectoral level, institutional and market reforms have been characterized by the policies described below.

i. Government monopoly of marketing was abolished in 1991 and 1993. Export producers are now paid cash on delivery by a wide choice of private buyers. Exporters are also free to borrow directly from commercial banks to pay farmers instead of going through marketing boards. These market reforms have also been accompanied by the removal of restrictions on the movement of produce across districts.
ii. The Government has withdrawn from agricultural pricing and marketing activities, limiting its role to supportive activities such as quality control, the provision of market information, and research and development.
iii. Pricing policy has focused on the liberalization of input and output prices by reducing or eliminating subsidies on agricultural inputs such as fertilizers and credit, realigning domestic prices with world market prices, eliminating pan-territorial and pan-seasonal pricing, and reducing exchange rate overvaluation.
iv. The enactment of the Land Act in 1998 was intended to enhance tenure security, by making it possible for a majority of squatters to acquire certificates of customary ownership and certificates of occupancy for tenants. However, the institutional framework for the effective implementation of the Land Act 1998 is not yet in place, as institutions for its implementation have to be developed from the grassroots level.
v. The National Agricultural Research Organisation was established in 1992 with the objective of undertaking, promoting and co-ordinating agricultural research. The benefits of research are slowly trickling down to smallholder farmers. Most rural smallholder coffee farmers have already adopted improved coffee varieties.

Sub-sector specific programmes and policies

Coffee

The coffee sub-sector was liberalized in 1991. This ended the monopoly of the CMB by allowing private exporters to buy and export coffee. The regulatory and development functions of the CMB were transferred to the Uganda Coffee Development Authority (UCDA). The withholding tax was lifted in 1992/93 and transport to the port of export fully liberalized. Exporters were therefore free to choose their own modes of transport. This put pressure on the Uganda Railways Corporation (which originally had the transport monopoly) to lower rates from US$50 per tonne to US$43 per tonne to Mombasa.

In 1992/93, the replanting policy for robusta coffee with high yielding clonal varieties also took effect. This covered all coffee producing areas and has been largely successful. At the beginning of the 1993/94 coffee season, and as part of a collective strategy by coffee producing nations, a stock retention scheme was launched with a view to improving export prices, which had fallen due to the collapse of the International Coffee Organisation quota system in 1988. This scheme commenced in October 1993, with a mandatory stock retention of 20 percent by exporters. This was revised downwards to 10 percent in March 1994 following the recovery of coffee prices.

In June 1994, the Government introduced a coffee stabilization tax, following a frost in Brazil and the subsequent rise in international coffee prices from US$1.5 per kg to over US$3.5. The rationale for the introduction of this tax emerged from concerns that such large foreign exchange inflows could lead to inflationary pressures, real exchange rate appreciation, loss of competitiveness, and a deterioration of the current account. The UCDA has been largely successful in maintaining quality by disseminating relevant information and distributing improved seedlings to rural farmers. However, allegations that farmers are exploited by private traders and therefore fail to enjoy the full benefits of liberalization persist.

Cotton

Cotton marketing was liberalized in 1991. This ended the monopoly of the cooperative unions, who were in charge of internal marketing and processing, and of the LMB, which was in charge of external marketing. The regulatory and development functions of the LMB were transferred to the Cotton Development Organisation (CDO), which was formed in October 1994. Private buyers were allowed to buy cotton, but the cooperative movement retained its monopoly in the ginning sector until 1995, when the private sector was permitted to gin cotton.

The expected benefits of the liberalization of the cotton industry have not been fully realized. Some cotton growers complain that the CDO is no different from LMB, in that it supplies seeds to farmers and deducts about 30 percent of the final price. The relatively large number of ginners has made coordination in the provision of inputs difficult. Farmers are also able to default on loans by selling to ginners other than those providing credit and inputs. Lack of coordination has also resulted in seed mixing thus leading to a decline in quality and yield.

Food crop sub-sector

Prior to liberalization, the PMB was mandated to procure, process, store and market food crops, mainly for domestic consumption, but also for export when there was a surplus. Direct government involvement in these activities ended in the early 1990s when the PMB was liquidated. The restrictions on the movement of food crops across districts were lifted in 1992. Increased output levels have been registered since the liberalization of maize marketing.

The main export market for maize and beans is the regional market. The local price is mainly driven by food shortages in neighbouring countries and purchases by international agencies, such as the World Food Programme and the United Nations High Commission for Refugees.

Tea
Management of the tea industry was originally under the control of the Uganda Tea Association, a voluntary association of tea producers established in 1948. However, in 1972, the Uganda Tea Authority took control, and production collapsed. In 1983, the industry was liberalized and the Uganda Tea Association was revived. Ugandan tea is marketed through the Mombasa Auction Market. Smallholder tea production has existed since 1966. Arrangements are under way for smallholder producers to form co-operatives to bridge the gap that will be created when the Uganda Tea Growers Corporation is wound up. This is expected to increase the bargaining power of smallholder producers and thus reduce their exploitation.

Tobacco
Tobacco is the second largest cash crop, far outstripping cotton and tea. It is grown in 16 out of 56 districts. Production peaked in the early 1970s and collapsed during the late 1970s when management was brought under the monopoly of the National Tobacco Corporation. Production recovered in 1984 after the divestiture of the industry to British American Tobacco (BAT) Uganda Limited. BAT is the main player in the tobacco industry, controlling up to 93 percent of the market. Because of its monopoly, tobacco is the only crop produced under contract farming.

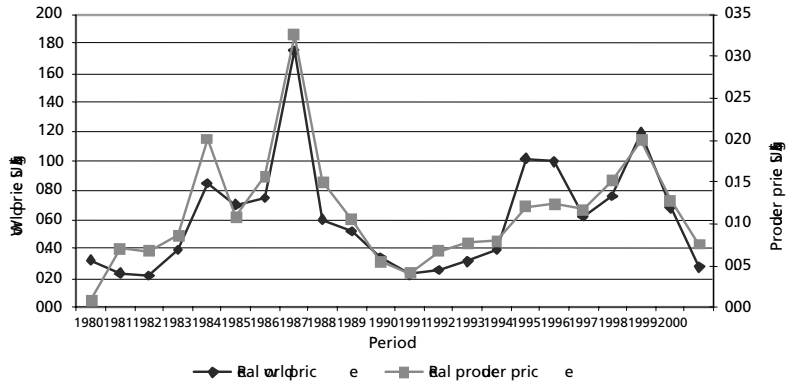
CONSEQUENCES OF REFORMS: INTERMEDIATE VARIABLES

In assessing the effects of reform on output incentives, the effects of changes in international and domestic commodity prices are investigated in relation to other possible drivers, such as the real exchange rate (RER), improvements in the efficiency of domestic marketing systems etc. It should be noted that many of the reforms that have been implemented simultaneously or/and sequentially are aimed at removing structural bottlenecks that impede the proper functioning of the market mechanism. It is therefore difficult to isolate the effects of individual policies.

Trends in real producer and world prices
For some tradable commodities, such as coffee and cotton, the real producer price during the reform period has followed trends in international commodity prices, reaching a peak in the mid to late 1980s, falling to a low in the early 1990s and then rising to a peak again at the end of the 1990s before falling once more. However, some divergences are notable. For example, the real producer price of coffee rose steadily up to 1984as a result of Government policy to revive the coffee sector, which had virtually collapsed during the economic mismanagement of the 1970s (Figure 1). The divergence between the producer price and the world price for cotton between 1994 and 1998 may be associated with the emergence of private sector marketing activity and related reductions in the quality of domestically produced cotton (Figure 2).

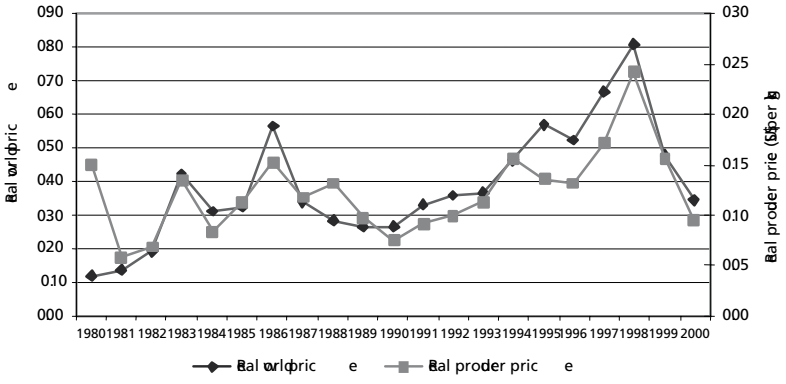
Maize and beans are semi tradable commodities and weak transmission of international prices is not unexpected. However supply and demand conditions (including drought) in neighbouring countries can have a significant influence on Ugandan prices and cross border trade. It is notable that post 1990 domestic prices tracked the international price more closely than previously. This may be a result of the liberalization of marketing activities in the early 1990s (Figures 3 and 4).

FIGURE 1
Real producer and world prices of coffee, 1980-2000



Source: Computed from Bank of Uganda database (2002) and Commodity prices database (2002).

FIGURE 2
Real producer and world prices of cotton, 1980-2000

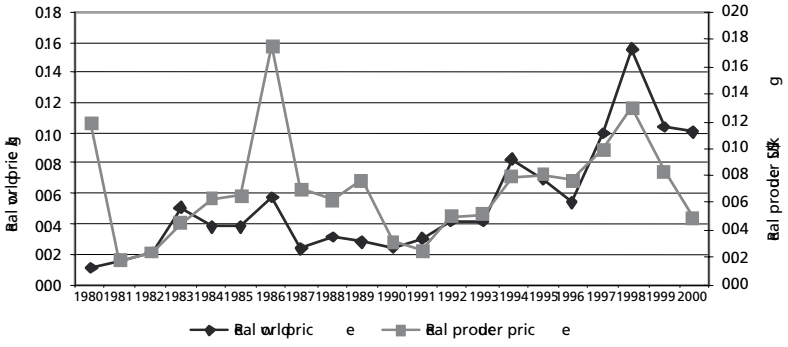


Source: Computed from Bank of Uganda database (2002) and Commodity prices database (2002).

The real producer price of tobacco declined sharply up to 1983 when the National Tobacco Corporation was privatized (Figure 5). British American Tobacco (Uganda) Limited enjoys some monopoly over the tobacco industry and engages farmers on contract terms. This gives them power to set prices and may explain why producer prices have remained low in the face of rising international prices since 1995.

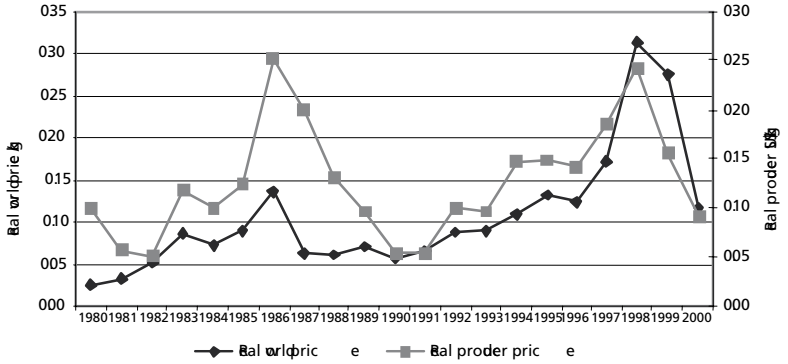
The real producer price for tea declined sharply in the first half of the 1980s and has remained low even in the face of rising world prices (Figure 6). Tea is mostly grown on plantations and by out-growers contracted to the plantations, which are able to maintain downward pressure on prices.

FIGURE 3
Real producer and world prices of maize, 1980-2000



Source: Computed from Bank of Uganda database (2002) and Commodity prices database (2002).

FIGURE 4
Real producer and world prices of beans, 1980-2000



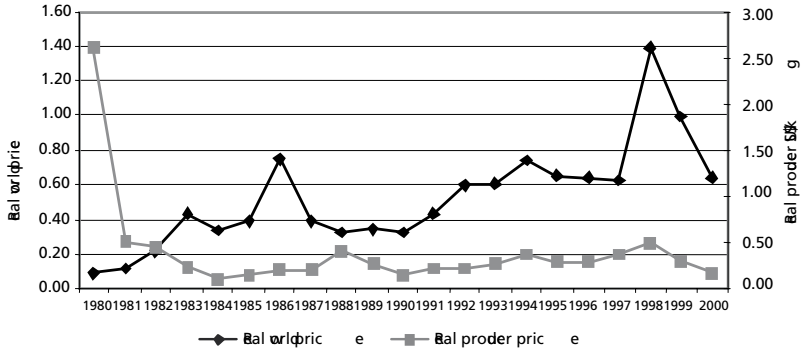
Source: Computed from FAOSTAT (2001) and Bank of Uganda Statistics (2002).

Price decomposition

Over the reform period as a whole, there have been significant improvements in real domestic producer prices. The relative contribution of different factors is shown in the Table 4. During the period 1980-84, real producer prices of coffee increased by 82.5 percent while real international prices rose by only 15.6 percent. The increase in real producer prices was largely due to movements in the real exchange rate which accounted for 77.5 percent of the increase. Policy interventions acted to reduce domestic prices by 10.6 percent.

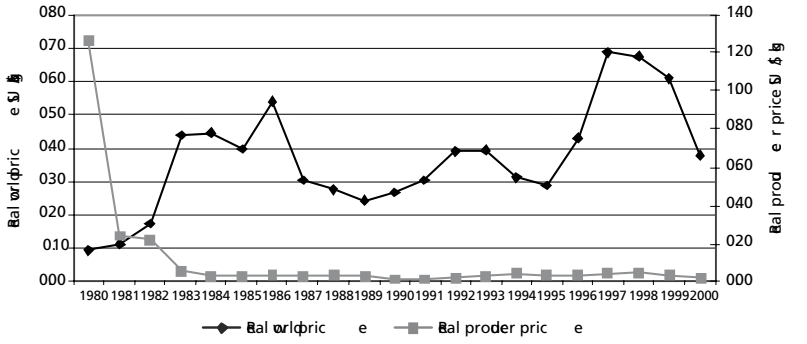
For all commodities, the positive effect on producer prices of depreciation in the real exchange rate is very marked and dominates other influences up to 1993. The effect

FIGURE 5
Real producer and world prices of tobacco, 1980-2000



Source: Computed from Food and Agriculture Organization (2001) and World Bank (2002).

FIGURE 6
Real producer and world prices of tea, 1980-2000



Source: Computed from FAOSTAT (2001) and World Bank commodity prices database (2002).

of international price changes has varied, being positive for some periods and negative for others. Other factors, beginning in 1987-93, contributed positively to real producer prices, and between 1993 and 2000 real producer prices rose for most commodities in response to improved infrastructure that helped reduce marketing margins.

Market integration

The residual in Table 4 provides an indication as to the integration of the domestic with world market, with a smaller residual suggestive of a greater level of integration.

The mixed picture of market integration suggests a lack of marketing infrastructure for most crops. The impact of international prices on domestic prices for maize and

TABLE 4
Decomposition of producer price changes of major agricultural exports, 1980-2000 (percentage change relative to base period)

Product	Period	Real domestic price	Real international price	Real exchange rate	Applied tariff	Residual
Coffee	1980-1984	82.5	15.5	77.5	0.0	-10.6
	1984-1987	26.5	-8.6	83.2	0.0	-48.0
	1987-1993	96.8	-21.2	63.5	0.0	54.5
	1993-2000	42.3	-1.8	4.6	-4.5	43.9
	1980-2000	58.8	-0.8	47.6	-1.7	13.7
Cotton	1980-1984	63.3	21.0	77.5	0.0	-35.2
	1984-1987	30.8	-5.7	83.2	0.0	-46.7
	1987-1993	112.6	-6.1	63.5	0.0	55.2
	1993-2000	42.0	-0.6	4.6	-4.5	42.4
	1980-2000	56.6	5.4	47.6	-1.7	5.3
Maize	1980-1984	96.4	22.9	77.5	0.0	-3.9
	1984-1987	45.2	-19.1	83.2	0.0	-18.9
	1987-1993	99.6	-4.6	63.5	0.0	40.6
	1993-2000	42.3	11.1	4.7	-13.1	39.6
	1980-2000	62.7	10.1	47.6	-5.0	10.0
Beans	1980-1984	59.8	20.2	77.5	0.0	-37.8
	1984-1987	47.3	-7.8	83.2	0.0	-28.1
	1987-1993	103.3	-5.9	63.5	0.0	45.7
	1993-2000	41.5	3.5	4.6	-8.7	42.1
	1980-2000	54.7	7.0	47.6	-3.3	3.4
Tea	1980-1984	-4.2	27.9	77.5	0.0	-109.6
	1984-1987	19.1	-9.2	83.2	0.0	-54.9
	1987-1993	113.9	-4.5	63.5	-7.3	62.2
	1993-2000	40.7	-0.4	4.6	-21.8	58.3
	1980-2000	47.9	-11.1	47.4	-18.4	30.0
Tobacco	1980-1984	8.9	22.6	77.5	0	-91.1
	1984-1987	29	-3	83.2	0	-51.2
	1987-1993	121.2	-3.1	63.5	-13.1	73.8
	1993-2000	39.8	0.9	4.6	-20.1	54.3
	1980-2000	45.5	8.4	47.6	-7.7	-2.9

Note: Comparative results from price decomposition analyses across the case study countries are provided in Annex B of the Synthesis chapter. The results in Annex B present the change in the domestic price as a percentage change with respect to previous period. The case study analyses vary in that some present results as a percentage change with respect to a base period. Whilst the interpretation of results in the case study narrative holds irrespective of the end points compared, the results presented in Annex B should be used for comparative purposes.
Source: Authors' computations from IMF, FAOSTAT and Bank of Uganda Databases.

beans is limited since international trade in these commodities is limited to the regional market and sales to international aid agencies.

Effects on agricultural output and value added

In this section, the findings from the price analysis are related to evidence of changes in output levels. These are presented on an annual basis by changes in area and in yield, the aim being to attempt to establish a link between prices (and non price factors) and output by examining the nature of the output response (or lack of response).

In assessing the ability of producers to respond it is important to recognize the agroclimatic context within which they operate as illustrated in Box 1.

BOX 1
Agroclimatic conditions

Of Uganda's total surface area 86 percent is suitable for agriculture. The country is endowed with some of the best agricultural land in the region, of which under 40 percent is under cultivation, reflecting significant underutilization of land. There is also scope for double cropping in most parts of the country, but the cropping intensity is only about 1.2.

The country also enjoys a favourable climate with ample rainfall, averaging 900-1 300 mm per annum. The climate over the greater part of the country favours the cultivation of a variety of tropical and sub-tropical crops throughout the year (Government of Uganda, 1996).

The period 1984-87 registered lower annual percentage growth rates than the preceding period (Table 5). Although some recovery was registered in the period 1987-93, the annual percentage growth rates are nonetheless far below the growth rates registered in 1980-84. The period 1993-2000 depicts mixed results, with coffee and cotton performing relatively well compared to the preceding period, while tobacco, tea, maize and beans registered lower growth rates compared to 1993-2000.

Results of an output decomposition analysis are presented in Table 5 to determine the contributions of increased acreage, productivity changes and other factors to output changes.

In the case of coffee, most of the output growth during 1980–84 was accounted for by productivity changes. Under the Coffee Rehabilitation Programme further supportive research and technical services were provided to coffee producers. Emphasis was on improving productivity. However, area increase has become an increasingly important explanatory variable.

Cotton acreage has declined although real producer prices have risen, and output growth has been largely accounted for by productivity changes. In 1984-87, output declined as a result of both area and productivity declines. Land area planted to cotton continued to fall in 1987-93, although it was compensated for by an increase in productivity. Impressive growth in both area and productivity occurred in 1993-2000.

Decreases in maize productivity levels in 1980-84 and 1984-87 were not compensated fully by increases in area. In 1987-93 and in 1993–2000, both area and productivity increases resulted in increased output.

Output growth in beans was explained mainly by increased acreage in three of the four periods, with limited improvements in productivity.

For tobacco, a decrease in acreage in line with declining tobacco prices was observed during the 1980-84 period, but was compensated for by productivity increases. In 1987-93, the area planted to tobacco increased dramatically and productivity levels were maintained.

TABLE 5
Decomposition of growth of major agricultural crops, 1980-2000

	Period	Output Growth	Productivity Change	Increased Acreage	Residual
Coffee	1980-1984	7.0	7.0	0.1	-0.1
	1984-1987	3.0	2.9	0.5	-0.4
	1987-1993	3.1	-3.8	1.8	5.1
	1993-2000	-4.0	1.5	1.7	-7.2
Cotton	1980-1984	12.5	27.7	-22.5	7.4
	1984-1987	-13.2	-8.5	-4.8	0.1
	1987-1993	3.2	8.9	-5.7	0.0
	1993-2000	13.5	9.3	4.5	-0.3
	1980-2000	5.7	8.2	-2.4	-0.1
Maize	1980-1984	-5.9	-10.7	2.0	2.8
	1984-1987	-3.6	-4.6	1.0	0.0
	1987-1993	13.1	6.7	6.4	0.0
	1993-2000	3.9	1.9	4.5	-2.5
	1980-2000	4.2	0.2	4.0	0.0
Beans	1980-1984	9.7	-0.9	14.0	-3.5
	1984-1987	-1.2	0.4	-1.6	0.0
	1987-1993	5.0	2.0	4.7	-1.8
	1993-2000	1.3	-2.8	3.3	0.8
	1980-2000	4.0	-1.4	5.4	0.0
Tobacco	1980-1984	18.0	20.9	0.7	-3.6
	1984-1987	-7.7	7.2	-14.8	0.0
	1987-1993	24.3	1.3	23.0	0.0
	1993-2000	15.4	14.0	1.4	0.0
	1980-2000	16.0	11.5	4.5	0.0
Tea	1980-1984	21.3	7.4	10.1	3.7
	1984-1987	3.5	-1.1	4.6	0.0
	1987-1993	19.9	6.6	11.8	1.5
	1993-2000	9.7	13.9	0.2	-4.3
	1980-2000	13.3	6.8	6.5	0.0

Source: Authors' computations from FAOSTAT, 2002.

The output of tea rose largely on account of both increased acreage and increased productivity.

The reform process has not adequately addressed the problem of poor market infrastructure and high post-harvest losses arising from inappropriate methods for harvesting, drying, cooling, pest control, storage and packaging.

Notwithstanding the reforms implemented so far, rural smallholder farmers are still confronted with a number of problems that impede and reduce the profitability of smallholder agriculture. These include lack of marketing infrastructure, information asymmetry (especially on input and output prices), high post-harvest losses, high input costs, quality constraints, and financial constraints.

Effects on imports and exports

The performance of the export sector shows some improvement over the pre-reform period (Table 6). Although the export sector is still dependent upon just a few commodities, new export items have been introduced since 1981, when coffee was practically the only significant export.

Coffee export earnings have been declining since 1997 largely on account of the fall in international coffee prices. Exports of maize and beans also rose in the mid-

TABLE 6
Agricultural exports, 1981-2001 (million US$ nominal)

	1981	1988	1995	1996	1997	1998	1999	2000	2001
Total exports	246.6	272.9	556.42	636.6	592.63	510.20	485.76	460.00	475.55
Coffee	241.6	264.3	419.00	396.09	310.36	294.97	274.35	125.39	97.63
Cotton	2.2	3.1	5.61	14.39	29.32	7.48	11.70	22.13	14.73
Tea	0.3	1.2	7.14	15.31	30.48	28.18	22.37	41.02	30.43
Tobacco	-	0.6	9.50	4.91	12.84	17.68	14.71	24.93	31.20
Fish and its products (excluding regional)	-	-	24.06	45.03	30.06	39.41	25.04	30.58	72.15
Fish and its products (regional exports)	-	-	-	-	-	-	2.28	10.09	23.81
Hides & skins	-	-	8.64	8.26	9.62	6.56	4.26	13.61	25.94
Simsim	-		6.44	9.34	0.63	0.01	1.41	0.79	0.80
Maize	-	0.1	8.44	13.22	11.57	9.25	4.66	2.29	10.89
Beans	-	0.1	6.14	5.42	6.36	2.30	5.90	3.00	1.61
Flowers	-	-	4.04		6.25	7.41	6.72	11.53	14.31
Electricity	-	-	2.41	3.70	11.70	11.74	13.21	18.46	11.00
Gold	-	-	25.39	64.09	80.59	18.60	38.36	55.73	50.35
Oil re-exports	-	-	5.44	9.28	9.55	11.23	9.63	9.36	10.97
Cobalt	-	-	-	-	-	-	2.32	10.98	12.65
Others*	2.5	2.9	24.16	47.57	43.29	55.38	42.83	61.01	58.77
Imputed exports	0.00	0.00	0.00	0.00	0.00	0.00	6.00	19.10	8.32

* includes a variety of non-traditional exports such as vanilla, spices, pepper, fruits, etc.
Source: Bank of Uganda databank, 2002.

TABLE 7
Imports, 1987-2001 (US$ million)

	1987	1989	1995	1996	1997	1998	1999	2000	2001
Total imports	**249.3**	**261.0**	**574.8**	**740.2**	**733.8**	**776.4**	**674.9**	**953.3**	**1 121.4**
Foods and non-alcoholic beverages	8.5	3.3	80.6	101.2	121.9	148.1	98.3	135.1	197.0
Other consumer goods	2.2	22.0	27.3	25.5	23.5	27.9	31.3	46.98	59.7
Petroleum products	38.0	41.0	40.5	97.5	90.4	78.9	56.4	159.8	158.2
Capital goods	94.1	189.7	392.1	482.7	469.3	482.5	461	582.2	668.0
Other	4.0	5.0	34.3	33.3	28.7	39	27.9	29.22	38.5
Percentage of total									
Foods and non-alcoholic beverages	5.7	1.3	14.0	13.7	16.6	19.1	14.6	14.2	17.6
Other consumer goods	1.4	8.4	4.8	3.4	3.2	3.6	4.6	4.9	5.3
Petroleum products	27.2	15.7	7.1	13.1	12.3	10.2	8.3	16.7	14.1
Capital goods	65.5	72.6	68.2	65.2	63.9	62.1	68.3	61.1	60.0
Other	2.7	1.9	6.0	4.5	3.9	5.0	4.1	3.1	3.4

Source: Bank of Uganda databank, 2002.

1990s but declined thereafter. Other export items have not shown any systematic trend.

The major export markets have remained basically the same over the last two decades, with the developed world absorbing more than 70 percent of total exports. This reflects little success in the search for new markets and means that the trade policies in developed countries have a direct bearing on the performance of the Ugandan export sector.

Food imports have maintained an upward trend reflecting declining per capita food production and increased demand for imported foods amongst more affluent

sectors of society (Table 7). Imported foods, however, form a very small proportion of the consumption basket of the poor.

CONSEQUENCES OF REFORMS: TARGET VARIABLES

National food security

Per capita food production

Per capita food production declined from 1.47 tonnes in 1975 to 0.75 tonnes in 2000. Table 8 shows that the pace of food production has not kept up with population growth.

Dietary deficiency

Dietary deficiency rates have worsened since 1992 (Table 9). The proportion of the population receiving less than 60 percent of required calories rose from 32.1 percent in 1992/93 to 44.3 percent in 1999/2000. Similarly the proportion of the population receiving less than 60 percent of the required protein and iron rose from 18.6 percent and 7.5 percent to 20.0 and 12.5 percent respectively. The typical consumption basket of the poor in 1992/93 yielded only 1 373 calories per day per person, far below the average recommended 2 161 calories per capita.

TABLE 8
Food crop production and population growth, 1975-2000

Year	Total food output ('000 tonnes)	Per capita food output (tonnes)	Population (millions)	Indices (1995 = 100)	
				Total food output	Per capita food output
1975	16 294	1.47	11.1	95.9	169.3
1976	15 130	1.33	11.4	89.0	152.9
1977	15 123	1.29	11.7	89.0	149.0
1978	15 022	1.25	12.0	88.4	144.3
1979	11 191	0.91	12.3	65.9	104.9
1980	10 490	0.83	12.6	61.7	95.7
1981	11 985	0.92	13.0	70.5	106.7
1982	12 928	0.97	13.3	76.1	112.4
1983	13 717	1.01	13.6	80.7	116.2
1984	12 446	0.89	14.0	73.2	102.9
1985	12 643	0.88	14.3	74.4	102.0
1986	12 995	0.89	14.7	76.5	102.3
1987	13 756	0.92	15.0	80.9	105.6
1988	14 482	0.94	15.4	85.2	108.5
1989	15 275	0.97	15.8	89.9	111.6
1990	15 514	0.96	16.2	91.3	110.6
1991	15 676	0.94	16.6	92.2	108.4
1992	15 399	0.88	17.5	90.6	101.4
1993	16 354	0.90	18.1	96.2	104.2
1994	15 795	0.85	18.7	92.9	97.5
1995	16 994	0.87	19.6	100.0	100.0
1996	15 484	0.78	19.9	91.1	90.0
1997	16 494	0.81	20.4	97.1	93.1
1998	17 887	0.84	21.4	105.3	96.4
1999	17 654	0.80	22.1	103.9	92.1
2000	17 189	0.75	22.9	101.1	86.6

Source: Bahigwa, 1999 and Uganda Bureau of Statistics, 2002.

TABLE 9
Dietary deficiency, 1992/93 and 1999/2000 (percent of population)

Period	Below 60 percent of the required:			Below 75 percent of the required:		
	Calories	Proteins	Iron	Calories	Proteins	Iron
1992/93	32.1	18.6	7.5	49.5	29.3	19.2
1999/2000	44.3	20.0	12.5	62.3	31.4	22.6

Source: Uganda Bureau of Statistics, Uganda Demographic and Health Surveys, 2000.

TABLE 10
Mean dietary intake, 1992/93 and 1999/2000

	1992/1993			1999/2000		
	Calories	Proteins[1]	Iron[2]	Calories	Proteins[1]	Iron[2]
Actual amount	1 886.8	47.3	17.3	1 641.1	46.2	14.9
Recommended	2 161	38.5	11.8	2 161	38.5	11.8

[1] Grams; [2] Milligrams.
Source: Uganda Bureau of Statistics, Uganda Demographic and Health Surveys, 2000.

TABLE 11
Child malnutrition indicators, 1995 and 2000 (percent of rural children under the age of five)

Prevalence	Place of residence						Gender			
	1995			2000			1995		2000	
	Rural	Urban	National	Rural	Urban	National	Male	Female	Male	Female
Stunting	40.3	22.5	38.3	39.9	26.5	39.1	40.0	36.7	40.4	36.9
Wasting	5.4	4.9	5.3	4.2	2.9	4.1	6.1	4.6	5.0	3.1
Underweight	26.8	15.3	25.5	23.6	12.4	22.8	27.1	24.1	23.7	21.4

Source: Uganda Bureau of Statistics, Uganda Demographic and Health Surveys, 2000.

Table 10 shows that the mean dietary intake also deteriorated between 1992/93 and 1999/2000, from 1 886.8 calories per day to 641.1 calories per day.

Table 11 indicates that child malnutrition indicators in rural areas improved only marginally between 1995 and 2000. Stunting decreased from 40.3 percent to 39.9 percent while wasting declined from 5.4 percent to 4.2 percent.

In spite of moderate improvement in the performance of the agricultural sector, national food production is inadequate to satisfy national food requirements. Per capita food crop production has been declining, leading to rising levels of food imports. However, the export earnings needed to finance these imports are too dependent upon primary commodities with low income elasticities and are not sufficient to meet ever increasing import requirements. The fragility of the export sector is exemplified by the country's reliance on import support grants.

Household level food security

Household level food security needs to be assessed against an understanding of the demographic and poverty context. Uganda's population is estimated at about 24.7 million, 43 percent of which is active in the labour force. Population density is 126 persons per square km and the population is growing at 3.4 percent per annum, up from 2.5 percent per annum recorded in 1991. About 80 percent of the population is presumed to be rural based.

TABLE 12
Rural poverty, 1992-2000 (headcount ratios – percent)

Location	1992/93	1993/94	1994/95	1995/96	1997/98	1999/00
National	55.7	52.2	50.1	48.5	44.0	35.1
Rural	57.9	56.7	54.0	53.0	48.2	39.0
Urban	27.8	20.60	22.3	19.5	16.3	10.1
Central	45.5	35.6	30.5	30.1	27.7	20.1
Rural	52.8	43.4	35.9	37.1	34.3	25.6
Urban	21.5	14.2	14.6	14.5	11.5	7.0
West	52.8	53.9	50.4	46.7	42.0	28.0
Rural	53.8	55.3	51.6	48.3	43.2	29.4
Urban	29.7	24.7	25.4	16.2	19.9	5.6
East	59.2	58.0	64.9	57.5	54.3	37.3
Rural	61.1	60.2	66.8	59.4	56.8	39.2
Urban	40.4	30.5	41.5	31.8	24.8	17.4
North	71.3	69.3	63.5	68.0	58.8	64.8
Rural	72.2	70.7	65.1	70.3	60.7	66.7
Urban	52.6	46.2	39.8	39.6	32.6	30.6

Source: Appleton *et al.,* 1999 and Appleton, 2001.

Both rural and urban poverty has been declining (Table 12). At the national level, the headcount ratios declined from 55.7 percent in 1992/93 to 35.1 percent in 1999/00. The rural and urban headcount ratios declined from 57.9 percent and 27.8 percent to 39.0 percent and 10.1 percent respectively. Poverty was reduced across all regions with the exception of the northern region, which has not shown any consistent trend. The persistence of poverty in the northern region is largely a result of the civil conflict that has raged there for more than 16 years.

The typical diet varies from region to region due to differences in staple crops, of which the most important are matooke, sweet potatoes, cassava, maize, millet and sorghum. The consumption basket also depends on culture and the type of farming system.

Own production constitutes a significant portion of the consumption basket in rural areas. The purchase of food from income derived from the sale of cash crops, provision of labour services, and remittances also helps supplement own food production. Households from areas with a history of insecurity reported donation from the government and international and non-governmental organizations as an additional source of food. Transfers from other households and donations from relatives were also reported to be contributing positively to household food security.

During harvest seasons, 95 percent of the households surveyed reported that they are food secure.[3] However, due to high post-harvest losses and poor storage facilities, food security declines over the course of the year (Table 13). During drought and bad harvests, the food security situation actually becomes chronic.

At the national level, food security improved by 10.9 percent (Table 14). The largest improvement was however registered in western region, where the proportion of food secure households increased from 65.5 percent to 86.2 percent. The eastern

[3] Households were asked how many meals they could afford in a day. Those that reported less than two meals a day were categorized as food insecure.

TABLE 13
Household food security status during harvest and off-harvest seasons by region

Season	Percentage of food secure households				
	National	Eastern	Northern	Central	Western
Harvest season	95	96	89	97	98
Off-season	52	49	42	57	58

Source: Rural rapid appraisals, 2003.

TABLE 14
Food security status, 1995 and 2003

Season	Percentage of food secure households				
	National	Eastern	Northern	Central	Western
1995	60.9	56	54	68	65.5
2003	71.8	59	53	89	86.2
Increase/decrease	10.9	3.0	-1.0	21.0	20.7

Source: Rural rapid appraisals, 2003.

region registered a modest improvement, while the situation in the northern region worsened. The situation in these two regions can partly be explained by the adverse security situation.

Sources of rural household income

Income sources for rural smallholder households have changed only modestly since the start of the reform programme. In 1992/93, agricultural income accounted for 75.4 percent of total rural household income, while wages[4] and non-farm[5] income sources accounted for 14.3 percent and 10.3 percent respectively. In 1999/2000, the share of agriculture in total household income declined to 67.6 percent, while wages and non-farm income sources rose to 15.6 percent and 16.8 percent respectively. Sometimes households may neglect own-farm activities to earn immediate income for pressing needs.[6] A further decomposition of households by income distribution shows, in Table 15, that the increase in non-farm income was more profound for households at the extremes of the income distribution.

The rural rapid appraisals also validate the above result, as seen in Table 16. Transfers from relatives have become an important source of income, especially for elderly households, whose children engage in relatively higher return activities, mostly in urban areas.

The producers' terms of trade, as measured by the purchasing power of selected cash and food crops, have generally improved, as shown in Table 17.

[4] Wages in rural areas are typically agricultural wages, i.e. income derived from work done on other people's farms.

[5] Non-farm activities include all other activities that are not related to the agricultural sector, such as commerce and trade, cottage industries, mining and quarrying. These reduce the man-hours spent on agricultural production.

[6] Such as in the case of ill health, the purchase of medical services or the purchase of some basic necessities such as salt or even for the purchase of alcoholic beverages.

TABLE 15
Sources of income of rural households by income group, 1992/93 and 1999/2000

Income group	1992/3			1999/2000		
	Agriculture	Wages	Non-farm	Agriculture	Wages	Non-farm
Decile 1	75.5	16.1	8.4	66.3	11.2	22.5
Decile 2	77.8	14.0	8.2	74.9	12.9	12.2
Decile 3	77.7	15.1	7.2	75.4	12.7	11.9
Decile 4	77.6	12.9	9.5	74.2	13.8	12.0
Decile 5	74.2	17.1	8.7	72.9	12.5	14.6
Decile 6	77.3	12.7	10.0	71.7	14.0	14.3
Decile 7	75.8	12.9	11.3	70.5	15.2	14.4
Decile 8	73.9	15.8	10.3	66.7	16.2	17.1
Decile 9	74.8	11.8	13.4	59.6	20.7	19.7
Decile 10	68.9	14.6	16.5	44.0	26.6	29.3
Total	75.4	14.3	10.3	67.6	15.6	16.8

Source: Authors' computations from the Integrated Household Survey (1992/93) and the Uganda National Household Survey (1999-2000) conducted by the Uganda Bureau of Statistics.

TABLE 16
Sources of household incomes

Source	Percent of households
Agricultural Income	75.3
Non-farm Income	11.4
Transfers from relatives	6.5
Wages	4.2
Other	2.6

Source: Rural rapid appraisals, 2003.

TABLE 17
Purchasing power of selected crops, 1994 and 1997

Crop	March 1994					May 1997				
	Salt (kg)	Sugar (kg)	Soap (bar)	Paraffin (litre)	Cloth (metre)	Salt (kg)	Sugar (kg)	Soap (bar)	Paraffin (litre)	Cloth (metre)
Cash crops										
Arabica coffee	2.00	0.60	0.86	0.66	0.50	7.33	2.20	3.14	3.14	1.57
Robusta coffee	1.00	0.30	0.43	0.33	0.25	2.33	0.70	1.00	1.00	0.50
Cotton	0.83	0.25	0.36	0.28	0.21	1.06	0.30	0.43	0.43	0.23
Food crops										
Maize	0.53	0.16	0.23	0.18	0.13	1.50	0.45	0.64	0.64	0.32
Millet	1.00	0.30	0.43	0.33	0.25	1.17	0.35	0.50	0.50	0.25
Rice	2.00	0.60	0.86	0.66	0.55	2.67	0.80	1.14	1.14	0.57
Beans	1.67	0.50	0.71	0.56	0.42	2.67	0.80	1.14	1.14	0.57
Groundnuts	2.33	0.70	1.00	0.78	0.58	3.33	1.00	1.43	1.43	0.71

Source: Agricultural Policy Secretariat, 1997.

Table 18 indicates that rural household incomes rose substantially between 1992/93 and 1999/2000. Agricultural incomes rose by 66 percent, while wage and non-farm incomes rose by 111 percent and 204 percent respectively. Both surveys indicate consumption expenditures[7] that are far above income levels. This could largely be

[7] The consumption data includes consumption of home produced food.

TABLE 18
Average incomes and consumption expenditure of rural households 1992/93 and 1999/2000 (1989 U Sh prices).

Item	1992/93	1999/2000	Percentage increase
Consumption	304 000	500 000	64.5
Income	198 000	366 000	84.8
Agricultural	149 000	247 000	66.0
Wage	28 500	57 000	111.0
Non-farm	20 400	62 000	204.0

Source: Authors' computations from the Integrated Household Survey (1992) and Uganda National Household Survey (1999-2000).

TABLE 19
Real monthly consumption expenditure per adult equivalent by region, 1992-2000 (1989 U Sh prices)

Location	1992/93	1993/94	1994/95	1995/96	1997/98	1999/00
National	**6 900**	**7 281**	**7 659**	**7 759**	**8 078**	**9 731**
Rural	6 091	6 327	6 712	6 742	7 127	8 108
Urban	12 608	13 885	14 342	14 273	14 264	19 986
Central	**8 865**	**9 860**	**10 983**	**10 672**	**10 958**	**13 783**
Rural	6 861	7 635	8 995	8 383	8 957	10 065
Urban	14 564	16 044	16 815	15 731	15 874	22 563
West	**6 449**	**6 527**	**6 839**	**7 371**	**7 369**	**9 355**
Rural	6 223	6 307	6 563	7 066	7 079	8 703
Urban	11 299	11 219	12 264	13 014	12 589	19 429
East	**6 115**	**6 085**	**5 681**	**6 463**	**6 739**	**8 356**
Rural	5 866	5 783	5 411	6 066	6 336	7 845
Urban	8 633	9 765	8 945	11 877	11 455	13 743
North	**5 317**	**5 403**	**5 677**	**5 525**	**6 226**	**5 675**
Rural	5 195	5 203	5 506	5 276	5 988	5 408
Urban	7 677	8 029	8 181	8 633	9 406	10 594

Source: Appleton, 2001.

due to the problem of households under-reporting income relative to consumption. Consumption expenditure is used here as a proxy for income.

Household Survey (1999-2000).
Table 19 demonstrates that consumption expenditure per adult equivalent in rural areas is about half that in urban areas, and within the rural areas the northern region has the lowest expenditure and central region the highest.

Poor rural smallholder households allocate a large share of expenditure to food (Table 20). In the lowest income group[8] this share declined only marginally between 1992/93 and 1999/00.

Food expenditure in urban areas is at least twice that in the rural areas. It has also risen proportionately more in urban areas compared to rural areas, and as a share of total expenditure it has declined more in urban areas, reflecting growth in urban living standards (Table 21). In the rural north food expenditures declined

[8] Those with a monthly expenditure of not more than UGX100 000 (at constant 1989 prices). More than 80 percent of rural small holder households fall into this category.

TABLE 20
Composition of expenditure of poor rural smallholder households, 1992-2000 (1989 U Sh prices)

Item	1992/93	1993/94	1994/95	1996/97	1997/98	1999/00
Food	68.9	66.7	65	63.2	64.3	62.4
Beverages and tobacco	3.6	3.6	3.8	3.1	3.9	3.3
Clothing	4.0	3.9	3.6	4.6	3.8	4
Rent, fuel, power	11.0	12.0	12	11.6	11.3	12
Education	2.8	5.2	2.8	3.7	2.5	4.4
Health	4.0	3.7	4.9	4	5.3	5.1
Other*	5.7	5.0	7.6	9.8	8.9	9.1

* Other includes transport and communications, household and personal equipment and goods, and recreation and other services.
Source: Uganda Bureau of Statistics, Statistical Abstracts, 2002 and authors' computations from Appleton, 2001.

TABLE 21
Real average monthly food expenditure per adult equivalent, 1992-2000 (1989 U Sh prices)

Location	IHS* 1992/93	MS**-1 1993/94	MS-2 1994/95	MS-3 1995/96	MS-4 1997/98	UNHS*** 1999/00	% Change (1992/93-1999/00)
National	**4 754**	**4 856**	**4 978**	**4 904**	**5 194**	**6 072**	**27.7**
Rural	4 197	4 220	4 363	4 261	4 583	5 059	20.5
Urban	8 687	9 261	9 322	9 021	9 172	12 471	43.6
Central	**6 108**	**6 577**	**7 139**	**6 745**	**7 046**	**8 601**	**40.8**
Rural	4 727	5 093	5 847	5 298	5 759	6 281	32.9
Urban	10 035	10 701	10 930	9 942	10 207	14 079	40.3
West	**4 443**	**4 354**	**4 445**	**4 658**	**4 738**	**5 838**	**31.4**
Rural	4 288	4 207	4 266	4 466	4 552	5 431	26.7
Urban	7 785	7 483	7 972	8 225	8 095	12 124	55.7
East	**4 213**	**4 059**	**3 693**	**4 085**	**4 333**	**5 214**	**23.8**
Rural	4 042	3 857	3 517	3 834	4 074	4 895	21.1
Urban	5 948	6 513	5 814	7 506	7 366	8 576	44.2
North	**3 663**	**3 604**	**3 690**	**3 492**	**4 003**	**3 541**	**-3.3**
Rural	3 579	3 470	3 579	3 334	3 850	3 375	-5.7
Urban	5 289	5 355	5 318	5 456	6 048	6 611	25.0

* Integrated Household Survey
** Monitoring Survey
*** Uganda National Household Survey
Source: Authors' computations from Appleton, 2001.

between 1992/93 and 1999/000 pointing to a worsening food security situation in that region.

A decomposition of rural household expenditure into deciles shows that between 1992 and 2000 expenditure increases were greatest for households at the lower end of the income spectrum, despite expenditure declines in 1994/95 and 1995/96 (Table 22).

The increase in incomes indicated by the national household surveys is also consistent with the findings of the rapid rural appraisals. Households producing coffee, tobacco and tea reported increasing income levels. Coffee producers attributed the increase to liberalization of coffee marketing and the introduction of high yielding varieties of coffee. Cotton producing smallholders, however, showed

TABLE 22
Average annual consumption expenditure per rural household by expenditure group, 1992-2000 (1989 U Sh prices)

Decile	1992/93	1993/94	1994/95	1995/96	1997/98	1999/00	% change (1992/93-1999/00)
1	142 920	167 220	166 620	161 280	184 320	197 095	37.9
2	185 520	206 580	212 640	210 360	228 600	241 106	30.0
3	226 620	245 760	253 320	256 020	271 860	284 620	25.6
4	265 080	285 900	294 540	297 720	317 580	332 368	25.4
5	309 300	324 420	334 980	339 480	364 860	380 332	23.0
6	356 460	375 360	383 460	391 740	417 660	434 612	21.9
7	417 480	431 640	442 860	456 240	483 960	502 215	20.3
8	504 120	513 960	531 420	570 900	582 300	603 808	19.8
9	643 440	648 900	705 060	749 220	754 500	785 568	22.1
10	772 127	765 701	839 020	899 063	897 855	933 241	20.9

Source: Authors' computations from data provided by Uganda Bureau of Statistics.

TABLE 23
Real gross margins and returns to family labour for selected crops, 1994 and 1997

Crop	Gross margins ('000 U Sh/ha)			Returns to family labour (U Sh/manday)		
	1994	1997	% change	1994	1997	% change
Arabica coffee (improved)	85.60	575.70	572.50	621.10	4170.60	571.49
Arabica coffee (improved)	58.50	308.30	427.00	7.70	2300.10	29 771.40
Robusta coffee (unimproved)	25.00	154.50	518.00	200.10	3689.7	1 743.90
Robusta coffee (clonal)	90.60	402.30	344.00	832.70	1235.40	48.40
Cotton (tractor)	2.50	43.80	1 652.00	33.90	609.10	1 696.70
Cotton (ox-plough)	5.70	35.90	529.8	78.10	551.90	606.70
Cotton (hand hoe with spray)	23.20	34.20	47.40	184.80	312.90	69.30
Cotton (hand hoe without spray)	18.90	26.90	42.30	149.50	235.10	57.30
Tea (out-growers)	77.60	112.00	44.3	377.00	546.00	44.80
Tobacco)	83.40	171.5	105.00	278.00	540.00	94.30
Maize (improved)	70.60	198.00	180.50	1199.80	2712.30	126.00
Maize (local)	48.20	129.60	168.90	337.90	959.50	183.96
Beans (improved)	90.30	99.30	10.00	1477.70	1291.10	-12.63

Source: Agricultural Policy Secretariat, 1997.

mixed results: 43 percent reported declining income from cotton whilst 57 percent reported an increase. Food crop producers of maize and beans reported increasing incomes from sales.

The profitability of crops increased between 1994 and 1997 (Table 23). Coffee producers benefited most with an average increase in gross margins of at least 300 percent. All crops registered increased returns to family labour apart from beans where returns declined by 12 percent. Improved gross margins and returns to family labour are related to increases in yields and real producer prices. The incomes of producers have grown in line with the improved performance of the agricultural sector.

Substantial improvement in the prices of coffee, tea and maize are observed between the two periods (Table 24). Consequently, the percentage of households growing these crops increased substantially, except in the case of tea which registered

TABLE 24
Price movements and household production behaviour, 1992/3 and 1999/2000

	Price per kg (at constant 1999 U Sh)			Mean per capita output per household growing crop (kg)			Percentage number of households growing the crop		
	1992/93	1999/00	% change	1992/93	1999/00	% change	1992/93	1999/00	% change
Coffee	239	500	109.2	69.41	108.59	56.5	16.4	27.5	67.7
Cotton	510	230	-54.9	11.37	7.77	-31.7	7.1	5.8	-18.3
Tea	185	510	175.6	9.66	134.18	1289	20.3	0.1	-99.5
Tobacco	1005	1013	0.8	15.9	7.64	-51.9	2.3	2.3	0.0
Maize	120	200	66.7	240.16	555.7	131.4	27.5	67.8	146.5
Beans	320	256	-20.0	155.31	155.16	-0.1	76.1	69.2	-9.1

Source: Own computations from Deininger, 1999.

TABLE 25
Rural real wage rates, 1987-2001 (1997/98 prices)

Year/period	Casual labour (U Sh/manday)	Permanent labour (U Sh/month)	Contract labour (U Sh/ha)
1987	769.2	5 769.2	26 923.1
1988	868.4	10 526.3	27 368.4
1989	1 764.7	23 529.4	73 529.4
1990	1 142.9	12 857.1	50 000.0
1991	1 123.6	15 730.3	67 415.7
1992	1 017.4	14 534.9	65 407.0
1993	1 025.6	19 230.8	64 102.6
1994	1 132.1	18 867.9	62 893.1
1995	1 177.9	18 845.7	62 426.4
1996	1 219.5	18 847.0	63 192.9
1997	1 170.7	18 833.4	62 811.8
1998	1 213.7	18 913.7	62 809.8
1999	1 147.2	18 833.7	62 810.7
2000	1 156.1	18 960.4	62 800.6
2001	1 180.3	19 066.6	63 555.5
Average annual increase (%)	6.1	14.8	11.9

* Manday is equivalent to five to six hours of work.
Source: Authors' computations based on data from Agricultural Policy Secretariat.

a small drop. Sizeable price falls were observed in cotton and beans although the percentage of households growing these crops fell only marginally. The mean output per farmer increased in the case of coffee, tea and maize; decreased in the case of cotton and tobacco, and remained almost unchanged in the case of beans.

Changes in rural wages and wage earning opportunities

Real rural wages for all categories of labour have shown an upward trend since 1987, with the biggest increase seen in the wages for permanent labour, as depicted in Table 25.

POLICY LESSONS

Policy reforms have resulted in increased agricultural output and farm household incomes, but for a significant proportion of the population the improvements still

fail to guarantee access to sufficient food and other basic needs. At a national level, export earnings are insufficient to meet rising import requirements, with potentially adverse implications for present and future food security.

Output increases were significantly greater than in many other countries, partly explained by recovery from a low pre-reform base. However, the more recent flattening off in output suggests that there are severe constraints to the expansion and modernization of agricultural production.

Rural smallholder farmers are still confronted with a number of obstacles to increased productivity and profitability, including minimal use of fertilizers and other inputs, poor marketing infrastructure, a lack of market information, high post-harvest losses, financial constraints and land tenure problems. The 1998 Land Act intended to improve land tenure security is not yet effective.

Improvements in agricultural productivity as well as diversification to non-farm enterprises are key requirements for poverty alleviation and food security. The National Agricultural Research Organisation was established in 1992 to undertake, promote and co-ordinate research in various aspects of agricultural development. The benefits of this are slowly trickling to the smallholder farmers; for example, most rural smallholder coffee farmers have adopted improved coffee varieties.

The Government has invested substantial resources roads, but market infrastructure constraints have not been adequately addressed during the reform process. Transport costs are high because of high fuel costs, poor roads and a lack of competition. The high level of other post-harvest costs, including storage, processing and handling costs, also affects the sector's competitiveness. Credit is a further constraint to small farmers, with the only source of credit for rural dwellers being the micro finance industry, which favours non-agricultural activities. Attempts are currently underway to develop financial services that meet the needs of the rural population and integrate them into the national financial system.

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