BOX 1
Agroclimatic conditions

Guyana has four major geographical regions:

A coastal plain or low-lying narrow piece of land along the Atlantic coast occupies about 10 percent of land area and is where the bulk of agriculture and food production is undertaken.

A hilly sand and clay area to the south of the coastal plain occupies about 20 percent of the land area and is known for its forests and minerals. It is believed that this area has potential for large-scale livestock rearing and orchard fruit cultivation.

A highland region occupies 60 percent of the country and is made up of dense rainforest.

Interior savannas situated in the south-west are predominantly a grassland area where agriculture and cattle rearing occurs.

In all four regions there is some cultivation of agricultural crops and rearing of small stock, usually for own consumption.

Guyana has a tropical climate marked by seasonal rainfall, high humidity and mainly diurnal changes in temperature. In total, about 2.3 percent of the land area is suitable for cropping, the coastal plain being the best area for agriculture. About 10 percent of the coastal plain is cultivated, and the two leading crops are sugar and rice. There are a number of "other" crops and some areas of cattle-farming. In the other natural regions less than two percent of the land is used for agriculture and housing, with forests, waterways, and mineral deposits the dominant features. Approximately 90 percent of the total land area is owned by the Government.

Effects on agricultural output and value added

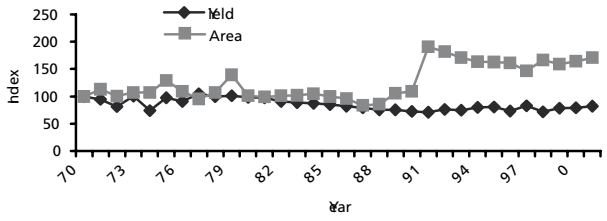
In this section, the findings from the price analysis are related to evidence of changes in output. In assessing the ability of producers to respond it is important to recognize the agroclimatic context within which they operate as illustrated in Box 1.

Sugar

Up until 1978, sugar output performed fairly well. During the period 1979-90, it declined steadily, reaching a low of 132 000 tonnes in 1990, at which time it was only 40 percent of what it was in 1970. This situation forced the industry to cut back on its work force, suppress wages, and diversify its activities. These policies severely affected the welfare of rural households through restricting effective demand.

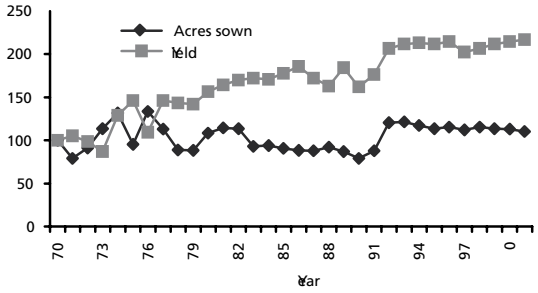
Area under sugar cane fell from 146 000 acres in 1980 to 119 000 acres by 1990 (Figure 4). However, since 1991 the sugar corporation has returned its operations and marketing portfolios to private management and placed greater emphasis on improving efficiency and productivity. This has led to a more than 90 percent increase in the acreage cultivated, but because yields have remained low relative to 1970, output was still significantly below that of 1970.

FIGURE 4
Sugar area sown and yield index, 1970-2000 (1970=100)



Source: Ghana Rice Development Board Reports (various years)

FIGURE 5
Index of rice yields and acreage sown, 1970-2000 (1970=100)



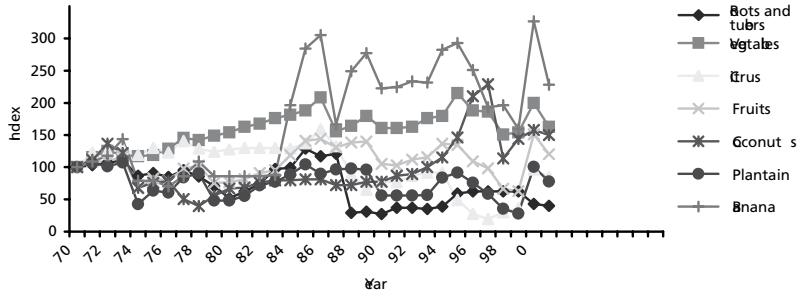
Source: Ghana Rice Development Board Reports (various years)

Rice

Prior to the reforms, the state owned all the major rice mills, administered local producer prices, rationed foreign exchange and inputs, and imposed restrictions on internal marketing and exports. This partly explains the sluggish performance of the industry during the period 1986-90. Further, the exchange rate policies hampered the purchasing of spares and equipment, as foreign currency often had to be acquired in the parallel market. Some producers reallocated their resources to cash crops or cattle farming to buffer their incomes, while others left their land idle and sought alternative employment.

Paddy prices were liberalized in 1991 resulting in substantial price increases received by farmers and producing the anticipated supply response as production increased (1991– 1999) at an annual average rate of 13.8 percent as a result of both increased yields and more land being brought under cultivation (Figure 5). In recent years rice holdings have been consolidated, mainly because of difficulties faced by small farmers in obtaining inputs and the generally low profitability of rice.

FIGURE 6
Index of output from the non-traditional sector, 1970-2000 (1970=100)



Source: FAOSTAT

Other crops

Other crops represent about 22 percent of value-added in agriculture. For some crops in this sub-sector - coconuts, vegetables and fruits - there was an increase in output after reforms, mainly as a result of government incentive schemes and a greater focus on the sector (Figure 6). These programmes attempted to provide the necessary supporting services for production, training in post-harvesting techniques, and improvements in rural infrastructure. However, roots and tubers and plantains declined due in large part to greater competition from cheap and subsidies food substitutes.

Production of these crops is largely oriented towards the domestic market. Output of other crops has been promoted as substitutes for a number of imports, particularly during the period of import restrictions. In the latter half of the 1980s, however, the rapid growth of the parallel economy facilitated increased exports of food crops. Small traders who travelled to various Caribbean countries to purchase merchandise, found it profitable to take small quantities of vegetables and fruits for sale abroad.

The non-traditional sub-sector has gradually increased its share of GDP from an average of 3 percent in 1980 to about 10 percent in 2001. Production of non-traditional products is carried out mainly by small farmers who are adjacent to the large sugar and rice farms and in other rural areas. While data on a continuous basis are not available, the survey did reveal that as a result of the disincentives to the production of rice and sugarcane, some small farmers from these sub-sectors converted to the production of "other crops."

Livestock

Livestock has historically played a significant role in and cattle production is the most important livestock activity along with the poultry industry. The poultry industry experienced severe constraints during the period of state control, particularly in the early 1980s, when economic pressures and foreign currency limitations resulted in the curtailment of vital inputs (hatching eggs, feed, and drugs).

During the early 1990s the local poultry industry was faced with an equally serious problem in the form of competition from imported poultry meat and table eggs. Import concessions on equipment purchased, however, resulted in a revival.[5] Further, the Government raised the bound rate on imported chicken parts, in order to offer the industry some protection to reduce over reliance on imported chicken. The production of poultry meat increased by some 135 percent between 1992 and 1995, and more than 200 percent between 1996 and 2001. The production of eggs had a similar trajectory.

Effect on imports and exports

Exports are led by sugar which accounts for approximately a quarter of total exports. Other important exports are rice, fish and shrimp. The high dependence on a small number of commodity exports means that the economy is extremely vulnerable to cyclical movements in commodity prices. This is despite the existence of preferential markets for its agricultural exports, since even these markets are not immune to the vagaries of world market prices. In recent years, the prices of most of the commodities that are important to Guyana have been declining. This has had significant effects on the trade balance, on consumption and on private investment: between 1997 and 1999, imports of consumer goods, intermediate goods and capital goods all declined. For the same period, total imports declined from US$628 million to US$550 million.

In 2001, 84 percent of sugar and 49 percent of rice exports went to the EU. High trade dependence on a few trading partners clearly opens the economy to risks associated with changes in trade policy and economic conditions within the importing countries. In Guyana's case, two of the commodities that are heavily dependent on the European market – sugar and rice – are among the most heavily administered products in the world. The preferential access arrangements for these products are totally bound up with the support arrangements in the EU, and for that reason, administrative decisions have a greater effect on export earnings than do market forces. The fortunes of the rice industry in recent years have been determined largely by changes in the EU quota arrangements.

Sugar

The bulk of Guyana's sugar exports enter the EU under the ACP Sugar Protocol as well as under an arrangement known as the Special Preferential Sugars (SPS). There they receive a higher price than they would on the world market. Exports to the EU accounted for 90 percent of the total value with the rest going to the United States, under that country's Sugar Agreement for Caribbean Basin countries, and to the CARICOM.

The quantity of sugar exported from Guyana increased from 134 103 tonnes in 1990 to 255 000 tonnes in 1994. This represented an increase of some 90 percent. The trend since 1991 has been an increasing one, and with production on the increase, this trend is anticipated to continue for some time.

The market provided by the Sugar Protocol is secured for an unlimited duration. The SPS Agreement provided a substantial new market at a good price until the year 2001 with the likelihood of renewal. The 1996 United States Farm Bill included

[5] This concession is mainly in the form of waivers on import duties.

provisions that secured Guyana's sugar quota in this market for seven years. At the same time, there remain several pressures that may result in an erosion of the value of sugar preferences, including the reform of the EU sugar regime, the renegotiation of the SPS, limitations imposed on the EU agricultural budget Agenda 2000, and the EU's agricultural support reduction commitments under the WTO.

Rice

In the period between 1989 and 1991 over 75 percent of rice exports went to the EU market. In 1992 the pattern changed, and direct exports to the EU dropped to only 17 percent of total exports. The major change in that year was the reappearance of Jamaica as a major destination for Guyanese rice, accounting for 46 percent of exports. With increasing rice production in the 1990s, Guyana has had a much larger export surplus.

Rice exports enter Europe under a quota arrangement for ACP producers that attracts a 35 percent levy in accordance with MFN provisions. In addition, in the early 1990s, a new arrangement was provided by the EU for its overseas countries and territories (OCTs) where rice that was partially milled in those territories would enter the EU duty free and in unrestricted amounts. Guyanese producers took advantage of this arrangement and, as a result, almost the entire output was shipped to the EU during 1994 and 1995. However, following complaints from the southern European producers, the EU in 1996 instituted safeguard measures that limited the OCT exports to 35 000 tonnes. During the high point of the OCT sales, the CARICOM market was almost totally abandoned. Currently, however, this market (Jamaica in particular) remains the most important for Guyana's rice.

At present, the most important issue concerns the impact of deliveries of United States PL480 rice on Guyana's share of the Jamaican market. In 1999, PL480 rice deliveries to Jamaica surged to more than 34 000 tonnes, from 13 180 tonnes in 1998, thereby taking up more than 45 percent of that market. The recent provisions within the 2002 US Farm Bill are expected to further threaten Guyana's exports. It should be noted that, coming under a food aid programme, PL480 commodities do not attract the CARICOM CET tariff.

General issues

Despite the conclusion in 2000 of the ACP/EU Cotonou Agreement that purported to provide for stable market access arrangements during the "preparatory period", the EU has been moving swiftly to implement measures that will significantly erode the margin of preferences currently enjoyed by many ACP exporters. One such measure is the granting of duty-free access to all LDCs, a group to which Guyana does not belong. This would mean that low cost rice producers like Myanmar and Indonesia, would be in a position to out-compete ACP producers on the EU market that do not fall within the LDC ranking.

Plans are also in train for the reform of the EU rice regime, which would have the effect of increasing import duties faced by Guyana and other ACP rice exporters. More importantly, rice imports from ACP countries are limited by quota, while presumably imports from LDCs will eventually be quota free. Taken together, the LDC initiative and the rice regime to the EU could have negative implications for Guyana's rice exports to the EU and for the economy as a whole, given the

TABLE 2
Major trade liberalization impacts (changes in main variables between pre- and post-reform periods)

Impacts on:	Overall agriculture	By product							
		Rice	Sugar	Fisheries	Meat and dairy	Roots and tubers	Vegetables	Fruits	Other
GDP	++	++	++	=	=	=	=	=	=
Production (volume)	++	++	++	++	++	++	++	+	++
Trade (in US$)									
Exports	++	++	++	++	=	++	++	++	++
Imports	++	*	*	=	++	=	=	+	=
Prices (in real terms)	=	+	+	*	=	*	*	*	*
Real wages	+	++	++	=	=	=	=	=	=

*** Changes in main variables between pre- and post-reform periods.**
++ Increases in the variables by more than 20 percent; **+** Increases between 5 percent and 20 percent with a sign; **=** Values between +5 percent and -5 percent.
Source: Computed by authors.

contributions and prominence of this industry to rural employment, quality of life and sustainable livelihood. The erosion of the preferences in the EU rice market comes hot on the heels of Guyana losing the lucrative OCT route.

Guyana expects reforms to the EU sugar regime to proceed much more slowly, given the fact that placing sugar under the same kind of regime that applies to other EU-supported products would have negative effects on the EU budget, but could similarly lead to competition for Caribbean sugar. In addition, the EU has been adjusting its agricultural support policies by way of reducing MFN tariffs, lowering intervention prices and increasing its direct payments to farmers. For cereals, this has meant lower internal prices, which harm Guyana's rice exports. It is for these reasons that both rice and sugar have been selected in this section for more detailed analyses, examining the effects of past reforms on these sub-sectors and the implication of forthcoming reforms.

CONSEQUENCES OF THE REFORM: TARGET VARIABLES

National food security

International trade in food commodities

The marked dualities that characterize Guyana's agricultural sector are reflected in its food production and processing, and consequently in food security. Agriculture is organized around large export-orientated estates and numerous smallholder farms producing a wide variety of food items, especially rice. The estates are government owned in the case of sugar and privately owned in the case of rice. The food-processing sector exhibits a similar duality.

Guyana imports significant quantities of some food items, particularly flour and dairy products. Table 3 reveals a pattern of significant import-reliance on food, although this has varied over the policy periods. Food imports averaged 9 percent of GDP for the entire period.

TABLE 3
Guyana: average value of trade

	1970-78	1979-85	1986-95	1996-01
Agri-Imports	35 378	36 026	38 071	57 054
Agri-Exports	111 188	122 637	139 274	214 746
Agri-Net Export	75 810	86 611	101 202	157 692
Agri-Imports as a percentage of GDP	10.2	7.6	8.3	9.7

Source: FAOSTAT

In the early pre-reform years, we find an upward trend in the value of exports, imports and net exports. There were, however, fluctuations within the period, with an export peak being reached in 1975, reflecting the worldwide boom of commodity prices in the early 1970s. From 1979 to 1985 the trends were reversed, as all three variables moved markedly downwards

Moving to the post-reform period, even as the policy reforms were being consolidated an upward trend commenced. However, while the value of agricultural exports nearly doubled between 1986 and 1995, the value of imports grew faster by a factor of nearly 3. This exceptional import surge after 1991 reflected the liberalization of the economy and an increased import-dependence on food.

The value of agricultural exports reached its peak in 1996. This high value of exports was more or less maintained until 1998, but trended sharply downwards thereafter, so much so that, by 2001, the value of agricultural exports had fallen to its pre-reform period level. Food import-reliance nevertheless deepened, as the value of food imports peaked in 1997. This level however, was not maintained, and like exports, imports later declined and by 2000/01 had fallen to pre-reform levels.

It can be concluded, therefore, that the impact of the policy reforms was most noticeable in the late 1990s, before international trade reached a plateau and then declined. The short-lived gains from the reforms reflected a number of considerations: design flaws in the original reforms; a tapering off of "implementation will", and exogenous shocks to the economy (including natural disasters).

National food balance sheets

For the entire period, 1970-2000, the per capita supply of calories averaged 2 487, or 4 percent above the recommended intake of 2 400 calories. Of this amount, 87 percent came from vegetable products and 12 percent from animal products. Table 4 shows the supply of calories, protein, and fat. Wheat, imported for local milling and distribution under the United States PL 480 food aid programme, is the largest imported staple in the food basket. It fell during the pre-reform period from about 17 percent of total calorie intake to less than half this amount (8 percent) before rising again to 16 percent in the post reform period.

Data on food imports as a percentage of GDP are shown in Figure 7. These reveal some interesting patterns. In the years 1971 and 1972, imports as a ratio of GDP averaged 8.9 percent. Following the commodity boom in 1976 this peaked at 13 percent of GDP. Thereafter it averaged around the 1973-74 level at 10.7 percent. However between 1982 and 1988 it fell precipitously, averaging only 5 percent of GDP. These were the years of rigid control of imports and a steep decline in GDP.

TABLE 4
Dietary energy supply, 1970-2000 (percentages in parentheses)

		1970-1978	1979-1985	1986-1995	1996-2000
CALORIES:	**TOTAL**	**2 422**	**2 503**	**2 458**	**2 563**
	Vegetable products	**2 099 (86.6)**	**2 233 (89.2)**	**2 207 (89.7)**	**2 166 (84.5)**
	Rice	716 (29.5)	1 062 (42.4)	845 (34.3)	805 (31.4)
	Sugar	438 (18.0)	463 (18.4)	399 (16.2)	330 (12.8)
	Wheat	421 (17.3)	193 (7.7)	384 (15.6)	400 (15.6)
	Vegetable oil	181 (7.4)	161 (6.4)	97 (3.9)	99 (3.8)
	Fruits	81 (3.3)	74 (2.9)	98 (3.9)	77 (3.0)
	Starchy roots	58 (2.3)	38 (1.5)	83 (3.3)	128 (4.9)
	Oilcrops	56 (2.3)	90 (3.5)	97 (3.9)	145 (5.6)
	Pulses	49 (2.0)	90 (3.5)	63 (2.5)	40 (1.5)
	Other vegetables	11(0.4)	90 (3.5)	8 (0.3)	8 (0.3)
	Fish, seafood	48 (1.9)	75 (2.9)	101 (4.1)	86 (3.3)
	Animal products	323 (13.2)	270 (10.7)	251 (10.2)	397 (15.4)
PROTEIN:	**TOTAL**	**59.6**	**58.4**	**61.5**	**72.2**
	Vegetable products	**34.9 (58.5)**	**34.3 (58.7)**	**37.1 (60.3)**	**37.0 (51.2)**
	Rice	14.2 (23.8)	21.0 (35.9)	16.7 (27.1)	15.9 (22.0)
	Wheat	12.1 (20.3)	5.6 (9.5)	11.1 (18.0)	11.5 (15.9)
	Fruits	0.9 (1.5)	0.9 (1.5)	1.1 (1.7)	0.9 (1.2)
	Starchy roots	0.9 (1.5)	0.5 (0.8)	0.9 (1.4)	1.5 (2.0)
	Oilcrops	1.5 (2.5)	1.4 (2.3)	2.1 (3.4)	3.3 (4.5)
	Pulses	3.2 (5.3)	3.6 (6.1)	4.2 (6.8)	2.6 (3.6)
	Other vegetables	0.5 (0.8)	0.4 (0.6)	0.4 (0.6)	0.5 (0.6)
	Fish, seafood	7.8 (13.0)	12.7 (20.7)	16.5 (26.8)	14.0 (19.3)
	Animal products	24.7 (41.4)	24.1 (41.2)	24.4 (39.6)	35.2 (48.7)
FAT	**TOTAL**	**48.9**	**45**	**37.4**	**50.4**
	Vegetable products	**28.9 (59.1)**	**29.7 (66.0)**	**23.4 (62.5)**	**27.8 (55.1)**
	Rice	1.2 (2.4)	1.8 (4.0)	1.4 (3.7)	1.3 2.5)
	Sugar	...	.....		...
	Wheat	1.2 (2.4)	0.5 (1.1)	1.1 (2.9)	1.1 (2.1)
	Vegetable oil	20.4 (41.7)	18.2 (40.4)	11.0 (29.4)	11.2 (22.2)
	Fruits	0.3 (0.6)	0.3 (0.6)	0.3 (0.8)	0.3 (0.5)
	Starchy roots	0.1 (0.2)	0.1 (0.2)	0.2 (0.5)	0.3 (0.5)
	Oilcrops	4.7 (9.6)	8.2 (18.2)	8.7 (23.2)	12.8 (25.3)
	Pulses	0.3 (0.6)	0.3 (0.6)	0.4 (1.0)	0.2 (0.30
	Other vegetables	0.1 (0.2)	0.1 (0.2)	0.1 (0.2)	0.1 (0.1)
	Fish, seafood	1.5 (3.0)	2.5 (5.5)	3.2 (8.5)	2.8 (5.5)
	Animal products	20.0 (40.8)	15.3 (34.0)	14.0 (37.4)	22.6 (44.8)

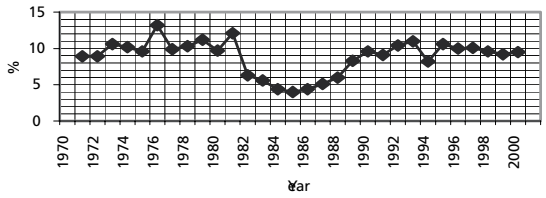
Source: FAO Online Statistical Database (extracted from Food Balance Sheet).

In the years after 1989 the level recovered and fluctuated between 8.3 and 11 percent. For the years 1999-2000 it averaged 9.4 percent.

The table first identifies the sources of dietary energy and the total calories, which is divided between vegetable and fish and animal products. The protein total shown in the next section (59.6) is the sum of vegetable products (34.9) and animal products (24.7). The fish/seafood total in the first section equals 1.9 percent of total calories (2 422) and so on. The fat total 48.9 is 28.9 (vegetable products) plus 20.0 (animal products).

The number of undernourished people in Guyana has remained constant at 0.1 million persons for the entire period under consideration, but the food security

FIGURE 7
Guyana: Food imports as a percentage of GDP, 1970-2001



Source: Statistical Appendices.

TABLE 5
Undernourishment in Caribbean countries, 1979-2000

Country/Region	Proportion of undernourished in total population (percent)		
	1979-1981	1990-1992	1998-2000
Guyana	13	19	14
Jamaica	10	14	9
Trinidad and Tobago	6	13	12
Latin America and the Caribbean	13	13	11
Developing world	28	20	17

Source: FAOSTAT

situation, ranging from 13 to 19 percent of the population undernourished, is shown to be worse than other Caribbean countries. Like Jamaica and Trinidad and Tobago, two sister CARICOM countries, Guyana experienced a reversal in the prevalence of undernourished between 1979-81 and 1990-92 (19 percent). This was followed by an improvement between the latter period and the most recent period 1998/2000 although the 1979/81 level was not reached. The developing world and the broader Latin American Caribbean region have not witnessed a similar pattern.

The inference which has usually been drawn for Guyana is that the national food security situation improved as a consequence of the reforms, having deteriorated significantly in the pre-reform period. However, while this association is clearly present, the data on national food security are not robust enough for this to be presented as a strong conclusion.

Household and individual food security

Guyana has a population of about 250 000 people, with population density of 9 persons per square mile. Over the past three decades population growth averaged about 0.2 percent per annum. This is largely explained by high levels of outward migration. Ninety percent of the population lives on the narrow coastal plain, where the population density is high, at about 400 persons per square mile.

The occupational structure of the population shows about 28 percent of the workforce engaged in agriculture, 3 percent in mining, 13 percent in manufacturing and utilities, 7 percent in construction and the remainder (49 percent) in a range of

TABLE 6
Malnutrition among children under five years, 1971

Prevalence category	Malnourished and underweight, and severely malnourished children (percent)
Rural high	40
Rural medium	26
Rural low	10
Urban	7
All areas in the sample	18

Source: Adapted from PAHO, 1976.

low-productivity traditional services, such as trading, transport, government and private households. Unemployment averages 9 percent of the labour force, and the labour force participation rate is 57 percent, with the rate for men being 76 percent and for women only 39 percent. Such significant gender disparities have a bearing on household food security outcomes. Wage labour is not adequately institutionalized in the rural areas, except on the sugar estates and some large rice operations where adequate labour market features and safeguards exist.

Data on the national minimum wage show a decline in real terms over the first three periods of our analysis (1970-78, 1979-85, and 1986-95) with a recovery in the fourth (1996-01). The real wage in the latter period remains 35 percent below that of the first. Absolute poverty in 1999 was 36 percent of the population and critical poverty was19 percent. Though these figures are high, they show a decline from levels of 43 percent and 28 percent respectively in 1992/93. The geographical concentration of poverty showed 16 percent absolute poverty in the urban areas and 40 percent in the rural coastal areas (where most agricultural production takes place) and 78 percent in the rural interior area where the indigenous Amerindian population principally resides. Significantly, there was no improvement in the situation for the rural interior area between 1992/93 and 1999.

Using Gomez calculations of "weight-for-age", a comprehensive nutritional survey conducted in 1971 found that 16 percent of children under 5 were in the Gomez II classification (definitely malnourished and underweight) and 1.7 percent in the Gomez III classification (very severe malnutrition). The rural areas fared worse than the urban areas, with the prevalence of malnutrition ranging from 10 to 40 percent compared to 7 percent in urban areas (Table 6).

Factors distinguishing rural areas with high malnutrition rates from those with low malnutrition rates are given in Table 7.

The results showed that over 40 percent of households in rural and urban areas consumed less than 80 percent of the recommended intake of total energy, protein, vitamin A, riboflavin and niacin (Table 8).

The evidence therefore suggests a marked improvement between 1982 and 1985 and the early pre-reform period, followed by a sharp deterioration in the later pre-reform period. Indeed this deterioration was so sharp that in years immediately prior to the reforms the malnutrition situation for children under five became worse than it was in 1971. In recent years (1996–2000) there has been improvement, and the situation has recovered to beyond the 1982– 85 period (Figure 8).

TABLE 7
Differences between rural high and rural low under 5 malnutrition areas, 1971

Significant differences found	No significant differences found
Household income	Time of giving first supplement to breast-feeding
Distance from piped water	Reported child mortality rates
Education of mothers	Household calorie consumption in relation to recommended intake
Patterns of child care	
Attendance at clinics	
Employment of main providers	
Religious prohibitions	

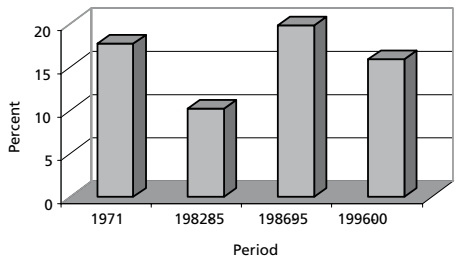
Source: Adapted from PAHO (1976) Table 10, p 14.

TABLE 8
Percentage of households consuming less than recommended intakes of energy and nutrients, 1971

	Less than recommended intakes		Less than 80 percent of recommended intakes	
	Rural (%)	Urban (%)	Rural (%)	Urban (%)
Energy	77.1	71.2	54.3	48.5
Protein	65.1	61.4	44.5	39.7
Calcium	28.0	29.3	17.9	20.5
Iron	26.9	38.3	13.6	21.2
Vitamin A	62.6	40.7	52.1	28.2
Thiamine	22.4	39.7	14.8	19.1
Riboflavin	88.0	76.5	75.9	62.8
Niacin	60.3	68.7	39.5	48.9
Ascorbic acid	35.9	32.4	27.3	24.3

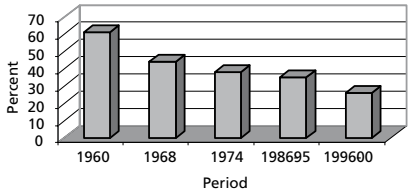
Source: PAHO (1976).

FIGURE 8
Child malnutrition by policy period (percent of children under 5 years)



Source: World Bank 1993, Guyana Agency for Health Science Education and Food Policy 2001, Ministry of Finance, Budget Speeches (various issues)

FIGURE 9
Infant mortality rate



Source: Guyana Statistical Bureau, Statistical Bulletin (various years)

Figure 9 shows that infant mortality (IMR) improved in the post-reform period. However, the performance in Guyana was the worst in the Caribbean Region. Given its resource endowment and food production capability, it reflected a substantial policy failure in securing better resource allocation and greater access and equity for the population as a whole.

Food security concerns have always been a major stated goal of public policy. Indeed, following the 1971 national survey and its recommendations, the Government committed itself to programmes in the areas of food production; trade in food; clinical practices to deal with malnutrition; education; and, other nutritional support services. In subsequent years these were to be supplemented by other programmes related to nutrition and food security, including programmes for agriculture, health, basic services, housing, employment, safety nets and social services. However, the economic reverses of the 1980s prevented these from being realized.

A desperate situation in terms of child malnutrition had developed by the end of the 1980s. A parastatal agency, the Guyana Agency for Health Sciences Education, Environment and Food policy (GAHEF), was established, with responsibility for nutrition assessment, education, and surveillance. That agency produced a National Food and Nutrition Policy in 1991 and by the mid-1990s a number of nutrition programmes were underway. However, subsequent assessments of these programmes were critical. The World Bank (1993) pointed to poor targeting, weak administration and general ineffectiveness, especially in the interior regions. The IDB (1994) concluded that: "child malnutrition continues to exist not because of a lack of programmes to remedy the problem, but because most are ineffective." With such strong verdicts, the authorities found it necessary to re-visit their nutrition-programmes and in 1998 announced a new National Plan of Action on Nutrition. However, this plan languished for over three years and its revision commenced in 2002.

Field survey results

A rapid assessment survey confirmed that domestic agricultural production provides the largest part of national food consumption.[6] For example, it highlighted that before

[6] Details of the approach used in conducting the survey can be found in Thomas and Bynoe (2003) Chapter 3.

TABLE 9
Main food staple consumed by the surveyed population before and after reform

Main food group	Before reform		After reform	
	Frequency	Percent	Frequency	Percent
Rice and rice products	102	77.9	84	64.1
Flour and flour products	14	10.7	42	32.1
Ground provisions	15	11.5	5	3.8
Total	131	100	100	100

Source: Rapid Assessment Survey (2003).

TABLE 10
Main food complements before and after the reform

Main food complement	Before reform		After reform	
	Frequency	Percent	Frequency	Percent
Meats	42	32.1	51	38.9
Poultry products	37	28.2	45	34.4
Fish	37	28.2	24	18.3
Milk	3	2.3	2	1.5
Vegetables	12	9.2	9	6.9
Total	131	100	131	100

Source: Rapid Assessment Survey (2003).

the reform period in the late 1980s, when food shortages were severe, approximately 92 percent of all surveyed producers were selling to meet local consumption demands. After the liberalization of the economy, this figure fell to 73 percent.

The same survey found that the mean expenditure on food of small farmers was GYD23626 and non-food items GYD15800. The mean total expenditure was therefore GYD39426 or the equivalent of about US$207, which was well above the national mean. Forty percent of the respondents spent less than half this amount and one-quarter spent about 30 percent of this amount.

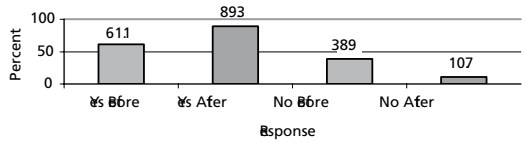
Before the reforms, 78 percent of the respondents consumed rice as the main food staple, but after the reforms this was reduced to 64 percent (Table 9). Both before and after the reforms the only other significant food item was flour, whose share trebled, rising from 11 percent before the reforms to 32 percent after, due in large part to the liberalization of the economy and the greater influx of wheat and wheat products.

The main protein sources before the reform were meat (32 percent) poultry (28 percent) and fish (also 28 percent) (Table 10). After the reforms more meat and poultry were consumed and less fish.

Following the liberalization of the economy in the early 1990s, there was a surge in food imports, with the value of some major categories increasing by three to six times. There was a 66 percent decline in the consumption of ground provisions as wheat flour became more readily available under the PL 480 Programme. The consumption of fish fell by 35 percent, as the liberalization of the economy made poultry and other meat products more readily available, and often at competitive prices compared to fish.

The survey also sought to establish whether farmers felt they were more food secure before the reforms or after. When asked whether the family enjoyed "three

FIGURE 10
Farmers declaring that food security was adequate



Source: Rapid Assessment Survey, 2003

TABLE 11
Impact of income, poverty and food security by type of rural population, 1970 – 2001

	Overall	Landless labour	Cultivators			
			Marginal	Small	Medium	Large
Changes in income	+	=	=	+	+	+
Poverty incidence	*	*	*	*	=	=
Changes in consumption						
- Calories	+	=	*	=	+	+
- Proteins	+	=	*	=	+	+
Changes in food availability						
- Sugar	++	++	+	+	++	+
- Rice	++	++	+	++	+	+
- Fisheries	++	++	+	+	+	+
- Meat and dairy	+	++	+	++	+	+
- Roots and tubers	++	++	=	+	+	+
- Vegetables	+	+	+	+	+	+
- Fruits	+	+	+	+	+	+
- Others	++	+	+	+	+	+
Changes in undernourished population	*	*	*	*	=	=

* Changes in main variables between pre- and post-reform periods; ++ Increases in the variables by more than 20 percent; + Increases between 5 percent and 20 percent with a sign, = values between +5 percent and -5 percent; Negative changes between -5 percent and -20 percent are indicated by an asterisk.
Source: Computed by authors.

healthy meals per day" before the reforms, 60 percent said yes and 40 percent said no. After the reforms, 89 percent said yes, with only 11 percent saying no (Figure 10).

Table 11 illustrates that food security in Guyana is not primarily a problem of aggregate food and resource availability. Rather it is a problem relating to income distribution and access. Strong and persistent pockets of poverty, particularly in the rural hinterland areas, have not been reduced. Poverty in other rural coastal areas and parts of some urban areas also remain a major problem for ensuring food security.

POLICY LESSONS

By any standard the economic and trade policy reforms introduced in 1989 were radical. In a relatively short period of time they shifted the economy away from state-led, inward-looking, commandist policies, to a de-regulated, liberalized, open, private sector-led, market-driven economic system. The reforms were designed to have a calculated shock effect during the initial stabilization period, paving the way for subsequent far-reaching structural reforms.

The consequent improvements in agricultural performance after 1991 is largely due to these reforms, which included eliminating price and other controls in the food industry sectors; the private management contract under which the state-owned sugar industry is now operated; the unification of the exchange rate and opening up of private transactions in foreign currency; the liberalization of capital flows; better water resources management; and promotion of land markets. Although imported food items (many of which were being subsidized in exporting countries) put some agricultural sub-sectors under pressure, consumers benefited through reduced prices, greater choice and better quality products.

There is to date no clear evidence that liberalization has caused export agriculture to develop at the expense of domestic food production. This could of course become a problem at a later date. Guyana depends significantly on food imports to meet its food requirements. However, foreign exchange availability and highly liberalized import regimes should ensure food availability, if not guaranteeing food access to the needy. In the post-reform period there have been no scarcities of foreign exchange and therefore no pressure from this quarter on food imports.

The performance of the economy tapered off after 1996. Reasons given are: 1) the statistical illusion of rapid growth from the low base to which the economy had declined by 1990 2) design flaws in the original reforms 3) some reduction in the level of "implementation will" as political unrest and civil conflict worsened and 4) exogenous shocks.

Despite some of the reforms' successes, there were various flaws in the approach undertaken. The currency has been allowed to appreciate again in real terms, with deleterious consequences for the competitiveness of agriculture which, in Guyana, is particularly exposed to international market forces.

The reform process underestimated the social consequences of the massive compression of national expenditure and the rapid increase in the cost of living which followed the currency devaluations. Measures to reduce the associated political conflict were insufficient. International finance institutions and donor countries put pressure on Guyana to follow what was at the time a standard one-size-fits-all approach to its economic recovery programme which did not take adequate account of local conditions.

After 1996, greater attention was paid to poverty-related issues, and Guyana qualified under the HIPC programmes, which required drawing up a plan to reduce poverty. Although the distribution of household expenditure by income group showed some improvement during the reform period (the share of the poorest quintile more than doubled, and also increased substantially for the second and third quintiles), nevertheless, income inequality remains a pressing issue for Guyana. Such improvements in the poverty rate as have occurred have benefited urban areas

disproportionately. The overall rate is still high, and rural areas remain the worst hit by poverty. This is particularly so in the rural interior which experienced no change in the absolute poverty rate. This is also the region where most of the indigenous population lives.

Safety nets provide cash, food and other benefits designed to alleviate the worst effects of poverty, and Government expenditure on social security and welfare has increased. However, there appear to have been targeting problems, with the pattern of expenditure not matching the distribution of regional poverty.

It is important to stress that the beneficial effects of state withdrawal from commercial agriculture activities should not be read as support for state withdrawal from the role of ensuring adequate food security, especially since the main problem of food security seems to be at the level of access, distribution, and equity. With persistent pockets of poverty remaining in the rural interior areas, among the Amerindian population, and in several rural coastal communities, food security is still an important public policy issue.

Broad-based rural reform, sustained economic growth, and better targeting are essential components for any successful programme to enhance food security. Such a programme would need to direct attention to the assets of the rural poor, including their land access, land improvement, infrastructure, credit, training, technical support and improved community services, as well as overall institutional support and strengthening. The programme has also to promote linkages among sectors in the rural areas and between the rural and urban areas. There is also a sharp divide between hinterland and coastal areas and here linkages also need to be promoted.

In conclusion, the reforms have impacted positively on the economy, contributing to rapid economic growth. This appears to be responsible for an improvement in household welfare. However, economic growth has slowed since 1997, raising concerns about the sustainability of food security improvements.

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India

Ramesh Chand and Praduman Kumar[1]

EXECUTIVE SUMMARY

Pre reform

Large-scale direct government intervention in agricultural marketing started in the mid-1960s, coinciding with the introduction of high yielding varieties of wheat and rice. The adoption of new seeds and the investment by farmers in associated inputs and technologies required appropriate incentives, including a favourable price environment. To achieve this, the Agricultural Prices Commission and the Food Corporation of India were created in 1965 to set and ensure minimum support prices (MSP) for rice and wheat. MSPs for other crops were either non-existent or operated on a small scale.

The Government also intervened in agricultural markets through the Essential Commodities Act, licences and permits. These regulated prices and the storage, transport, distribution, disposal and acquisition of agricultural produce by private agencies.

The 1960s and 1970s also witnessed rapid growth in public investments in agriculture, but in the 1980s and 1990s a decline set in combined with a sharp rise in the level of input and output subsidies.

The reforms

A major shift in policy was initiated in 1991 as a result of serious fiscal and balance of payments problems. The process of reform, particularly in trade, was further intensified in 1995 following the implementation of the WTO agreement on agriculture.

Two components comprised the 1991 reforms: (1) short-term stabilization measures which included a reduction of the fiscal deficit, devaluation of the currency, and the dismantling of barriers to foreign capital; (2) medium-term structural changes involving reforms in fiscal policy, exchange rate policy, trade and industrial policy, as well as financial sector and capital market reform. The focus shifted from the inward looking policy towards an outward one. Instruments used included a devaluation of the rupee by 23 percent against the dollar; export controls reduced to a minimum and imposed for only a few selected commodities; widening of the list of items that could be freely imported; reduction of canalization of exports and imports; and the rupee was made partially convertible. As a result of these reforms, agricultural trade has been largely liberalized.

[1] Ramesh Chand, National Centre for Agricultural Economics and Policy Research, New Delhi; and Praduman Kumar, Division of Agricultural Economics, Indian Agricultural Research Institute, New Delhi.

Impact on intermediate variables

The reforms initiated in 1991 affected agricultural prices in two ways: through steep increases in domestic support prices (particularly for rice and wheat) to reduce the gap between domestic and international prices; and through the liberalization of trade. In the first year of economic reforms, agricultural prices increased by 19 percent. Substantial changes in the terms of trade took place during the reforms as agricultural prices increased faster than the prices of goods in other sectors.

The main beneficiaries of price support have been states where the new high-yielding varieties of grain were first introduced. Government procurement was concentrated in these areas, although the output response to higher prices is limited because productivity is already high and has virtually reached a plateau The remaining states have hardly benefited from government procurement of grains, even though these neglected regions have shown tremendous potential for generating a marketable surplus and there is still significant potential in those areas for raising productivity through greater investment and better prices.

The devaluation of the exchange rate in 1991 and subsequent depreciations, coupled with the lifting of some restrictions on exports, helped the country to double its exports over the next six years. After 1996/97, as international prices started falling, so did the value of exports. Imports were facilitated by the import liberalization resulting from WTO commitments and doubled over the next three years. Net agriculture trade earnings in the post-WTO period dropped sharply.

Impact on target variables

Cereal net availability and consumption has declined over the reform period. This has not occurred due to a significant setback in production, but due to high prices and the consequent accumulation of cereals in government stocks. While there was a sharp reduction in the proportion of the population consuming less than the suggested minimum level of calorie intake between 1983 and 1987-88, the process reversed at the beginning of economic reforms.

During the reforms per capita income among rural households has risen significantly, pointing to a reduction in poverty. However, these positive developments have not coincided with a reduction in calorie and protein deficiency, mainly because of the reduction in per capita intake of cereals. There has been an increase in the consumption of horticultural and livestock products, but in terms of calorie and protein intake, this has not sufficiently compensated for calorie and protein losses arising from reduced cereal consumption.

Policy lessons

Price support for cereal production, which was earlier confined to small agriculturally advanced regions, has become further concentrated. In states with a large unexploited potential to raise cereal production, institutional and policy support has remained weak and unreliable. Exclusive emphasis on prices during the reforms caused a setback in efforts to promote improved technology, modern inputs, and irrigation. If greater importance was accorded to the development of public infrastructure and to the spread of improved technology and institutional support for the neglected regions, then even with lower prices, the production response to agricultural reform could be expected to be better than that achieved.

To date, researchers have argued that the decline in cereal consumption is the result of structural shifts in demand or dietary diversification away from cereals caused by changes in lifestyle, tastes and preferences, and should not be seen as causing adverse effects on nutrition. However, this study has found that the decline in cereal consumption during the 1990s was much higher than that which could be accounted for by dietary diversification alone. The reason for the decline in cereal consumption was a sharp increase in the real price of cereals. Had this price-induced decline not occurred, nutrition would not have been affected adversely by the reforms. Thus it is concluded that due importance should continue to be attached in India to the role played by cereals and pulses in achieving adequate nutrition and food security.

CONTEXT AND NATURE OF THE REFORMS

The role and level of development of the agriculture sector

Indian agriculture has undergone significant changes during the last fifty years. Growth rates in agricultural output are presented in Table 1. The 1950s recorded an annual growth rate of 2.7 percent. The growth rate of the crop sector fell to 1.5 percent during the 1960s but accelerated in the subsequent three decades as a result of the green revolution during 1970s and 1980s, and of improvements in the terms of trade during the 1990s. After the 1960s the output of the livestock sector increased by close to 4 percent per annum.

The non-agriculture sectors have grown at more than double the rate of the agriculture sector since 1960/61. Agricultural growth in the 1960s and 1970s was lower than the national and rural population growth rates, but after 1980 outstripped population growth. Cereals have maintained more than two percent compound growth rate in all post-independence periods. Paddy is the most important crop, and alone accounts for more than 20 percent of the value of all crops produced. Wheat is the second most important crop. Its share in total crop output increased sharply with the onset of the green revolution in the late 1960s, and its share continued to increase after 1970-71 but at a slower rate. Wheat now accounts for a little more than 10 percent of total crop output.

Among individual crops, sugar cane occupies third position after rice and wheat. Cotton contributed more than three percent of crop output until the 1990s. Its contribution has declined during the reform period to less than 2.5 percent. The share of fruits and vegetables has increased throughout the last 50 years. Between 1950/51 and 1970/71, the contribution of fruit and vegetables to crop output increased from 8.2 percent to 15.5 percent.

The share of pulses dropped to a mere 4.3 percent in 2000/01 as against 6.7 percent in the 1990s. Growth in most of the periods has remained below two percent and far below the population growth rate.

The share of oilseeds in total crop output increased from less than 9 percent in 1980/81 to more than 13 percent in 1990/91, as a result of government policy to make the country self-sufficient in oilseeds. The subsequent removal of support for the oilseed sector during the 1990s caused a sharp decline in production and oilseed plummeted to less than 7 percent of the value of crop output by 2000/01. A similar trend is observed in the groundnut sector, which is the most important oilseed produced.

TABLE 1
Growth of agriculture and non-agriculture sectors, 1950/51 to 1999/2000 (percent per year)

	1950-51 to 1959-60	1960-61 to 1969-70	1970-71 to 1979-80	1980-81 to 1989-90	1990-91 to 1999-2000
GDP:					
All sectors	3.68	3.29	3.45	5.38	6.19
Agriculture & allied	2.71	1.51	1.74	2.95	3.28
Agriculture	2.93	1.27	1.94	3.13	3.33
Fishing	5.79	4.00	2.90	5.82	5.47
Non agriculture	4.91	5.00	4.72	6.78	7.38
Value of output:					
Crop sector	3.06	1.7	1.79	2.47	3.05
Livestock sector	1.42	0.41	3.92	4.99	3.81
Fruits and vegetables	0.56	5.82	2.88	2.36	6.10
Population:					
Total	1.96	2.22	2.2	2.04	1.93
Rural	1.90	1.99	1.78	1.84	1.66

Source: Central Statistical Organisation, 1950-2000.

TABLE 2
Factors affecting the agriculture sector, 1950-1999

	1950/51	1960/61	1970/71	1980/81	1990/91	1998/99
1. Number of operational holdings (million)	Na	48.9	70.5	88.9	106.6	na
2. Average size of holding (ha.)	Na	2.7	2.3	1.8	1.6	na
3. Holdings below 2 hectare (%)		63	69.7	74.6	78	
4. Cropping intensity (%)	111.1	114.7	118.2	123.2	130.5	135.1
5. Percent of gross cropped area irrigated	17.1	18.3	23.0	28.2	33.9	39.2
6. Fertilizer use NPK(kg/ha)	0.52	1.92	13.6	32	67.5	88.15
7. Use of pesticides (gram/ha)	19	65	173	390	527	344
8. Area under high yielding varieties of cereals (%)			15.4	43.1	65	78

Source: Ministry of Agriculture, Agriculture in Brief, various issues; Ministry of Agriculture, Agricultural Statistics at a Glance, 2002.

The contribution of livestock to the economy has increased during the last three decades: in 1970/71 this sector contributed 15 percent of total agricultural output, which has increased to more than 26 percent in recent years. The share of livestock has increased from less than 17.5 percent of total agriculture output in 1980/81 to 28 percent in 2000/01.

Table 2 summarizes some of the main features of agriculture. Smallholders predominate, and the number of holdings is increasing as plots are subdivided between children on inheritance. More than 80 percent of farmers cultivate less than two hectares of land. On more than two thirds of cultivated land, crop production is limited to one growing season per year and a large amount of land remains idle for most of the year. Average annual output per hectare is low. Moisture stress is the main reason for low crop intensity, although with the expansion of irrigation facilities, crop intensity and land productivity are rising.

Fertilizer use has seen impressive growth in the last three decades but the level of application is still low, at 88 kg of fertilizer per cultivated hectare. Use of pesticides, including herbicides, increased until 1990/91 but declined after that. India

is promoting a shift from inorganic pesticide use to integrated pest management involving organic pesticides. Although nearly 80 percent of the area under cereal crops is under HYV, cereal yields remain low.

Important features of states

Agricultural development varies between the 17 states, as shown in Table 3.

West Bengal is the most densely populated state and despite having the highest agricultural productivity per unit of land, agricultural output per person is low. Population density in Bihar is only slightly lower than that in West Bengal, but with lower yields per hectare, it is the poorest state in the country. The states of Punjab and Haryana and some parts of Uttar Pradesh are characterized by the dominance of rice-wheat cultivation. This region along with parts of Andhra Pradesh and Tamil Nadu were early adopters of green revolution technology. The eastern region (except West Bengal) has low agricultural productivity but is rich in water resources. This region is said to possess high potential for raising cereal production. Agriculture in the southern state of Kerala is dominated by plantation crops, and foodgrains are

TABLE 3

Population density, literacy, per capita income and agricultural sector output by state

Location/state	Population density: persons/ km² 2001	Literacy rate %	Per capita income rupee 2001-02	NSDP ag/ ha rupee 2001-02	NSDP ag/ person rupee 2001-02	Gross cropped area irrigated % 2000-01	Crop intensity % 1999-2000
North – hill							
Himachal Pradesh	109	77	21 533	51 125	4 544	19.1	174
Jammu and Kashmir	99	54	14 507	50 723	3 656	40.3	147
North Plains							
Punjab	482	70	28 819	65 267	11 267	96.0	194
Haryana	477	69	27 922	48 269	8 012	85.4	170
Northwest arid							
Rajasthan	165	61	15 651	15 733	4 256	31.9	124
Central							
Madhya Pradesh	196	64	13 304	14 512	3 579	24.0	135
Western							
Gujarat	258	70	24 808	13 826	2 607	33.9	105
Maharashtra	314	77	27 754	19 523	3 532	17.4	126
Eastern plain high rain							
Uttar Pradesh	689	57	11 211	35 687	3 563	67.3	148
Bihar	880	48	6 052	23 290	2 056	47.8	134
Orissa	236	64	11 710	20 286	3 334	27.0	140
Assam	340	64	12 164	36 138	3 661	14.0	151
West Bengal	904	69	19 373	69 461	4 705	37.0	174
Southern							
Andhra Pradesh	275	61	19 926	34 712	4 845	43.7	122
Karnataka	275	67	20 626	23 192	4 483	26.6	117
Tamil Nadu	478	73	23 804	36 713	3 214	55.1	119
Kerala	819	91	23 326	62 184	4 263	15.2	134

Sources: Statistical Abstract of India, Government of India, various issues. Agricultural Statistics at a Glance, Ministry of Agriculture, GOI, various issues.

grown on a small fraction of the cultivated area. Punjab and Haryana are known as India's food basket. They are agriculturally the most developed states and have the least poverty.

Degree of openness of the economy prior to the reforms

Following independence in 1947, India embarked upon a series of government-led Five Year development plans in its efforts to stimulate economic growth and reduce widespread poverty. Trade policy from the outset was highly protectionist as the country sought to industrialize through import substitution. Domestic producers were protected from foreign competition through the use of import quotas, licenses and outright bans.

During the 1950s and 1960s, institutional reforms (such as land reform) and the development of irrigation and other infrastructure played a major role in improving output. The 1960s and 1970s witnessed rapid growth in public investments in agriculture which improved the infrastructure base for growth in the following decade. The 1980s saw a decline in public investments in agriculture and a sharp rise in the level of input subsidies. This trend continued during the 1990s.

Public sector participation in economic activity was widespread in the pre-reform era. In the 1970s the public sector nationalized private banks and some other institutions. Large-scale direct government intervention in agricultural marketing started in the mid 1960s in the case of foodgrains. This coincided with the introduction of new high yielding varieties of wheat, and similar breakthroughs in rice. The adoption of these new seeds and the investment by farmers in associated inputs and technologies required appropriate incentives, including a favourable price environment. To achieve this, the Agricultural Prices Commission (APC) and the Food Corporation of India (FCI) were created in 1965 to set and ensure minimum support prices (MSP) for rice and wheat. The ACP helped set the minimum support price whilst the FCI implemented it by buying and distributing grain and maintaining buffer stocks that could be expanded and depleted in order to achieve the MSP and reduce price instability.

The implementation of MSPs for other crops was more limited. However, for oilseed, the National Agriculture Cooperative Marketing Federation of India (NAFED) and some State Federations played a significant role. For cotton, the public sector intervened via the Cotton Corporation of India (CCI), established in 1970, and in Maharashtra, via the monopoly of the Maharashtra State Cooperative Cotton Growers Marketing Federation. Sugar cane is another crop that has witnessed significant government intervention, with statutory status assigned to the minimum support price for sugar.

The Government also intervened in agricultural markets through various legal instruments aimed at regulating marketing activities. These included the Essential Commodities Act and a large number of control orders which empowered governments to exercise control over prices and the acquisition, storage, transport, and distribution of agricultural produce by private agencies.

Motivations for the reforms

By the mid 1970s, about 40 percent of the population was below the poverty line, unemployment and underemployment remained high, the distribution of income

and wealth had worsened and there was severe inflationary pressure (Datt and Sundharam 1987). Protected from foreign competition, domestic industry had become inefficient and uncompetitive.

There was a perceived need to open up the economy, but it was only in 1985 that India started to liberalize trade and reduce import restrictions for a variety of different goods. Moreover, major policy shifts only began in 1991 in the wake of compelling economic pressures, including serious fiscal deficits and a severe balance of payments crisis in which the country had to pledge its gold reserves to assure payment of foreign obligations.

Macro and sectoral components and the policy instruments used

The period since 1991 has been marked by various reforms, including exchange rate reform and the liberalization of external trade. The process of reforms, particularly trade reforms, was further intensified in 1995 following the implementation of the WTO agreement on agriculture. The reform period is therefore divided into two parts: 1990-91 to 1995/96 and 1995/96 to 2000/01, representing sub-periods before and after the WTO agreement.

The New Economic Policy in 1991 consisted of two components: (1) short term stabilization measures, which included a reduction of the fiscal deficit, a 23 percent devaluation of the currency (Rupee), and the dismantling of barriers to the free flow of foreign capital; and (2) medium term structural changes involving reforms in fiscal policy, exchange rate policy, trade and industrial policy, and reforms of the financial sector and capital markets.

Under trade reform, export controls were reduced to a minimum and limited to only a few selected commodities, and the list of items that could be freely imported was widened. The reforms also aimed at simpler and more transparent trade rules. Further action planned in the area of trade included the eventual elimination of all non-tariff restrictions on imports; the removal of export licensing and minimum export prices; decanalizing and allowing private participation in exporting; reducing the role of state monopoly agencies in foreign trade; and step-by-step reductions in peak ad valorem tariff rates.

Exchange rate devaluation was aimed at improving export incentives and international competitiveness. With the introduction of partial convertibility in 1992, a further boost was given to competitiveness and trade.

Reforms in agriculture sector

Reforms in domestic agricultural trade and markets have been slow, despite liberalization of external agricultural trade. Domestic trade is still regulated by provisions that restrict the movement of goods among states and adversely affect the efficiency of domestic markets, private trade and producers. Government intervention in setting prices of some commodities is discouraging private sector investment and participation in agricultural trade (Chand 2002a).

Although MSPs are announced for 24 commodities they are only implemented effectively in the case of a few commodities, notably wheat and rice. Procurement by government constituted 10 to 15 percent of total rice output and 15 to 22 percent of total wheat output during 1985/86 to 1989/90. In recent years, the procurement of rice and wheat by government agencies has witnessed a steep rise. It reached a peak

in 2000/01, despite low production levels compared to the previous two years and the existence of already large buffer stocks. Private sector participation in grain trade was much reduced as a result.

The agriculture sector has benefited indirectly from reform due to exchange rate devaluation and an improvement in the terms of trade. There has been a significant reduction in the implicit bias against agriculture that previously arose due to high levels of industrial sector protection (Dholkia, 1997). Trade policies during the green revolution period, in particular, favoured industry and discriminated against agriculture (Rao and Gulati, 1994).

Investments and subsidies in agriculture

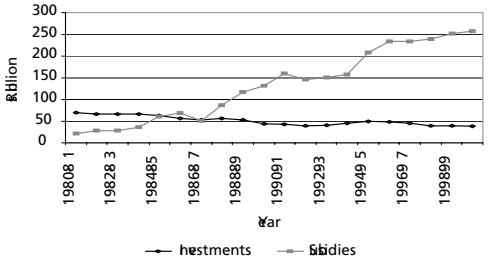
Public investments in agriculture were accorded a high priority during the 1960s and 1970s. However, after 1979/80 these investments declined in real terms which coincided with a sharp rise in the level of subsidies applied to agricultural inputs like fertilizer, power and irrigation (Figure 1). This trend has continued through the reform period and reflects a policy focused more on price incentives, including those provided by the MSPs, than on public sector investment in long-term growth.

Trade policy for selected commodities

Trade policy for selected commodities during the period 1988 to 2002 is presented for exports and imports in Tables 4 and 5.

The rules governing trade concern two broad categories of exports and imports. The first refers to commodities covered under the open general license (OGL), which are freely imported and exported without any kind of restriction on trade, price and quantity. The other category refers to commodities included in the negative list, the import and export of which is subject to restrictions. The list includes: (a) prohibited items; (b) restricted items, subject to licensing and price and quota restrictions; and (c) canalized items, which can only be exported and imported by a government designated agency.

FIGURE 1
Public investment and subsidies in agriculture, 1980-1999 (1993/94 prices)



Source: Central Statistical Organisation, National Accounts Statistics, 2001 and 2003; Gulati and Narayanan, 2003.

TABLE 4
Changes in export policy for major agricultural commodities, 1988-2002

	1988-1991	1992-97	1997 -2002
Wheat	Restricted	Free s.t. QRs and MEP	Free s.t. QRs
Rice	Restricted	Free s.t. QRs and MEP	Free
Maize for feed	Free	Free	Free
Maize	Restricted	Free s.t. QRs and MEP	Free s.t. QRs
Sorghum	Restricted	Free s.t. QRs and MEP	Free s.t. QRs
Barley	Restricted	Free s.t. QRs and MEP	Free s.t. QRs
Pulses	Prohibited	Restricted	Restricted
Rapeseed/mustard seed	Prohibited	Restricted	Free
Soybean	Prohibited	Restricted	Free
Groundnut	Free	Restricted, except H.P.S. which is free	Free
Soybean oil	Prohibited	Restricted for more than 5 kg pack	Restricted for more than 5 kg pack
Rapeseed/mustard oil	Prohibited	Restricted for more than 5 kg pack	Restricted for more than 5 kg pack
Groundnut oil	Prohibited	Restricted	Restricted
Onion	Canalized	Canalized	Initially canalized, now free
Cotton	Free	Regulated	Free
Sugar	Canalized	Free s.t. QRs	Free

s.t. QR = subject to Quantitative restrictions ; MEP = minimum export price.
Source: Government of India, Import – Export Policy, 1988-2002; Recent government announcements.

TABLE 5
Changes in import policy for major agricultural commodities, 1988-2002

Commodity	1988-91	1992-97	1997-2002
Wheat, barley, sorghum, rice	Canalized	Canalized	Canalized till 1999. Now free.
Maize for feed	Free	Free	Free
Chickpea and other pulses	Free	Free	Free
Rapeseed/mustard seed, soybean seed, groundnut seed	Canalized	Canalized	Canalized till1999. Now free.
Rapeseed-mustard oil	Canalized	Canalized	Free
Soybean oil	Canalized	Canalized	Free
Groundnut oil	Canalized	Canalized	Free
Edible vegetable oils	Restricted	Restricted	Coconut and RBD Palm oils were canalized till 1999.
	Canalized	Canalized	Now free.
Onion	Restricted	Restricted	Restricted
Potato	Restricted	Restricted	Restricted
Cotton	Canalized	Restricted	Free
Jute	Canalized	Restricted	Free
Sugar	Free	Free	Free

Source: Government of India, Import – Export Policy, 1988-2002.

During 1988-91, the export of cereals was restricted through licensing. During 1992-97 cereals were kept on the negative list but their export was allowed freely, as long as it did not exceed a stipulated quantity, and the price did not fall below the minimum export price. In the current trade policy export of cereals is free.

Imports of all cereals remained canalized until 1999 and only the FCI was authorized to make such imports. Cereal imports are now unrestricted. Trade in other agricultural commodities has also been gradually liberalized.

As the import of agricultural produce is no longer regulated through physical restrictions, different tariff rates are imposed from time to time to regulate imports. There was zero custom duty on cereal imports until 1999. However, the removal of quantitative restrictions (QRs) and the freeing of imports led to a sudden surge in the import of wheat, which forced the country to impose varying rates of tariff to regulate such imports. There has been considerable year-to-year variation in duties levied on agricultural commodities, although there has been a tendency for them to decline. As far as agricultural exports are concerned, there has been no tariff on any item except on cotton and groundnuts.

Changes in trade policy and tariff structures during the last 12 years reveal that India has liberalized agricultural exports to a great extent, and that restrictions on farm imports have been gradually removed.

CONSEQUENCES OF REFORMS: INTERMEDIATE VARIABLES

Trends in international and domestic prices

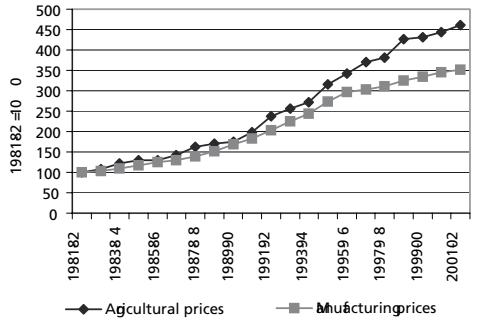
The reforms initiated in 1991 affected agricultural prices in two ways: by leading to steep increases in domestic support prices (particularly rice and wheat) to reduce the gap between domestic and international prices; and through the liberalization of trade. The impact of the reforms on prices can be seen in Figure 2.

The index of agricultural prices increased from 100 in 1981/82 to 198 during 1990/91 before start of the reforms. This corresponds to a compound growth rate of 7.6 percent. The improvement in agricultural terms of trade during the reform period is presented in Figure 3 and Table 6.

During the decade preceding reforms prices of cereals show the lowest growth among selected groups of food commodities (Table 7). The rate of increase was lower than the rate of inflation. During the economic reform period, the position has been reversed, with cereal prices growing faster than the rate of inflation. The real

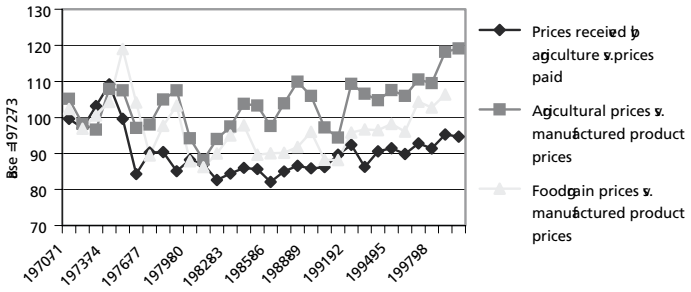
FIGURE 2

Agricultural and manufactured price indices, 1981-2002



Source: Ministry of Finance and Company Affairs, Economic Survey 200203; and 2002a.

FIGURE 3
Terms of trade between agriculture and manufacturing sector, 1970-98



Source: Mishra, 2002.

TABLE 6
Annual rate of growth in prices, 1980/81-1999/2000

	Growth rate in prices (% per annum)	
	1980-81 to 1990-91	1990-91 to 1999-00
Wheat		
Procurement price	4.36	10.53
Wholesale price	5.67	9.48
Retail price	6.62	8.88
PDS1 price	3.74	11.85
Rice		
Procurement price	5.42	9.65
Wholesale price	5.24	9.24
Retail price	7.36	8.69
PDS price	5.80	12.96
Consumer price index		
Food	8.38	9.39
General	8.58	9.31
Wholesale price index		
All commodities	6.72	8.07

[1] PDS = Public Distribution System.
Source: Chand (2002b).

price of cereals continued to rise at about the same rate in both the first and second stages of the reform period. However, in the case of edible oils, pulses, and fruits and vegetables the growth rate in real prices after 1996/97 was negative.

Price decomposition and transmission from international to domestic market
Figures 4-6 show domestic and international price trends for different commodities.

Price decomposition analysis investigating the extent of price transmission from international markets to domestic markets and the relative effect on domestic prices of changes in the exchange rate, international prices, trade protection and other factors produced the following findings.

TABLE 7

Growth rate in prices of selected food commodities before and after reforms, 1981-2002 (percent per annum)

Price/Period	Cereal	Pulses	Edible oil	Fruit and vegetable	Milk and its products	Meat, egg and fish	All food articles	All commodities
Nominal prices								
1981/82 to 1990/91	5.8	10.4	8.8	7.5	8.6	7.3	9.1	6.6
1990/91 to 1999/00	10.0	10.3	4.0	9.6	7.2	11.8	8.1	8.3
1990/91 to 1996/97	11.3	13.6	4.4	11.0	8.1	13.8	8.0	10.6
1996/97 to 2001/02	5.7	4.2	-0.8	3.6	7.9	5.9	5.5	5.0
Real prices								
1981/82 to 1990/91	-0.9	3.4	2.0	0.7	1.7	0.5	2.2	
1990/91 to 1999/00	1.6	1.9	-4.0	1.3	-1.0	3.3	-0.2	
1990/91 to 1996/97	0.7	2.7	-5.6	0.4	-2.3	2.9	-2.3	
1996/97 to 2001/02	0.7	-0.8	-5.5	-1.4	2.7	0.8	0.4	

Source: Computed from Government of India, Index Number of Wholesale Prices in India, various issues.

FIGURE 4

Domestic and International price trends: oilseeds, 1980-2000

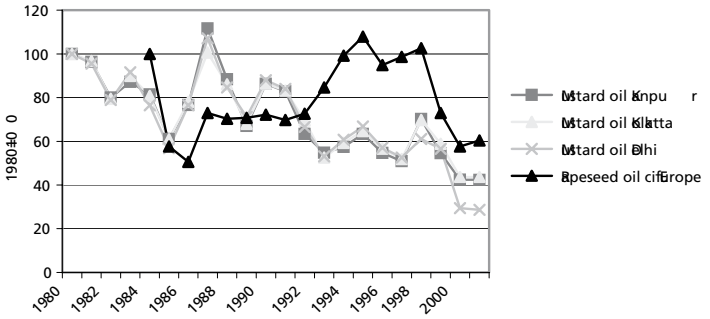


FIGURE 5

Domestic and international price trends: sugar and cotton, 1980-2000

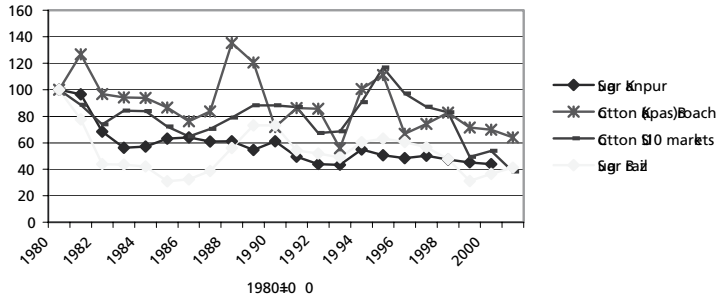
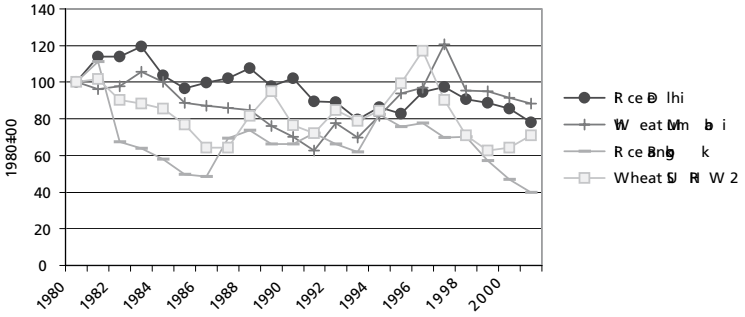


FIGURE 6
Domestic and international price trends: rice and wheat, 1980-2000



Source: M F,2002;Ministry of Agriculture , Agricultural Prices in India, various issues.

- The import duty on rice did not have a significant impact on the domestic price. This could be due to the fact that India hardly imported rice during the study period and that out of 22 observations, import duty was zero in the 20 years covering the period 1980-1999. The elasticity of the domestic price with respect to international prices remained at around 0.12.
- A one percent increase in the international price of wheat raised the domestic price of wheat by about half a percent. The impact of the real exchange rate was of a similar magnitude and the domestic price of wheat increased with trade liberalization. All three variables were highly significant and explained 68 percent of the variation in the domestic price of wheat.
- For sugar, a one percent change in international prices resulted in a 0.29 percent change in the domestic price and the elasticity of domestic prices with respect to the real exchange rate was between 0.88 and 0.98.
- In the case of cotton, only the international price showed a statistically significant impact on domestic price variations.

Effects on agricultural output and value added

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

There is almost no change in the growth rate of output during the pre-reform decade and post-reform period up to 2000/01. However, during the reform period there is a clear acceleration in the output of the crop sector and a clear deceleration in the livestock sector.

Dividing the post-reform decade in two periods shows that the production of oilseeds, cotton and pulses declined in the post-WTO period. Horticultural crops experienced impressive performance during the reform period and also during the post-WTO period (Table 8).

The net sown area did not increase much after 1970/71, so output increases are through productivity improvements rather than area expansion (Table 9).

BOX 1
Agroclimatic conditions

India's geography provides it with diverse climatic conditions across regions and across seasons. In summer, the temperature goes above 50 °C in the western deserts while it drops to as low as -45 °C in some upper reaches of Himalayas. Similar variations are observed in precipitation. The Himalayas receive snowfall and the rest of the country receives annual rainfall varying from 10 cm in western desert to 400 cm in north east. These climatic differences lead to considerable variations in the pattern of human settlement, vegetation and agricultural systems.

Of the total surface area (329 million hectares), 22.5 percent is under forest and 46.6 percent is cultivated. Most of the area under cultivation is rainfed, but irrigation coverage has steadily increased from 17.5 percent of net sown area in 1950/51 to 40 percent during recent years. Canals and tubewells are the main source of irrigation.

Average annual rainfall for the entire country is 50 cm. However, the bulk of rainfall is received in a brief period of three to four months. Unequal and erratic distribution of rainfall makes the country vulnerable to droughts and floods. India has made massive investments to harness its water resources for power generation and irrigation purposes.

To encourage productivity improvements, a four pronged strategy was followed: (a) increase in crop intensity, (b) technological improvement, (c) increased use of productivity-enhancing inputs, and (d) diversification in crop patterns from low value to high value crops and from the crop to the livestock sector.

Three broad patterns of output response to price changes can be observed:

(a) Deceleration in output growth despite prices becoming highly favourable, as in the case of cereals.
(b) Impressive increase in output with small improvement in real prices – fruits and vegetable fall into this category.
(c) Decline in real prices brings down growth in output, as has been experienced to some extent in the case of livestock products and to a large extent with oilseeds.

Of these three patterns, cereals represent a somewhat unusual case, which is partly explained by regional variations in growth potential and patterns of government intervention. Government support for production focuses heavily on the few states (Punjab and Haryana and parts of Andhra Pradesh and Uttar Pradesh), which in the early 1970s were the first to adopt green revolution technology and produce a surplus of rice and wheat. This support has helped these states in raising production and farm income. Thus, government procurement activities primarily benefit these already developed regions. A justification given for this has been that the other states and regions do not have a sufficient marketable surplus to require procurement by official agencies. Over time these states also adopted the new agricultural technology

TABLE 8
Growth of production of selected commodities before and after reforms, 1980-2001 (percent per annum)

	Before reform	After reform		Before WTO	After WTO	
	1980-81 to 1989/90	1990-91 to 1999/2000		1990-91 to 1995/96	1995-96 to 2000/01	
Foodgrain	2.73	2.09	-	1.51	1.79	+
Cereals	2.85	2.20	-	1.69	2.06	-
Pulses	1.49	0.66	-	-0.66	-2.09	-
Wheat	3.58	3.59	-	3.27	2.51	-
Paddy	3.62	2.06	-	1.53	2.34	+
Oilseeds	5.45	2.23	-	3.91	-3.55	-
Sugar cane	2.71	2.75	-	2.92	1.65	-
Cotton	2.79	2.30	-	5.53	-5.36	-
Onion	1.94	5.22	+	2.96	6.06	+
Fruit and vegetables	2.36	6.10	+	4.93	5.98	+
Milk	5.41	4.30	-	4.34	4.14	-
Egg	8.47	4.47	-	5.36	3.82	-
Fish	4.39	4.13	-	5.16	2.38	-

Growth rates based on index number triennium ending 1981/82 = 100.
Source: Ministry of Agriculture, Agricultural Statistics at a Glance, 2002.

TABLE 9
Area and production of selected commodities, 1950/51 to 2000/01

	1950/51	1960/61	1970/71	1980/81	1990/91	2000/01
Area: million hectares						
Rice	30.81	34.13	37.6	40.1	42.7	44.36
Wheat	9.75	12.93	18.24	22.28	24.17	25.07
All cereals	78.23	92.02	101.8	104.2	103.2	99.75
All pulses	19.09	23.56	22.6	22.5	24.7	20.03
Chickpea	7.57	9.28	7.84	6.58	7.52	4.89
Foodgrains	97.32	115.58	124.3	126.7	127.8	119.78
Oilseeds	10.73	13.77	16.64	17.6	24.15	23.25
Groundnut	4.49	6.46	7.33	6.8	8.31	6.73
Cotton	5.88	7.61	7.61	7.82	7.44	8.58
Sugar cane	1.71	2.42	2.62	2.67	3.69	4.3
Onion	na	na	na	0.25	0.3	0.49
Production: million tonnes						
Rice	20.58	34.58	42.2	53.6	74.3	84.87
Wheat	6.46	11	23.83	36.31	55.14	68.76
All cereals	42.41	69.32	96.6	119.0	162.1	185.29
Chickpea	3.65	6.25	5.2	4.33	5.36	3.52
All pulses	8.41	12.7	11.8	10.6	14.3	10.63
Foodgrains	50.82	82.02	108.4	129.6	176.4	195.92
Oilseeds	5.16	6.98	9.63	9.37	18.61	18.4
Groundnut	3.48	4.81	6.11	5.01	7.51	6.22
Cotton	0.52	0.95	0.81	1.19	1.67	1.64
Sugar cane	57.05	110	126.37	154.25	241.05	299.21
Onion	na	na	na	2.5	3.23	4.72

Source: Ministry of Agriculture, Agricultural Statistics at a Glance, various issues.

TABLE 10
Production and procurement of rice and wheat by official agencies, 1985/86 - 2000/01

Year	Production Lakh tonnes		Procurement Lakh tonnes		Procurement as percent of production	
	Rice	Wheat	Rice	Wheat	Rice	Wheat
1985/86	638	471	99	105	15.51	22.32
1986/87	606	443	92	79	15.19	17.82
1987/88	569	462	69	66	12.13	14.30
1988/89	705	541	77	89	10.92	16.45
1989/90	736	499	118	111	16.04	22.27
1990/91	743	551	127	78	17.09	14.15
1991/92	747	557	102	64	13.66	11.49
1992/93	729	572	130	128	17.84	22.37
1993/94	790	591	143	119	18.10	20.12
1994/95	818	658	137	123	16.75	18.70
1995/96	770	621	100	82	12.99	13.21
1996/97	817	694	130	93	15.90	13.41
1997/98	825	663	155	127	18.78	19.14
1998/99	860	708	126	141	14.65	19.92
1999/00	895	756	182	164	20.34	21.70
2000/01	849	687	208	206	24.50	29.99
2001/02	907	735	202	190	22.27	25.80

Source: Ministry of Agriculture. Agricultural Statistics at a Glance, various issues.

and started generating marketed surpluses of rice and/or wheat. However, central government agencies continued to concentrate their operations in the traditional surplus region and failed to implement procurement operations in newly emerging growth pockets.

Thus, during the reform period there has been excessive emphasis on prices, leading to a large increase in input and output subsidies. To meet the growing fiscal burden of these subsidies, resources have been diverted from public investment in rural infrastructure. Government price support for cereal production has become even more concentrated in small agriculturally advanced regions. In regions with a large unexploited potential to raise cereal production, support remains weak.

Table 10 shows overall government procurement, and the regional variation can be seen in Table 11.

Bihar, Gujarat, Madhya Pradesh, Karnataka and Maharashtra experienced sharp increases in marketed surpluses of wheat after 1983-84. Similarly, the marketed surplus of rice has witnessed substantial increase in Bihar, Gujarat, Karnataka, Kerala, Madhya Pradesh, and Orissa. However, farmers in these states have hardly benefited from the government procurement policy. It is striking to observe that more than three fourths of wheat that arrived in markets in Punjab and Haryana was procured by official agencies, compared to only 2.2 percent outside Punjab, Haryana, Uttar Pradesh and Rajasthan. Similarly, in the case of rice, more than three fourths of market arrivals in Punjab, 59 percent in Haryana and 68 percent in Andhra Pradesh was procured by official agencies, compared to only 8 to 37 percent in Madhya Pradesh, Orissa, Tamil Nadu and West Bengal. In other states, government procurement was below 3 percent of market arrivals. Government procured a much higher proportion of marketed surplus in the states which were

TABLE 11
Productivity of rice and wheat, and government procurement in selected states, 1996/97-2000/01

	Yield/ hectare kg					Market arrival procured by government (%)
	1996/97	1997/98	1998/99	1999/00	2000/01	Triennium ending 1999/00
Rice						
Andhra Pradesh	2 601	2 431	2 752	2 650	2 936	68
Assam	1 336	1 339	1 345	1 456	1 495	--
Bihar	1 437	1 490	1 454	1 671	1 475	--
Haryana	2 968	2 797	2 239	2 385	2 559	59
Madhya Pradesh	863	731	848	981	574	27
Orissa	993	1 380	1 212	1 127	1 041	36
Punjab	3 397	3 465	3 153	3 347	3 506	76
Uttar Pradesh	2 121	2 146	1 942	2 185	1 976	20
West Bengal	2 178	2 243	2 256	2 227	2 287	8
India	1 879	1 900	1 921	1 994	1 913	40
Wheat						
Bihar	2 183	1 961	2 091	2 163	2 134	--
Haryana	3 880	3 660	3 916	4 165	4 109	76
Madhya Pradesh	1 821	1 591	1 807	1 796	1 446	--
Punjab	4 234	3 853	4 330	4 696	4 563	88
Uttar Pradesh	2 700	2 525	2 551	2 804	2 720	18
India	2 679	2 485	2 590	2 778	2 743	50

Source: Ministry of Food, Public Distribution and Consumer Affairs, Food Statistics, various issues; Ministry of Agriculture. Agricultural Statistics at a Glance, various issues.

agriculturally advanced as can be seen from per hectare productivity and much lower or no quantity in the states which were agriculturally laggard.

The traditional grain surplus regions have now approached a plateau in terms of productivity, and price increases alone are therefore insufficient to raise productivity further. On the other hand, there are pockets in the eastern states and in central India which have large potential for raising grain output. At present, private trade is not well developed in these regions and farmgate prices are frequently below the MSP because the Government does not procure in these states. These areas require the kind of remunerative price environment provided in traditional surplus regions, as well as complementary investment in institutions and infrastructure. However, expanding government support faces fiscal constraints, whilst switching support from developed regions to less advantaged is difficult, given the strength of the political lobby in traditional surplus regions and its relative weakness elsewhere.

Agriculture growth at State level

Performance of the agriculture sector at the regional level was studied by estimating growth rates in the Net State Domestic Product (NSDP) of agriculture during the 1980s and by examining the level of agricultural productivity and income per rural person for the major states of the country (Table 12). Agricultural productivity per unit of land is lowest in Rajasthan and Madhya Pradesh. Highest productivity is reported in the state of Punjab, West Bengal and Kerala. There were significant variations in the ranking of states in respect of NSDP per hectare and NSDP per rural person due to large variation in the land-person ratio. Rajasthan, which has

TABLE 12
Per hectare NSDP and annual growth rates in NSDP agriculture (1993/94 prices)

	Per hectare NSDP triennium ending 1990-91	Growth rate in NSDP agriculture total	
		1980/81 to 1989/90	1990/91 to 1999/00
Bihar	20 107	2.44	-1.69
Assam	18 889	2.01	0.54
Orissa	10 414	3.08	1.13
Himachal Pradesh	18 984	3.10	1.37
Haryana	20 512	3.87	1.88
Andhra Pradesh	13 851	2.13	2.12
Punjab	26 099	5.33	2.47
Uttar Pradesh	16 595	2.73	2.51
Kerala	23 534	2.17	2.63
Tamil Nadu	16 488	3.33	2.95
Madhya Pradesh	6 952	3.16	3.18
Maharashtra	8 348	2.78	3.42
Rajasthan	6 791	3.11	3.44
Karnataka	9 450	2.93	3.94
Gujarat	11 913	-1.52	4.05
Jammu and Kashmir	21 326	0.81	4.36
West Bengal	23 628	6.42	5.18
All India	13 357	3.15	3.37

Source: Central Statistical Organisation, Net State Domestic Product.

the lowest land productivity, comes in the middle in terms of agricultural income per person. Bihar, with land productivity close to the national average gets less than half of national average of agricultural income per person. Bihar, Orissa, Himachal Pradesh and Assam come at the bottom in respect of agricultural income per rural person. These states have been worst affected during reforms as their agricultural output declined in the case of Bihar, increased by about half a percent per year in Assam and by about one percent in Orissa. Growth in Himachal Pradesh has also been poor.

Among other states, agricultural growth did not show much change during the reform period in Andhra Pradesh and Madhya Pradesh, but showed an impressive improvement in Gujarat, Jammu and Kashmir, Karnataka, Kerala and Maharashtra, whilst Rajasthan showed a small improvement. Despite perceptible falls, West Bengal recorded a more than 5 percent annual rate of growth in agricultural NSDP during 1990s. The richest agricultural state, Punjab, had a declining growth rate of aggregate agricultural output – to 2.5 percent during reforms as compared to 5.3 percent during the pre-reform decade. All the states which were early adopters of green revolution technology, namely Punjab, Haryana, Uttar Pradesh, Andhra Pradesh and Tamil Nadu witnessed a deceleration in output growth during the 1990s.

Growth rates in agricultural NSDP in most of the states were associated with the diversification of crop patterns away from cereals. All the states with an agricultural growth rate of more than 3 percent saw their share of area under cereals decline. Similarly, all the states where the intensity of cereal cultivation increased saw a lower growth rate. This shows that in general, the states where the crop pattern was adjusting to market driven prices were able to achieve relatively better growth in

output. The average rate of growth in agricultural NSDP per capita was 2.1 percent before the reforms and increased to 2.8 percent during the reforms. Bihar was the only state where agricultural income per capita declined. Between the pre-and post-reform decades, the growth rate in agricultural NSDP per person turned positive in Gujarat, Himachal Pradesh and Jammu and Kashmir. Out of 17 states the rate of growth in agricultural NSDP per rural person accelerated in 11 states and decelerated in 6.

Effects on imports and exports

Total agricultural exports were US$3.4 billion in 1990/91, which corresponds to 3.8 percent of agricultural sector GDP (Table 13). Devaluation of the exchange rate by 23 percent in 1991, followed by subsequent depreciations in the exchange rate coupled with the lifting of some restrictions on exports helped the country to double its exports over the next six years. Growth in exports was much faster than growth in imports, raising net exports from US$2.7 billion during 1990/91 to US$4.9 billion by 1996/97. The increase in exports and imports raised the ratio of trade in agricultural GDP from 4.5 percent in 1991 to 8.7 percent by 1996/97. After 1996/97, as international prices started falling, so did the value of exports. Imports, facilitated by the liberalization under WTO commitments, doubled in the next three years. Net agriculture trade earnings in the post-WTO period dropped to a low level.

Trends in exports show that India has not been able to maintain steady exports of commodities like non-basmati rice, wheat, cotton, and sugar. In the post-WTO period, exports of oil, groundnut, spices, tea and coffee have been adversely affected. In the case of high value horticultural and livestock products, exports maintained a generally rising trend, even during the post-WTO period of depressed international prices. India's agricultural exports are responsive to international prices. In the post-WTO period, price declines led to a decline in the value of exports and in turn to export volume.

Imports of food and related items increased threefold in the first four years of economic reform (Table 14). They also increased sharply during the post-WTO

TABLE 13
Agricultural trade post-reform, 1990-2002

Year	Exports	Imports	Net exports	Trade as percent of GDP agriculture		
	$ million	$ million	$ million	Export	Import	Total
1990/91	3 352	672	2 679	3.8	0.8	4.5
1991/92	3 203	604	2 599	4.2	0.8	5.0
1992/93	2 950	938	2 011	4.3	1.4	5.7
1993/94	4 013	742	3 271	5.2	1.0	6.2
1994/95	4 211	1 891	2 320	4.7	2.1	6.9
1995/96	6 098	1 761	4 337	6.7	1.9	8.7
1996/97	6 806	1 863	4 943	6.7	1.8	8.5
1997/98	6 685	2 364	4 321	6.4	2.3	8.7
1998/99	6 064	3 462	2 601	5.8	3.3	9.1
1999/00	5 842	3 708	2 134	5.5	3.5	9.0
2000/01	6 273	2 646	3 627	6.1	2.6	8.6
2001/02	6 183	3 408	2 775	-	-	-

Source: Ministry of Agriculture. Agricultural Statistics at a Glance, various issues.

TABLE 14
Imports of selected agricultural commodities during reforms and post WTO period, 1991-2002 (US$ million)

Item	1991/92	1992/93	1993/94	1994/95	1995/96	1996/97	1997/98	1998/99	1999/00	2000/01	2001/02
Food and related items	321	555	426	1 263	1 103	1 372	1 678	2 757	2 655	1 687	2 332
Fruit and nuts	41	62	69	100	99	129	155	159	137	175	160
Pulses	104	109	181	189	205	251	322	168	82	109	664
Sugar	0	0	0	727	65	1	127	264	257	7	7
Edible oil	101	54	53	199	677	826	745	1 803	1 859	1 310	1 362
Cotton raw and waste		71	6	161	156	9	22	91	290	260	432

Source: Ministry of Finance and Company Affairs, Economic Survey, various issues.

period, which raised imports from US$1.1 billion in 1995/96 to US$2.7 billion during 1998/99. Imports of edible oil account for a major increase in food imports, rising to more than US$1.8 billion by 1998/99 from only US$200 million four years previously. This has raised dependence on imports for edible oil to 40 percent (Chand and Pal, 2003), causing an adverse impact on domestic oilseed growers. Imports of cotton also witnessed a sharp increase after 1998/99. Despite having a large surplus of sugar for export, India witnessed an import shock whenever tariffs on sugar imports were low.

CONSEQUENCES OF REFORMS: TARGET VARIABLES

National food security

Per capita availability[2] of rice did not change much during 1961 to 1981 but increased between 1981 and 1991. Per capita availability of wheat more than doubled between 1961 and 1991, but declined thereafter. Within food grains, cereal consumption increased during the pre-reform period, but pulse availability fell and continues to do so (Figures 7 and 8). This shows there was improvement in calorie-based food but a decline in protein-based food.

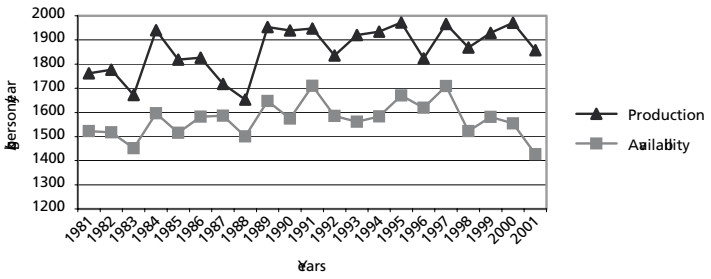
During the 1990s, however, per capita cereal availability followed a downward trend. This is a matter of serious concern because cereals are the main source of calorie intake.

Despite the poor performance of edible oilseeds during the 1990s, the per capita availability of edible oils has increased by about 40 percent between 1991 and 2001. This has resulted from significant imports of low-price palm and soybean oil. Per capita availability of sugar has more than doubled during the two decades following 1981.

This decline in per capita cereal availability has not resulted from a significant setback in cereals production, but from the accumulation of rice and wheat in government stocks. This constituted more than one third of the total production of rice and wheat in the country. Before the reforms, stocks were increased during good harvest years and withdrawn in years when production was below normal, so that

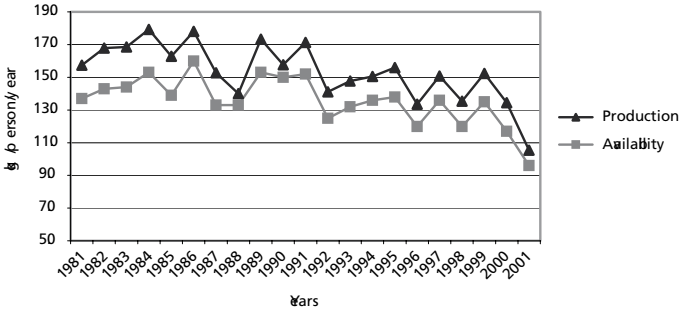
[2] Availability after making adjustments for export, import and carry over stock and by setting aside wastes and the quantity used for seed, industrial use and feed, etc.

FIGURE 7
Per capita production and availability of cereals, 1981-2000



Source: Government of India, Economic Survey 2002-03.

FIGURE 8
Per capita production and availability of pulses, 1981-2000



Source: Government of India, Economic Survey 2002-03.

there was no secular accumulation of stocks. Since the reforms, there has been a large and continuous build up of stock (Table 15).

Net change in cereal stock between 1991 and 2001 exceeded 48 million tonnes – far above the quantity genuinely needed as a buffer against price and production instability – and stocks have at times reached a level of about 60 million tonnes. These stocks have accumulated due to reduced per capita cereal consumption, and despite the fact that per capita cereal production did not increase and that the growth rate in cereal output was almost the same as the population growth rate.

For the country as a whole 29.2 percent of the population consumed less than the recommended calories from all sources during 1987/88. Economic reforms initiated during the year 1991 resulted in a sharp increase in the procurement and market prices of cereals. The procurement prices and wholesale prices of rice and wheat during the 1990s increased much faster than growth in the general price index, and at

TABLE 15
Net import and change in stock of cereals, 1981-2001 (million tonnes)

Year	Net import	Change in stock
1981	0.5	-0.2
1982	0.6	1.3
1983	4.1	2.7
1984	2.4	7.1
1985	-0.3	2.7
1986	-0.1	-1.6
1987	-0.4	-9.5
1988	2.3	-4.6
1989	0.8	2.6
1990	0.0	6.2
1991	-0.6	4.4
1992	-0.7	-1.6
1993	2.6	10.3
1994	0.5	7.5
1995	-3.0	-1.7
1996	-3.5	-8.5
1997	-0.6	-1.8
1998	-2.9	6.1
1999	-1.5	7.5
2000	-1.4	13.9
2001	-4.5	12.3

Source: Government of India, Economic Survey, 2002-03.

TABLE 16
Undernourished population, 1987-2000 (percent)

Year	Rural	Urban	National
1987/88	26.4	35.0	29.2
1993/94	31.7	36.7	33.5
1999/00	31.2	32.4	31.6

Source: Estimated from NSSO data on Household Consumer Expenditure, 43rd , 50th and 55th Round, National Sample Survey Organization I.

a faster rate than in the previous decade. Rural retail prices and Public Distribution System (PDS) prices also increased at a much faster rate during the 1990s compared to the 1980s. Thus, both open market purchases and PDS demand have been affected by the high growth in prices, causing a decline in per capita consumption. In 1993/94, the undernourished population increased to 33.5 percent and still remains above 30 percent. Table 16 shows the difference between the rural and urban areas.

Household level food security

The implication of the reforms for household level food security is examined by investigating trends across rural household types (primarily cultivators and landless labourers) and states. In 1999/2000, more than 26 percent of the farm population and more than 45 percent of rural labour suffered from energy and protein deficiency.

Amongst cultivator households, average per capita calorie intake in 1983 was 2 289 kcal, and increased to 2 423 in 1987/88 (Table 17). With the beginning of economic reforms calorie intake declined to 2 277 and remained at this level in

TABLE 17
Poverty and nutrition among agricultural labour and farm households of various size groups

Aspect/Year	Labour households	Farm households according to farm size					
		Sub-marginal	Marginal	Small	Medium	Large	All farm sizes
Population under poverty %							
1983	64.6	53.4	46.0	41.3	33.5	24.2	42.6
1987/88	55.3	42.8	38.1	32.4	25.4	16.1	31.6
1993/94	54.6	43.1	34.9	29.8	21.9	14.1	30.1
1999/00	39.7	28.9	23.5	19.9	13.3	7.4	21.0
Undernourished population %							
1983	48.6	42.3	30.1	25.1	19.6	15.0	29.0
1987/88	41.2	33.3	25.2	20.7	16.0	11.1	21.9
1993/94	53.6	34.5	26.7	22.8	18.6	12.1	24.0
1999/00	45.5	33.0	26.7	25.7	19.6	16.2	26.2
Malnourished population							
1983	44.1	41.2	28.6	24.8	17.7	11.8	27.7
1987/88	38.0	33.0	25.0	20.7	14.6	8.6	21.1
1993/94	50.0	33.7	26.7	20.9	15.9	8.3	22.3
1999/00	48.7	36.5	30.1	27.2	20.7	14.1	28.2
Calorie intake/person/day							
1983	1 908	2 018	2 252	2 327	2 496	2 673	2 289
1987/88	2 010	2 142	2 298	2 404	2 539	2 822	2 423
1993/94	1 819	2 058	2 183	2 270	2 377	2 616	2 277
1999/00	1 948	2 147	2 221	2 274	2 409	2 561	2 278
Protein intake/person/day: gram							
1983	54.0	56.2	63.2	65.5	71.5	78.2	64.7
1987/88	56.9	60.1	64.7	68.1	72.9	83.1	69.2
1993/94	50.7	57.7	61.6	64.7	69.2	77.9	65.3
1999/00	51.9	58.1	60.2	62.4	67.8	73.1	62.7
Number of sample households							
1983	11 074	15 868	9 920	11 171	6 408	4 215	47 582
1987/88	4 909	15 095	10 134	11 213	8 845	7 658	52 945
1993/94	9 013	12 255	8 208	8 578	5 986	5 391	40 418
1999/00	10 627	15 236	8 541	7 651	5 190	3 993	40 611

Source: National Sample Survey Organisation, Household Consumer Expenditure, 38th, 43rd, 50th and 55th Rounds, GOI.

1999/2000. However, average calorie intake rose slightly in the second phase of the reform period, except in the case of households in the large farm category. Protein intake increased between 1983 and 1987/88 but declined between 1993/94 and 1999/2000. Calorie intake by agricultural labourers dropped sharply at the beginning of reforms but recovered subsequently.

While there was a sharp reduction in the proportion of the population consuming less than the suggested minimum level of calorie intake between 1983 and 1987/88, the process reversed at the beginning of economic reforms. As the reforms progressed, the incidence of undernourishment (i.e. calorie deficiency) increased among farm households and declined in the case of labour households. The incidence of malnourishment (i.e. protein deficiency) declined before the reforms, but increased slightly at the beginning of the reforms. Intensification of the reforms, however, was accompanied by a sharp increase in malnourishment of the farm population. The situation is somewhat different in the case of labour households,

whose protein deficit increased substantially at the beginning of reforms and dropped subsequently.

There was no significant reduction in poverty between 1987/88 and 1993/94, but between 1993/94 and 1999/2000 the proportion decreased significantly from 30 percent to 21 percent in farm households and from 55 to 40 percent in labour households. This is in contrast to the increased incidence of undernourishment in farm households.

The reason for this differential impact on labour and farm households is related to dietary patterns. In labour households there was a small decline in cereal intake and a moderate to large increase in the consumption of pulses, fruits and vegetables, milk, meat etc. Thus the impact of the small decline in cereals was more than offset by increased consumption of the other foods. Moreover, there was no decline in foodgrain (cereal plus pulses) consumption in labour households. This helped in reducing undernourishment and malnourishment among rural agricultural labour.

In contrast to this, there was a sharp drop in per capita consumption of cereals and total foodgrains at farm households, even after 1993/94, which was not compensated by increased consumption of horticultural and livestock products. This caused an increase in nutritional deficiency amongst farm households.

Household level food security across states

The wide regional variations in income and employment opportunities affect nutrition and food security in different regions. Despite improvements at the national level, poverty remains widespread in some states. Among labour households more than two thirds of the population in Assam, about 60 percent in Bihar and Orissa, 58 percent in Madhya Pradesh, 49 percent in Uttar Pradesh. and 47 percent in West Bengal was in poverty during 1999/2000. Among cultivator households the proportion of the population in poverty was 40 percent in Orissa, 35 percent in Bihar, 31 percent in Assam, 31 percent in Madhya Pradesh, 25 percent in Uttar Pradesh and 22 percent in West Bengal. Poverty in the remaining states ranged between below 2 percent in Punjab and Haryana and 18.6 percent in Maharashtra.

In 1999/2000, the incidence of undernourishment ranges from below 8 percent in Punjab to 43.3 percent in Tamil Nadu. Despite having much higher poverty compared to southern states there is a much smaller incidence of under-nutrition in Bihar, West Bengal and Orissa.

Between 1987/88 and 1993/94, the proportion of the population in rural labour households with a deficit in calories increased in all states except Jammu and Kashmir, Kerala and Orissa, where there was decline during this period. Between 1993/94 and 1999/2000 changes in nutritional deficiency presented a mixed picture. Calorie intake during 1999/2000 in labour households was lower than the calorie intake in 1993/94 in 12 out of 17 states. Between 1987/88 and 1999/2000, though, energy consumption by landless labourers increased in Kerala, Orissa, Tamil Nadu, West Bengal and Jammu and Kashmir. Nevertheless, more than half of labour households remain calorie-deficient in Gujarat, Karnataka, Kerala, Madhya Pradesh, Maharashtra and Tamil Nadu.

Among farm households under-nutrition worsened during the reform period in all the states except Kerala. Among cultivator households per capita calorie intake declined during the first and second phase of economic reforms in 9 out of 17 states. Per capita calorie intake during 1999/2000 was lower than that in 1987/88 in all the

states except Kerala. Each member of the farming family consumed an average of 2 800 kcal in Punjab and 2 010 kcal in Assam.

Protein deficiency is severest in rural areas of Tamil Nadu affecting more than half of the farm population and more than 72 percent of landless labourers. Amongst landless labour more than 60 percent of the population in Andhra Pradesh, Assam and Kerala are protein deficient. In Karnataka, Orissa and West Bengal the incidence of protein deficiency affects more than 55 percent of the population. Low levels of protein deficiency are seen in Rajasthan where less than 12 percent of landless labourers are malnourished.

Incidence of protein deficiency in the rural population declined in most of the states during 1983 to 1987/88 and then increased as per capita protein intake fell between 1987/88 and 1993/94 in all the states except Jammu and Kashmir. In the second phase of the reforms protein intake at labour households improved substantially in Maharashtra, Rajasthan and Uttar Pradesh., moderately in Andhra, Assam, Gujarat, Haryana, Jammu and Kashmir Karnataka, Tamil Nadu and West Bengal, whilst there was no change in Bihar, Kerala and Punjab. Overall the economic reforms have coincided with a decline in protein intake in more than two thirds of states.

In the remaining subsections, the determinants of differential food security impacts across households and across states are explained in terms of changes in household incomes, expenditure on different food types, and consumption patterns.

Changes in farm household income

Average per capita income for the country as a whole increased by 0.2 percent per annum between 1987/88 and 1993/94 (Table 18). Per capita income in real terms increased in urban households and declined among rural households (at –0.4 percent per annum for cultivators and –0.3 percent for landless labourers).

All household types experienced moderate growth in per capita income between 1993/94 and 1999/2000: 1.9 percent for urban and 2.0 percent for rural households. Per capita income in cultivator and labour households increased at an annual rate of 2.2 and 2.6 percent respectively. Amongst cultivators, per capita income increased at

TABLE 18
Nominal income and income of the rural population, 1987/88 to 1999/2000

Household category	Compound annual growth rate in income at 1987-88 prices (%)		Per capita nominal income (INR/year)		
	1987/88 to 1993/94	1993/94 to 1999/00	1987/88	1993/94	1999/2000
Landless labour	-0.26	2.59	1 532	2 661	4 831
Cultivators:					
All size classes	-0.40	2.17	2 180	3 755	6 652
Sub-marginal	-0.19	2.71	1 887	3 292	6 019
Marginal	-0.37	2.73	1 974	3 407	6 234
Small	-0.34	2.20	2 097	3 625	6 430
Medium	0.10	2.57	2 273	4 036	7 319
Large	-0.63	2.46	2 772	4 710	8 487
All rural	-0.24	2.01	2 122	3 692	6 478
All urban	0.56	1.88	3 207	5 743	10 652
All households	0.22	2.05	2 480	4 446	8 044

Source: Estimated from NSSO data on Household Consumer Expenditure for 43rd, 50th and 55th round, National Sample Survey.

TABLE 19
Annual growth rate in real wage rates in major states, 1980/81 and 1990/91

	Before reform	After reform
	1980/81 to 1989/90	1990/91 to 1999/2000
Andhra Pradesh	5.67	1.87
Assam	5.06	-1.60
Bihar	5.29	0.28
Gujarat	2.26	0.97
Haryana	2.28	3.42
Himachal Pradesh*	7.43	8.76
Karnataka*	3.42	2.61
Kerala	2.55	4.89
Madhya Pradesh	5.75	4.79
Maharashtra	6.45	3.58
Orissa	5.48	1.69
Punjab	4.35	0.41
Rajasthan	3.64	4.24
Tamil Nadu	2.76	8.17
Uttar Pradesh	3.76	4.88
West Bengal*	7.93	1.04

* Growth rate after reforms cover 1990/91 to 1997/98 only.
Source: Authors' computation from Ministry of Agriculture, Agricultural Wages in India, various issues; Government of India, Statistical Abstract of India, various Issues.

a slightly higher rate in sub-marginal and marginal holdings compared to the other farm size holdings.

In 1987/88, per capita income of farm households was 88 percent of average household income. This declined to 83 percent in 1999/2000. This implies that farming incomes were increasing at a slower rate than the growth in national per capita income. Per capita nominal income in the sub-marginal farm size category remained about 25 percent higher than that of landless agricultural labourers. This shows that possession of land, however small, makes a difference to the economic status of rural households.

Per capita income of landless labourers has grown at a higher rate than farm households – real wages for agricultural labour increased in the range of 2 to 8 percent per annum. The lowest growth rate was recorded in Gujarat and the highest in West Bengal. During the post-reform period, real wages for agricultural labour continued to rise in all states except Assam, where the real wage rate declined at the rate of 1.6 percent per year. In more than one third of the states, real wage rates grew more rapidly during the reform period (Table 19).

Per capita income varies widely between states. The coefficient of variation indicates that per capita income of farm households varies more widely across states than is the case with labour households. It also indicates that during economic reforms, interregional differences in per capita income of farmers across states have widened. Per capita income of farm households is highest in Punjab and Kerala, and double that in Orissa, Bihar, Assam and Madhya Pradesh.

Food expenditure and changes in consumption

Between 1987/88 and 1993/94, per capita real expenditure on food declined for all categories (Table 20). The rate of decline was higher among cultivators than landless

TABLE 20
Food expenditure of rural population, 1987/88 to 1999/00

Household category	Compound annual growth rate in food expenditure at 1987/88 prices (%)		Per capita nominal food expenditure INR/year		
	1987/88 to 1993/94	1993/94 to 1999/00	1987/88	1993/94	1999/2000
Landless labour	-1.2	2.4	1 078	1 777	3 214
Cultivators:					
All size classes	-1.3	1.6	1 430	2 345	4 033
Sub-marginal	-1.4	2.4	1 280	2 087	3 772
Marginal	-1.2	2.0	1 332	2 198	3 867
Small	-1.2	1.5	1 393	2 299	3 939
Medium	-1.0	1.9	1 487	2 480	4 332
Large	-1.2	1.3	1 708	2 814	4 759

Source: Estimated from NSSO data on Household Consumer Expenditure for 43rd, 50th and 55th Round National Sample Survey Organisation.

labour. The scenario changed between 1993/94 and 1999/2000 when per capita real food expenditure increased annually by 2.4 percent in labour households and 1.6 percent in cultivator households. Nominal expenditure on food, even at sub-marginal holdings, was about 20 percent higher than for labour households. Per capita expenditure on food increased with the increase in size of holding.

Among labour households, real food expenditure declined between 1987/88 and 1993/94 in all states except Tamil Nadu and Jammu and Kashmir, where it increased by 1.9 and 2.7 percent per annum; and in Gujarat and Kerala where there was a small increase. In this period, the decline was around 3 percent in Haryana, Assam, Himachal Pradesh and Uttar Pradesh. In the second phase of reforms real food expenditure increased everywhere except Assam and Jammu and Kashmir.

Among cultivator households, real food expenditure at the beginning of the reforms declined in all states except Orissa, Tamil Nadu and Jammu and Kashmir. During 1993/94 to 1999/00 real expenditure on food declined in Andhra Pradesh, Karnaka, Maharashtra and Orissa. In most of the states cultivator households spent about 25 percent more on food than labour households, except in Punjab, Kerala and Haryana where the difference was 63, 45 and 41 percent respectively. Minimum expenditure on food occurred in Orissa for both types of households. The average member of a farm family in Punjab spent INR6 216 on food during 1999/00, which was almost double that in Orissa.

Changes in consumption patterns are shown in Table 21. Two significant changes in the food consumption basket of farm household between 1993/94 and 1999/2000 are that (a) per capita edible oil consumption increased by 25 percent and (b) per capita cereal consumption declined by 6 percent. The consumption of edible oil, fruit and vegetables, and milk increased for all categories over time. Per capita cereal consumption increases with the increase in income.

Prices of cereals increased much more than the prices of horticultural products and milk and milk products in both the sub-periods (Table 22). From 1993/94 to 1999/00, the growth rate in cereal prices was 50 percent higher than in general prices. The increase in retail prices of cereals, which account for more than one third of total food expenditure, definitely caused an adverse impact on their consumption. Government intervention to support rice and wheat prices during the reform period

TABLE 21

Consumption pattern of rural households, 1983-1999/2000 (kg/capita/annum)

Household category and year	Cereals	Pulses	Edible oils	Fruit and vegetables	Milk	Meat	Sugar
Landless labour							
1983	166.1	8.2	2.7	39.4	16.8	3.3	8.1
1987/88	162.6	8.7	3.5	47.0	26.2	3.6	9.5
1993/94	149.3	7.4	3.8	61.4	23.9	4.4	7.4
1999/00	148.4	8.5	5.1	70.3	25.5	4.7	8.0
Sub marginal farm							
1983	172.4	8.3	3.0	50.0	22.9	5.2	7.6
1987/88	170.9	9.4	3.7	58.0	32.0	6.6	8.3
1993/94	163.4	8.5	4.1	74.9	38.1	5.4	7.8
1999/00	156.7	9.9	5.5	79.2	46.0	7.1	8.9
Marginal farm							
1983	189.4	10.6	3.4	51.9	33.5	3.8	9.4
1987/88	183.7	10.7	4.0	59.8	41.8	4.8	9.2
1993/94	170.6	9.5	4.4	73.5	50.8	4.6	8.9
1999/00	162.8	10.1	5.8	80.1	56.0	5.4	9.5
Small farms							
1983	191.7	12.2	3.6	51.5	41.1	3.5	10.9
1987/88	188.9	11.9	4.3	61.0	51.8	4.6	10.8
1993/94	173.8	10.1	4.7	73.6	61.8	4.2	10.0
1999/00	162.4	10.7	5.9	78.8	65.1	4.6	10.8
Medium farms							
1983	197.0	14.5	4.1	49.9	57.9	2.7	14.9
1987/88	192.5	13.9	4.7	62.7	65.7	4.1	13.0
1993/94	173.5	11.2	5.2	74.9	81.6	4.1	12.1
1999/00	164.0	12.2	6.5	78.7	91.0	4.6	13.3
Large farms							
1983	200.7	17.7	4.6	46.3	79.7	1.7	18.8
1987/88	200.3	16.9	5.7	60.7	99.9	2.9	18.8
1993/94	178.5	12.7	5.9	75.2	113.1	3.6	15.6
1999/00	165.7	13.2	7.0	79.4	121.6	3.0	16.0
All farm size classes							
1983	187.5	11.7	3.6	50.2	41.4	3.7	11.2
1987/88	186.2	12.4	4.4	60.3	56.6	4.7	11.8
1993/94	171.3	10.2	4.8	74.4	65.8	4.4	10.6
1999/00	161.2	10.9	6.0	79.3	68.1	5.4	11.0

Source: Estimated from NSSO data on Consumer Expenditure for 43rd, 50th, and 55th Round, National Sample Survey Organisation, GOI.

TABLE 22

Wholesale price index of selected commodities, 1987/88-1999/2000

	Wholesale price index (1993-94=100)			Compound growth rate (% per annum)	
	1987/88	1993/94	1999/00	1987/88 to 1993/94	1993/94 to 1999/00
All commodities	49.4	100.0	145.3	12.48	6.43
Cereals	54.9	100.0	177.8	10.51	10.07
Rice	54.9	100.0	171.0	10.52	9.35
Wheat	53.4	100.0	175.0	11.04	9.78
Edible oil	49.4	100.0	122.0	12.48	3.37
Pulses	49.7	100.0	166.0	12.37	8.81
Fruit and vegetables	64.2	100.0	154.5	7.67	7.52
Milk	56.6	100.0	147.6	9.96	6.70

Source: Estimated from NSSO data on Consumer Expenditure for 43rd, 50th, and 55th Round, National Sample Survey Organisation, GOI.

has adversely affected their consumption, even by farm households. The implications for nutrition are discussed in the section below.

In all states, per capita cereal consumption declined between 1987/88 and 1999/2000. Punjab, which stood at the top in terms of per capita income of cultivating households, was third from the bottom in cereal consumption. Kerala with the second rank in level of income of cultivating household comes at the bottom in cereal consumption. On the other hand, Orissa with lowest per capita income consumed the highest quantity of cereals. Thus state level consumption data shows an inverse relation between income and consumption of cereals. Consumption of pulses declined between 1987/88 and 1993/94 in all except two states. In the next six years two thirds of states increased pulse consumption. Consumption of fruits and vegetables has increased in all states during the last 12 years.

Expenditure shares

The share of food in total expenditure has declined steadily and by 1999/2000 was 66.5 percent in labour households and 60.6 percent in cultivator households (Table 23). Around half of total expenditure in 1983 was for cereals for sub-marginal and marginal farmer households and for labour households, but this fell to about 37 percent in 1999/2000.

Expenditure on pulses did not decline as a percentage of total food expenditure (5-6 percent) during the reform period, despite a small decline in the quantity consumed in labour and farm households. Despite an increase in consumption of edible oil in all categories, its share in food expenditure fell steadily from 1987/88 to 1999/2000, mainly because of the decline in real prices of edible oil as a result of liberalization of imports. In contrast to the decline in the share of cereals and edible oil, fruit and vegetables, milk and meat have increased their share in food expenditure of farm households. The increase has been impressive in the case of fruit and vegetables and milk. Labour households also show sharp increases in the share of horticultural products but no change in the share of milk.

The above discussion shows that during the reforms, poverty among cultivator and rural labour households declined sharply due to an increase in per capita income. However, these positive developments have not helped in reducing undernutrition and malnutrition, which have actually increased. The main reason for this is the reduction in the per capita intake of cereals which has not been sufficiently compensated for in terms of calories and protein by increases in the consumption of horticultural and livestock products.

States were grouped in different categories to analyse the relation of income, poverty and cereal consumption to nutritional deficiency (Tables 24 and 25). The first category includes the states in northwest India which have the lowest nutritional deficiency. This is associated with either low poverty or high per capita cereal consumption. There is a contrast between eastern states (Uttar Pradesh, West Bengal, Bihar and Orissa) and southern states (Andhra Pradesh, Karnataka, Kerala and Tamil Nadu). The southern states have much lower poverty and higher income. However, the incidence of calorie deficiency is much higher than in the east. The reason for this is that per capita cereal consumption in eastern states is higher than in the south. The pattern is similar for both cultivator and labour households.

TABLE 23
Food expenditure and in rural households, 1983-1999/2000 (percent)

Household category and year	Share of expenditure on different commodities in total food expenditure (%)								Food share in in total expenditure (%)
	Cereals	Pulses	Edible oil	Fruits and veg.	Milk	Meat	Sugar	Other food	
Landless labour									
1983	52.2	5.1	5.6	8.4	6.1	4.4	3.8	14.1	72.1
1987/88	41.4	6.1	7.4	9.8	9.0	4.6	4.7	16.6	70.4
1993/94	43.6	5.7	7.3	12.3	8.8	5.3	4.6	12.2	66.8
1999/00	38.6	6.4	6.1	12.8	9.0	5.5	3.6	17.7	66.5
Sub marginal farm									
1983	51.1	4.5	5.4	9.7	7.4	5.5	3.1	13.2	70.9
1987/88	41.1	5.4	6.9	11.0	9.9	6.7	3.4	15.4	67.8
1993/94	41.7	5.7	6.7	12.6	12.0	6.1	4.0	11.0	63.4
1999/00	37.1	5.9	5.9	12.8	12.1	6.9	3.3	15.6	62.7
Marginal farms									
1983	50.1	5.3	5.8	8.9	9.9	4.9	3.5	11.3	69.9
1987/88	41.0	5.8	7.3	10.1	12.1	5.9	3.6	13.9	67.0
1993/94	40.3	6.0	6.7	11.8	14.9	5.4	4.4	10.1	64.5
1999/00	36.9	6.1	6.0	12.1	14.6	6.1	3.5	14.3	62.0
Small farms									
1983	48.6	5.7	5.8	8.6	11.6	4.7	4.0	10.9	69.5
1987/88	39.4	6.2	7.5	9.9	14.4	5.4	4.1	12.8	66.4
1993/94	38.5	6.1	6.7	11.4	17.3	5.0	4.7	9.8	63.4
1999/00	35.2	6.4	5.8	11.7	17.2	5.1	3.9	14.2	61.3
Medium farms									
1983	43.7	6.2	6.0	8.0	15.8	3.8	5.0	11.1	66.3
1987/88	36.7	6.7	7.7	9.4	17.0	4.8	4.6	12.6	65.4
1993/94	34.1	6.4	6.9	11.1	21.2	4.5	5.3	9.9	61.5
1999/00	31.4	6.5	5.7	11.0	20.8	4.0	4.4	15.4	59.2
Large farms									
1983	37.9	6.8	6.4	7.6	20.1	2.6	6.2	11.8	65.1
1987/88	30.8	7.1	8.1	8.7	22.4	3.3	6.0	12.9	61.6
1993/94	29.5	6.7	7.0	10.3	25.8	3.6	6.2	10.0	59.8
1999/00	28.5	6.5	5.6	10.6	25.1	3.2	4.9	14.7	56.1
All farm size classes									
1983	47.3	5.5	5.8	8.7	12.0	4.5	4.1	11.7	68.8
1987/88	37.6	6.2	7.5	9.8	15.3	5.2	4.4	13.5	65.6
1993/94	36.9	6.1	6.8	11.5	18.1	4.9	4.9	10.2	62.4
1999/00	34.5	6.2	5.8	11.8	16.9	5.4	3.9	14.9	60.6

Source: Estimated from NSSO data on Consumer Expenditure for 43rd, 50th, and 55th Round, National Sample Survey Organisation, GOI.

Because of differences in nutritive values, the decline in cereal consumption over time has not been adequately compensated by the increase in other foodstuffs. One kilogram of cereal contains about 3 460-3 610 kcal of energy and 64 (rice) to 116 (bajra) grams of protein. Most of the leafy vegetables and fresh fruits contain less than 1 000 kcal and less than 60 grams of protein per kg. Similarly, one kilogram of milk contains less than 1 170 kcal of energy and less than 45 grams of protein. Thus, to compensate for energy lost from a one kilogram decline in cereals, intake of fruit and vegetables or milk needs to be increased by more than three kilograms. Similarly, to compensate for protein, increase in fruit/vegetables or milk needs to be much higher than the reduction in cereals.

TABLE 24
Poverty, cereal intake, income and nutrition in cultivator households, 1999/2000

State	Energy deficit (percent of population)	Cereal consumption (kg per annum)	Per capita income (INR) nominal	Poverty ratio (%)
Punjab	7.4	138	11 802	1.1
Haryana	11.6	141	9 677	1.7
Himachal Pradesh	14.6	158	8 186	6.6
Jammu & Kashmir	11.9	172	8 624	4.5
Rajasthan	14.7	175	7 030	11.6
Eastern states				
Uttar Pradesh	18.7	170	6 188	25.3
West Bengal	25.3	172	6 435	22.3
Orissa	26.7	187	4 951	40.4
Bihar	27.0	171	5 283	35.0
Southern states				
Andhra Pradesh	33.6	160	6 003	9.3
Karnatka	34.2	150	6 844	12.9
Kerala	41.4	122	10 554	7.3
Tamil Nadu	43.3	141	7 598	11.4
Other states				
Maharashtra	33.5	144	6 433	18.6
Gujarat	33.8	129	7 347	9.2
Assam	36.6	158	5 723	30.6
Madhya Pradesh	32.4	163	5 478	30.1

Source: Estimated from NSSO data on Household Consumer Expenditure for 43rd, 50th, and 55th Round, National Sample Survey Organisation.

TABLE 25
Poverty, cereal intake, income and nutrition in rural labour households, 1999/2000

State	Energy deficit (percent of population)	Cereal consumption (kg per annum)	Per capita income (INR nominal)	Poverty ration (%)
Northwest states				
Punjab	31.5	123.2	6 507	16.1
Haryana	30.1	145.0	6 352	21.6
Himachal Pradesh	39.6	135.7	6 855	17.0
Jammu & Kashmir	7.9	159.7	6 539	10.9
Rajasthan	19.0	172.0	6 039	24.4
Eastern states				
Uttar Pradesh	35.7	157.1	4 607	48.6
West Bengal	39.9	163.0	4 616	46.8
Orissa	38.1	181.9	3 862	59.9
Bihar	42.2	163.3	4 027	59.6
Southern states				
Andhra Pradesh	43.9	155.2	4 720	15.7
Karnatka	56.3	131.4	5 096	23.9
Kerala	55.6	117.0	5 997	28.6
Tamil Nadu	60.6	130.8	5 594	28.5
Gujarat	50.4	123.2	5 568	19.2
Other states				
Maharashtra	50.1	137.5	4 637	40.3
Madhya Pradesh	50.9	149.0	3 920	57.8
Assam	57.8	152.2	4 047	68.6

Source: Estimated from NSSO data on Consumer Expenditure for 43rd, 50th , and 55th Round, National Sample Survey Organisation.

TABLE 26
Cost of energy and protein derived from different foodstuffs at cultivator households, 1983-1999/2000

Year	Cereals	Pulses	Vegetables	Fruits	Vegetables and fruits	Milk	Meat
Energy			**(INR/1 000 kcal)**				
1983	0.72	1.32	2.43	7.94	2.82	2.99	9.55
1987/88	0.84	2.09	3.96	3.44	3.82	3.89	13.70
1993/94	1.47	4.08	6.69	7.06	6.76	6.46	22.69
1999/00	2.51	6.70	10.61	10.45	10.58	10.06	34.67
Protein			**(INR / 100 g)**				
1983	2.58	2.03	8.15	62.83	9.88	8.38	6.00
1987/88	3.04	3.20	10.54	28.87	12.48	10.09	8.76
1993/94	5.30	6.03	20.46	63.78	23.76	16.54	14.89
1999/00	9.25	10.12	34.46	94.21	39.85	26.38	23.93

Source: Estimated from NSSO data on Consumer Expenditure for 43rd, 50th, and 55th Round, National Sample Survey Organisation.

TABLE 27
Cost of energy and protein derived from different foodstuffs of rural labour households, 1983-1999/2000

Year	Cereals	Pulses	Vegetables	Fruits	Vegetables and fruits	Milk	Meat
Energy			**(INR/1 000 kcal)**				
1983	0.70	1.38	2.75	7.82	2.98	2.94	8.15
1987/88	0.80	2.17	4.28	3.08	4.06	3.77	12.03
1993/94	1.52	4.16	7.04	5.94	6.85	6.56	18.42
1999/00	2.43	6.94	10.98	8.44	10.53	10.23	31.52
Protein			**(INR / 100 g)**				
1983	2.51	2.06	8.11	62.35	9.05	7.83	4.92
1987/88	2.88	3.21	10.49	25.52	11.4	9.68	7.42
1993/94	5.70	6.02	20.19	54.93	22.31	16.6	12.02
1999/00	9.32	10.35	35.31	77.09	38.28	25.2	22.26

Source: Estimated from NSSO data on Consumer Expenditure for 43rd, 50th, and 55th Round, National Sample Survey Organisation.

The 1 000 kcal derived from cereals cost only about INR0.70 in 1983 but increased to over INR2 in 1999/2000. Cereals are the cheapest and main source of energy and protein. The unit cost of calories and protein from horticultural and livestock products is much higher (Tables 26 and 27).

POLICY LESSONS

After 1979/80 and during the decade of reforms, public investments in agriculture declined in real terms, subsidies on agricultural inputs such as fertilizer, power and irrigation increased, whereas public sector investments continued to fall. The reforms shifted emphasis to making input and output prices favourable to farmers, whereas public investments were neglected, jeopardizing long-run growth.

After 1995, under its commitments to the WTO, India had to remove quantity restrictions and liberalize imports. However, in 1997 international prices started

to fall, resulting in downward pressure on the domestic prices of most agricultural commodities, with an adverse impact on the growth rate of agricultural output.

Stability in the import tariff regimes, important for providing clear, stable expectations, has sometimes been an elusive goal. Customs duties on agricultural commodities have varied considerably in the last decade, and after the freeing up of cereal imports in 1999, a surge of wheat imports caused the Government to re-institute a variable wheat tariff for the express purpose of regulating the volume of wheat imports.

The build-up of huge stocks of cereals has given the impression of a surplus in food. However, these surpluses are the result of reduced per capita consumption of cereals caused by the sharp increase in prices resulting from government interventions to raise the MSP for cereals. Government pricing policy has also caused an adverse affect on fiscal resources due to the mounting food subsidy bill.

Despite the sharp increase in grain subsidies during the last decade, per capita cereal consumption has declined. The reason why consumers have not benefited lies in how subsidies are paid. Central government pays food subsidies to the FCI to meet (a) the difference between the economic cost of foodgrains and their sales at Central Issue Prices (CIP) fixed for welfare schemes, and (b) the carrying cost of buffer stocks. During the 1990s, the Government announced hefty increases in procurement prices and to reduce the wide gap between CIPs and the economic cost, the former were also increased sharply and frequently. Similarly, through its control over a substantial part of supply, government procurement at high MSPs also resulted in a large increase in wholesale prices.

However, demand side factors did not justify this increase in cereal prices. Inability of open market and domestic consumers to absorb increases in the procurement price caused the accumulation in government stocks and forced the government to sell produce at a heavy discount. Thus, substantial increases in the carrying cost of buffer stocks, and a rising difference between the price at which produce could be sold and the economic cost of production resulted in the rapid growth in output subsidies, particularly during late 1990s. The main beneficiaries of these subsidies are those producers who could sell their produce to government agencies. Rather than benefiting, consumers have been hurt by the system of administered prices in recent years.

The main beneficiaries of price support have been states where the green revolution started and where government procurement is concentrated. In these relatively developed regions, the output response to higher prices is somewhat limited because productivity is already high and has to some extent reached a plateau. Other states have hardly benefited from government procurement of grains, even though these neglected states have shown tremendous potential for generating a marketable surplus through greater investment and better prices. Had greater importance been attached to improving institutions and infrastructure in these regions, the output response to reforms might have been better, even if prices had been lower.

Some research concludes that the decline in cereal consumption is the result of structural shifts in demand or dietary diversification away from cereals caused by changes in lifestyle, tastes and preferences and it should not be seen as causing adverse effect on nutrition. However, this study found that the decline in cereal consumption during the 1990s was much greater than could be accounted for by

dietary diversification. The rate of decline in cereal consumption was small during 1970s and 1980s - the period during which real prices of cereals were also falling. During the 1990s the rate of decline in cereal consumption accelerated by about 70 percent. The reason for this was a sharp increase in the real price of cereals. About one fifth to one third of the total decline in cereal consumption was caused by the price rises. The study reveals that nutrition would not have been adversely affected during the reform period, had this price-induced decline not occurred,

Cereals continue to be the most important food for nutritional requirements and are also the cheapest source of energy and protein. Low levels of per capita income prevent rural inhabitants from substituting the nutritional value of cereals with increased consumption of fruit and vegetables, milk, meat etc. The price of cereals plays an extremely important role in determining food security in India. Higher cereal prices might help to build up grain surpluses, but they result in reduced consumption, which is detrimental to household food security. In India, due importance should continue to be attached to the role played by cereals and pulses in achieving adequate nutrition and food security.

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Kenya

Hezron O. Nyangito, Jonathan Nzuma, Hellen Ommeh and Mary Mbithi[1]

EXECUTIVE SUMMARY

Pre-reform
The pre-reform period was characterized by wide-scale government intervention in the economy in general, and by strict controls over the pricing and marketing of staple food commodities and export commodities. By the mid-1980s, severe structural constraints and macro imbalances had emerged within the economy.

The reforms
Market liberalization policies were initiated in 1980 under the structural adjustment programmes of the World Bank and International Monetary Fund (IMF). Reforms in macro policies involved exchange rate reform and the liberalization of interest rates. However, it was not until 1993 that the Government began implementing a wide range of policy reforms.

Impact on intermediate variables
Food crop prices increased in real terms during the 1990s. Changes in cereals and export crop prices before the reforms arose mainly from exchange rate movements. After the reforms, changes in domestic maize and wheat prices can be attributed mainly to changes in the exchange rate and the world market price, but rice prices were affected more by other factors, such as domestic marketing margins and government intervention. Coffee prices after the reforms are explained by changes in world market prices, exchange rate movements and other factors, while tea prices were influenced more by changes in domestic price.

Production of most commodities declined, especially maize, rice, milk, cotton, sisal and coffee. Although the area under food crops (maize and wheat) and cash crops (tea and coffee) has generally increased, it has declined for industrial crops, particularly sisal. Given these trends, the decline in production is attributed to falling yields, although some yield increases have occurred for tea and wheat.

Agriculture's share of export earnings has averaged 55 percent for the past ten years. Tea, coffee, pyrethrum, and horticultural products dominate agricultural exports. Horticultural crops overtook coffee in 1998 to become the second most important agricultural export. The performance of traditional exports was poor, growing at an average of 7.4 percent compared to non-traditional exports, where

[1] Hezron O. Nyangito, Jonathan Nzuma, Hellen Ommeh and Mary Mbithi, Kenya Institute for Public Policy Research and Analysis, Nairobi.

growth was estimated at 20.1 percent. Liberalization has not greatly changed the pattern of exports.

Agricultural imports are dominated by food items, particularly cereals and dairy products. The level of food imports for most commodities was low between 1987 and 1991, but from 1992 imports have been high because of the decline in production.

Impact on target variables

The food production index increased slowly from 1994, in contrast to the decline in maize production, because it includes all other crops such as millet, sorghum, pulses, potatoes, etc. production of which have increased. However the low percentage increase is an indication that the overall agricultural supply response has been limited. Per capita cereal supply decreased both in the pre-reform and post-reform periods. The decline in availability is explained by the decline in maize, wheat and rice production, although other cereals (millets and sorghums) compensated to some extent. Imports have significantly increased, but the capacity to import has declined because of the poor performance of exports.

The general trend for the percentage of stunted children shows a decrease between 1982 and 1987 and an increase between 1987 and 1997. Between 1982 and 1987 there was an increase in incomes and agricultural growth, while there were major declines in 1994 to 1997. Malnutrition figures reflect these trends.

Poverty levels are highest in Coast, North Eastern and Eastern provinces and in the highly populated regions of Western, Nyanza, Rift Valley and Central provinces. These areas have fewer agricultural opportunities due to climatic conditions or to population pressure.

In the average rural household, 70 percent of food is purchased and approximately 30 percent is own production. Most rural households are net food purchasers. There has been a shift to greater dependence on off-farm and remittance incomes, reflecting the diminishing role of farm incomes. Farm incomes dominated in five regions in 1982 but declined to less than 50 percent in 1994 and 1997 for all regions except in Rift Valley Province. A decline in wages during the period indicates that the poor performance of the agricultural sector may also have affected off-farm job opportunities. Households headed by males had higher incomes than those headed by females in all regions except Coast Province where female headed households have higher off-farm incomes.

Policy lessons

The agricultural supply response following the reforms has been weak. The linkages between the performance of the agricultural sector and household incomes indicate that when performance of the sector is poor, household incomes remain low: although the role of agriculture in its direct contribution to household incomes is diminishing, the close linkages with rural off-farm job opportunities – such as agroprocessing, manufacturing and marketing farm inputs – means that agriculture still plays a leading role in the welfare of rural households.

While the policy reforms have helped to bring about macroeconomic stability, they have been less successful in stimulating growth in the agricultural sector. Complementary policies and proper sequencing were often missing. Kenya has equated liberalization and privatization with an abdication of responsibility for

economic development. After years of government monopolies in production and marketing, private entrepreneurs lack the ability to take over.

INTRODUCTION: CONTEXT AND NATURE OF THE REFORMS

The role and level of development of the agriculture sector

Agriculture's contribution to GDP declined from 32.8 percent in 1980 to 25.9 in 2001, whilst that of the manufacturing sector has remained stagnant at about 13 percent. The declining contribution of the agricultural sector is matched by an increase in the share of the services sector, which rose from about 55.5 percent to about 61 percent over the same period (Table 1).

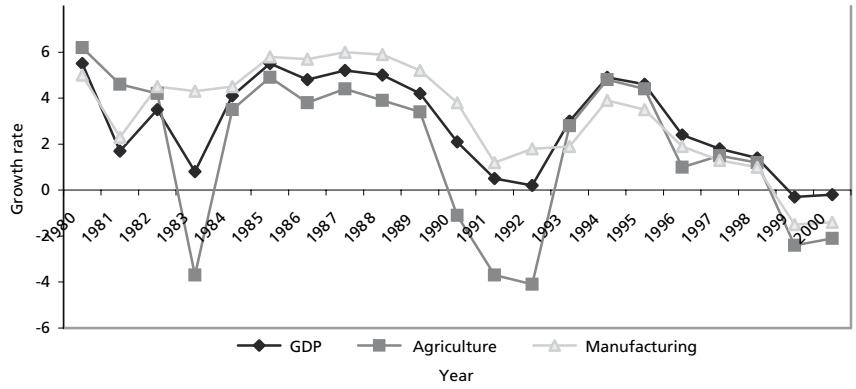
Sectoral growth rates have fluctuated between 1980 and 2000 (Figure 1). In the 1980's agricultural sector growth slowed, largely because of a reduction in donor and public investment in the sector. In the 1990's, growth rates were negative in the first three years, averaging -3 percent for the period 1990/91 to 1992/93. They recovered in the following three years before falling again and becoming negative at the end of the decade. The performance of the agricultural sector in the 1990s was very poor compared to previous decades, with annual growth in agricultural GDP

TABLE 1
Sector contributions to GDP 1980-2001

Sector	1980	1990	2001
Agriculture	32.8	28.2	25.9
Manufacturing	12.8	13.4	13.1
Services	55.4	58.4	61.0
Total	100.0	100.0	100.0

Source: CBS (Various years) Economic Surveys.

FIGURE 1
Percentage growth rates



Source: CBS, Economic Surveys (various years).

TABLE 2
Value of production (gross marketed production) by farm size and the share of small farms, 1980-2000

Year	Large farms (K Sh million)	Small farms (K Sh million)	Total (K Sh million)	Percent share of small farms
1980	3 376	3 690	7 066	52.2
1981	3 572	4 166	7 738	53.8
1982	4 334	4 644	8 978	51.7
1983	5 426	5 920	11 346	53.3
1984	7 724	8 051	15 775	51.0
1985	6 918	8 186	15 104	54.4
1986	10 311	8 456	18 766	45.1
1987	8 641	7 713	16 354	47.2
1988	10 008	8 907	18 915	47.1
1989	10 166	9 898	20 064	49.3
1990	9 951	12 346	22 297	55.4
1991	13 394	10 838	24 234	44.7
1992	9 924	16 433	26 357	62.2
1993	15 491	27 731	43 222	64.2
1994	17 679	34 547	52 226	66.0
1995	19 229	41 621	60 850	68.4
1996	20 294	44 752	65 046	68.8
1997	21 468	49 666	71 134	69.8
1998	25 576	59 226	84 802	69.8
1999	22 103	51 209	73 312	69.9
2000	23 633	55 143	78 776	70.0

Source: Republic of Kenya, Statistical Abstracts (various years).

averaging 2 percent as compared to 4 percent in the 1980s. Growth during the 1980s was attributable to three main factors: area expansion, use of improved production technologies and a sound extension system. Growth in the economy as a whole is closely related to that of agriculture.

Past growth can be divided into two distinct phases (Kariuki, 2001). Growth in 1963–1980 was characterized by heavy government and donor involvement through subsidized services and inputs. However, this involvement was not sustainable and in the second phase, since 1980, the sector has faced major crises due to scarcity of funds, fluctuations in international prices and inflation. Slow growth in the last two decades has resulted in a change from food self-sufficiency in most basic staples to net importation.

Small-scale farmers are those with land size of less than 20 ha. There are about 3 million smallholder farms of which 80 percent are less than 2 hectares with women providing the bulk of the labour and heading about a third of the households. Small-scale farms account for over 75 percent of total agricultural production and their share of marketed production has been increasing since 1980 (Table 2). Small farmers account for the production of about 70 percent of maize, 65 percent of coffee, 50 percent of tea, 80 percent of milk, 70 percent of beef and other meats and the production of all pyrethrum, cotton (Jayne *et al.*, 1998).

Table 3 shows the main farming activities by region. Rift Valley Province dominates food crop production and accounted for about 33 percent of the total national production in 1997, followed by Central Province, which contributed

TABLE 3
Major farming activities by region, 1997 (percent of total production) and national total production

Region	Central	Coast	Nyanza	Western	Rift Valley	Eastern	National total production (kg)
Maize	18.5	3.3	10.8	14.6	43.9	8.7	1 559 023 213
Wheat	3.5	-	0.4	-	86.7	9.4	45 037 535
Potatoes	65.9	0.1	3.4	7.0	15.4	8.2	429 049 920
Millets	0.1	0.1	72.3	6.8	7.7	13.0	260 753 347
Other	19.2	7.3	20.1	11.4	15.8	26.2	331 078 683
Total food crops	24.3	2.9	16.7	12.0	32.9	11.3	2 624 942 698
Tea	87.3	-	6.5	-	2.2	4.0	203 632 783
Coffee	98.2	-	1.1	-	0.3	0.4	78 210 563
Sugar	-	-	53.3	34.5	11.0	1.1	3 849 860
Cotton	-	46.9	8.9	32.1	-	12.1	1 546 111
Others	1.9	5.6	39.3	18.3	32.6	2.4	25 954 487
Total cash crops	81.5	0.7	8.4	2.1	4.3	3.0	313 193 804
Vegetables	70.5	1.9	4.2	3.0	16.2	4.1	409 856 566
Fruits	1.0	5.4	49.1	0.6	35.4	8.5	1 690 675
Herbs & spices	30.2	9.9	9.5	11.2	19.0	20.2	157 927
Total horticulture	70.2	1.9	4.4	3.0	16.3	4.2	411 705 168
Livestock							**Total numbers**
Cattle	23.8	1.7	17.9	12.4	25.7	18.5	2 269 463
Poultry	18.6	4.9	23.1	16.6	18.8	17.9	2 277 246
Others	18.0	4.8	20.4	8.0	24.7	24.2	1 793 381
Total livestock	20.3	3.7	20.5	12.6	22.9	19.9	6 340 090

Source: Republic of Kenya, 1997 and CBS, 2002.

about 24 percent. Coast Province accounted for the lowest proportion of food crops, estimated at about 3 percent. Central province dominates cash crop production and accounted for about 82 percent of the total national production in 1997, followed at a distance by Nyanza Province, with 8 percent.

The less lucrative cash crops (sugar, cotton and others) are produced in Coast, Western and Nyanza provinces while the more lucrative cash crops (tea and coffee) are primarily produced in Central Province. The other regions, Rift Valley and Eastern provinces, produce a small proportion of almost all cash crops. Central Province also dominates in horticulture production and accounts for about 70 percent of total national production, followed by Rift Valley Province, which accounted for about 16 percent. The rest of the regions produced only about 13 percent of the total production.

The contribution of regions to the total national livestock numbers is fairly well distributed across three provinces – Rift Valley (23 percent), Central (20 percent) and Nyanza (21 percent). Cattle and poultry are the major livestock sub-sectors, comprising about two-thirds of the total livestock numbers in Kenya.

The difference in the dominance of farming activities across regions is mainly explained by the agroclimatic conditions. The land most suitable for farming activities, particularly crop and intensive livestock production, are classed as high potential areas (Box 1). Central Province has about 13 percent of Kenya's high potential area, which constitutes nearly 70 percent of the province's total land area.

Central Province's high contribution to the total national production of crops and livestock, despite its relatively small size, is due to high yields and intensive land use.

BOX 1
Agroclimatic conditions

Kenya is situated on the east coast of Africa and lies along the equator. The land area is about 569,000 square kilometres. Most of Kenya's agricultural commodities are produced in the hinterland away from the shipping port of Mombasa through which most exports and imports enter or leave into the country. Transport costs have a major impact on the profitability of farming, raising the cost of inputs and putting downward pressure on farmgate prices.

Land is classified broadly into three categories based mainly on rainfall received: high potential (13 percent of the total land area), medium potential (7 percent) and low potential (80 percent). The high and medium potential areas are suitable for arable rain-fed agriculture, and are dominated by crop and dairy farming, occupying 31 percent and 30 percent, respectively. Rift Valley is the largest province in terms of area and population. It also has the largest proportion of high and medium potential land. Western and Central provinces have the lowest land area but have proportionately more high potential land. These provinces are also the most densely populated ones.

The low potential areas, commonly referred to as arid and semi-arid lands (ASALs), are dominated by nomadic pastoralism which utilizes about 50 percent of the land in these areas; ranching and other livestock keeping occupies about 31 percent of the area; the rest is used for agriculture, including irrigated agriculture.

Water availability is more of a constraint in the low potential areas which constitute about two thirds of the country. In such areas irrigation is a major source of water for agricultural production. However, the country's irrigation potential remains largely unexploited, due to the high cost of such developments. Out of 539 000 hectares of irrigable land, which lies mainly along the river valleys, only about 87 000 hectares are irrigated.

Drought is a problem for Kenya, and a major factor reducing agricultural production in 1980, 1984, 1994 and 1999. This problem is particularly serious given the country's dependence on rainfed agriculture. Too much rain caused by the El Niño phenomenon has also been a problem for Kenya, with heavy rain destroying infrastructure.

Although Rift Valley and Nyanza provinces have about two thirds of the high potential land, the combined contribution of the two provinces to agricultural production (particularly of cash crops and horticulture) is less than that of Central Province, due to lower yields and less intensive land use. The Coast has only one percent of Kenya's high potential land, explaining its low contribution to agricultural production.

The major agricultural commodities produced in Kenya can be classified into food crops, industrial and export crops, horticulture and livestock and livestock products. The major tradable food crops in Kenya are maize, wheat and rice while the non-

TABLE 4
Agricultural land in Kenya (000 ha[1]) and population (000 persons[2])

Region	High potential	Medium potential	Low potential	Other land	Total area	Population 2000 census
Central	909	15	41	353	1 318	3 882
Coast	373	796	5 663	1 472	8 304	2 623
Eastern	503	2 189	11 453	1 431	15 576	4 841
Nairobi	16		38	14	68	2 290
North Eastern			12 690		12 690	1 055
Nyanza	1 218	34			1 252	4 598
Rift Valley	3 025	123	12 230	1 515	16 883	7 386
Western	741			82	823	3 532
Total	6 785	3 157	42 105	4 867	56 914	30 207

[1] 1998 Estimates.
[2] Projections based on 1999 census.
Source: Republic of Kenya, Statistical Abstracts (2000).

tradables include sorghum and millets, pulses (beans and peas) and roots and tubers (cassava, sweet potatoes, Irish potatoes and yams).

Food crops

Maize is the primary food staple crop. Annual production in the 1990s has averaged about 2.3 million tonnes – lower than the 3 million tonnes realized in the late 1980s. This is attributed to droughts and high costs of production, diminishing farm sizes, inadequate use of new technologies, inefficiencies in production and policy bias, which have led to low productivity. During drought years, production can be as low as 1.6 million tonnes. In recent years such as in1997, production has been even lower in normal climatic than in drought years because of the other factors mentioned.

The domestic production of wheat will never meet demand. Policy has consistently focused on protecting a small number of producers. Import tariffs are used to raise domestic prices and keep some of the more inefficient producers in business. Rice is produced mainly under irrigation. The average annual production is about 52 000 tonnes, about 34 percent of the national consumption requirement. Constraints in rice production include conflicts over land ownership, use of low yielding varieties, poor disease and pest control, high costs of production and poorly organized marketing channels.

Sorghum and millets are considered traditional food crops and are non-tradable. The area under production decreased in the 1990s but the crops still remain an important source of food in the low potential areas because of their tolerance to droughts compared to maize. There has been a decline in consumption of these crops due to a shift towards maize, low productivity, pest and disease problems and the narrow range of uses of these crops. Pulses are grown mostly for domestic consumption and local marketing. They are usually intercropped, especially with maize. Production of these crops has been declining because of the use of low quality seeds and high input costs. Roots and tubers are grown mostly for domestic consumption and local marketing. They are of high calorific value and are important for food security. They are drought tolerant and are therefore important in low potential areas. The main constraints to the production of these crops include lack of clean planting materials and low husbandry practices.

Industrial and export crops

The most important industrial crops are sugar cane, cotton, sisal and pyrethrum. Others are tobacco, cashew nuts, wattle trees and a wide range of oil crops. These crops are produced for use in local agroprocessing and in some cases for export. Kenya consumes over 600 000 tonnes of white sugar, but produces only about 400 000 tonnes in a good year. Production increased during the post-independence period because of large government investments in processing between 1966 and 1978. Major constraints to sugar production include high costs of production, competition with sugar imports and inefficiencies in production.

Soon after independence the Government invested in the cotton industry, which led to massive increases in acreage and production. Free seed, inputs on credit and administered prices were the tools used in this effort. Area and production peaked in 1980 at 140 000 ha and 7 700 tonnes (42 000 bales), but started to decline thereafter due to reduced government intervention. Currently area under cultivation is 20 000 ha and lint production is about 2 500 tonnes. Constraints in cotton production include cash flow problems for farmers and ginneries, poor access to quality seed and ginning facilities.

Kenya produces over 70 percent of the world's supply of pyrethrum. The area under production has consistently increased since 1998. The crop is marketed through the Pyrethrum Board of Kenya, a government controlled agency. However, problems have emerged which include delayed payments to farmers. These have led to calls from farmers for the liberalization of the industry. The main oil crops are sunflower, soybeans and castor. Annual production is estimated at about 2 500 tonnes compared to an industrial sector requirement of about 50 000 tonnes. The import cost is about K Sh5 billion annually. The country could potentially produce 250 000 tonnes of oil crops annually, but this potential is yet to be exploited. The main constraints include poor plant varieties, low investments and weak marketing services.

Export crops

Coffee, tea and horticultural crops jointly contribute about 34 percent of agricultural GDP, employ over 40 percent of the agriculture labour force and jointly contribute to over 60 percent of foreign exchange earnings.

Kenya is the biggest black tea exporter in the world and is projected to account for 20-23 percent of world exports in the next five years. Markets for Kenyan tea are heavily concentrated. Currently the United Kingdom, Pakistan and Egypt account for 83 percent of Kenya's export market. With a stagnating or declining demand in traditional markets, significant increases in production might negatively affect prices. Furthermore, the tremendous increase in production has created bottlenecks in factories thus affecting processing efficiency. Quality of tea is being threatened by major congestion at the Kenya Tea Development Agency (KTDA) run tea factories. KTDA has a monopoly in the delivery of production, processing and marketing services to small-scale farmers. However, its role in the provision of smallholder services, including input supply, has provided an effective framework for supporting production.

Horticulture

Horticulture is the third most important foreign exchange earner in Kenya. The sector (fruits, vegetables, flowers, spices and herbs) has grown considerably since

the 1970s mainly due to the expansion of exports. Export volumes grew from 57 363 tonnes valued at K Sh2 516 million in 1992 to a total of 348 000 tonnes valued at K Sh14.2 billion in 2000. About 2.75 million tonnes of horticulture were consumed in the domestic market. Smallholders constitute 80 percent of all growers and produce 60 percent of horticultural exports. The exports are dominated by cut flowers that account for 52 percent of the total value of exports. The horticulture sub-sector faces several challenges including competition from producers in other countries, notably Morocco and Israel, who are closer to European markets. Another concern are sanitary and phytosanitary standards (SPS) which restrict Kenya's access to horticultural export markets, such as the European Union (EU) whose requirements on pesticide residues and related issues are particularly difficult for smallholder production.

Livestock

Livestock contributes about 40 percent of agricultural GDP. Red meat (beef and small ruminants meat) comprise about 70 percent of the meat consumed in the country.

Dairy production is dominated by smallholders (80 percent of total milk production) and uses more land than any other single agricultural enterprise, accounting for about 47 percent of the high and medium potential land. The dairy herd of about 3.2 million dairy cows gives about 60 percent of the 2.5 million litres of milk produced each year. The demand for milk continues to increase rapidly but supply does not keep pace, especially in the dry months of the year. Milk marketing channels are both formal and informal. The formal channels involve public-owned creameries and licensed private processors. The number of processors licensed by the Kenya Dairy Board (KDB) increased to about 45 in 1998. Overall, trade in raw whole milk has greatly increased. There are more than 1 000 traders in the industry. Although most of them are ailing, co-operative societies continue to play a key role in milk marketing and handle about 40 percent of marketed milk.

Degree of openness of the economy prior to the reforms

After Kenya achieved independence in 1963 and until 1980 when the reform process began, economic activity was dominated by direct government controls and participation, including controls on foreign exchange, investments and production activities.

In the pre-reform period, production and marketing for most smallholder commodities was organized under cooperative societies whose main function was procurement of production inputs and marketing of outputs. In addition to the cooperatives, state-run farmer organizations were also set up to support production and marketing of major commodities. These parastatals controlled the marketing of their respective commodities. They included: the Kenya Tea Development authority (KTDA) for tea, the Kenya Co-operative Creameries (KCC) for milk, the National Cereals and Produce Board (NCPB) for cereals, the National Irrigation Board (NIB) for irrigated crops and the Horticultural Crops Development Authority (HCDA) for horticultural crops.

State boards regulated the production and marketing of all important commodities, including the Sisal Board of Kenya, the Pyrethrum Board of Kenya, the Kenya Sugar

Authority, the Coffee Board of Kenya (CBK), the Tea Board of Kenya, the Kenya Dairy Board, the Cotton Board of Kenya and the Kenya Meat Commission. The farmer cooperatives, the state run farmer organizations and the boards dealing with food crops often failed to achieve their objectives. For example, one of the responsibilities of the NCPB was to ensure price stabilization and food security in cereals. However, this objective was not always realized because of high operational costs and managerial problems within the boards, which led to inefficiencies in the delivery of services to farmers, and to delayed and unreliable payments. As a result, prices in surplus maize producing areas often fell below the government's administered price, whilst those in deficit areas often rose above it.

Motivation for the reforms

Kenya's economy grew rapidly in the 1960s and 1970s, attaining an average annual growth of over 4 percent a year. However, by the mid-1980s, severe structural constraints and macro-economic imbalances had emerged within the economy that prevented these growth rates from being sustained. Although indications pointed to the oil crisis, other countries that were at the same level of economic development as Kenya, and which faced similar external forces were able to emerge from the crisis unscathed, due to sound macroeconomic policy and greater structural flexibility (WTO, 2000).

Macro and sectoral components and the policy instruments used.

Market liberalization policies started in 1980 under the structural adjustment programmes (SAPs) of the World Bank and IMF. Macroeconomic policy reforms involved the removal of restrictions on the exchange rate, foreign exchange retention and remittances, and the liberalization of interest rates. The impetus of the reforms gained momentum in 1982 as the removal of economic distortions became a condition for the disbursement of World Bank loans (Swamy, 1994) and in 1986 the Government committed itself to a wide-ranging reform programme. The reforms focused on the reduction of government controls, with a shift toward increasing the role of market forces and the private sector. However, it was not until 1993 that rigorous implementation of reform really started, and for this reason the policy reform period considered in this study starts from 1993.

Another factor that has affected the Kenyan economy is restricted donor financing between 1991 and 2002. Due to the government's failure to honour political governance and economic management pledges made to the World Bank and the IMF, these institutions suspended their support. Other donors followed suit and the restricted lending to Kenya from 1993 affected the performance of the economy, including agriculture.

GNP per capita rose from a low of US$327 in 1980 to a high of US$389 in 1998, but this declined to US$324 in 2000 (Table 5).

GDP growth in the 1990s has been low and the public deficit has worsened (Table 6). Trade performance shows mixed results with a general increase in export and import indices between 1995 and 1998 but a decline thereafter. The terms of trade worsened from 1999, although international reserves have been on the increase.

The policy reforms led to export growth in 1997 and 1998 but export performance declined from 1999 and Kenya's trade deficit has worsened since 1999.

TABLE 5
GNP per capita and population growth

Year	GNP (1995 =100) million US$	GNP per capita (US$) (1995 = 100)	Population growth rate (%)
1980	5 445	327	4.2
1985	6 152	309	3.5
1990	7 970	341	3.2
1995	8 686	325	2.3
2000	9 777	324	2.1

Source: World Bank, 2002.

TABLE 6
Selected macroeconomic indicators, 1992-2000

Indicator	1992	1994	1995	1996	1997	1998	1999	2000[1]
Real GDP growth rate (%)	–0.8	2.6	4.4	4.1	2.1	1.6	1.3	–0.2
Consumer prices (% change)	27.1	28.9	1.5	9.0	11.2	10.6	15.0	8.4
Nominal exchange rate (US$ to K SH)	36.22	44.84	55.94	55.02	62.68	61.91	72.93	78.04
Real exchange rate (%change)	0.61	0.57	0.51	0.52	0.48	0.47	0.53	0.63
Public deficit (% change)	0	3.2	-6.2	-3.6	-7.5	-7.8	-5.7	-9.1
International reserves (end of period)[2] (million US$)	68.0	148.0	408.0	433.0	497.0	557.0	564.0	746.0
Export trade indices (1995=100)	87.5	82.9	100.0	98.5	112.8	113.7	95.3	94.9
Import trade indices (1995=100)	112.6	81.0	100.0	94.1	102.7	107.7	99.9	94.9
Terms of trade (%)	77.7	102.4	100.0	104.6	109.8	105.6	94.5	94.5

[1] Provisional [2] Excluding gold.
Source: World Bank (2002), WTO (2000), CBK (2000), CBS, Economic Surveys . (Various years).

The 1993 reforms included monetary and fiscal policy reforms, price decontrol on all commodities, removal of import licensing and foreign exchange controls, the replacement of import-substitution policies with outward-oriented ones, as well as privatization of public enterprises. Several public enterprises were restructured and the influence of most agricultural boards reduced. Kenya also dismantled its quantitative import restrictions. The tariff structure was rationalized and tariffs became the main trade policy instrument.

Monetary policy reforms

In 1996 comprehensive measures were taken to improve the effectiveness of monetary control instruments. Strict monetary policy has affected credit availability, with most of the credit going to the government and parastatals, and only a limited amount available for private sector development (Ndung'u, 1997).

Exchange rate reforms

In 1993, the foreign exchange system was liberalized allowing the commercial banks to effect foreign payments for their private clients without referring them to the Central Bank of Kenya (CBK). The Kenyan Shilling was allowed to float freely and exporters were allowed to retain 100 percent of all their foreign exchange earnings.

Since independence, the nominal exchange rate has generally increased (depreciated), with the highest annual increases experienced in 1992/93 (see Table 6). However, the real exchange rate appreciated after 1992/93 and only started depreciating again after 1998. This appreciation could have contributed to the slow growth of the Kenyan

economy, although Ndung'u (1997) argues that the growth of the production sectors has been contracting due to liberalization and the short-term reallocation of resources. There is need for exchange rate stability to reduce uncertainty in the sector; the floating exchange rate does not seem to be providing this.

Fiscal policies

Fiscal policy reforms started during the 1980-1984 period. Combined with tight monetary policy, they helped bring about a sharp fall in inflation by reducing the budget deficit and cutting public expenditure. However, efforts to control the budget deficit have not always been successful and it has continued to grow over the years. The Government has in recent years sought to reduce the number of public sector workers, but servicing the public debt remains a major problem for the economy. The total debt to GDP ratio is about 80 percent. This limits the Government's capacity to invest in productive services.

Trade policy reform

Trade policies prior to the 1980s were geared towards import substitution and government revenue generation, through high levels of protection. The instruments used to achieve these objectives included licensing, quantitative restriction, high tariffs and export/import bans. The policy reforms adopted in 1986 focused on moving towards a more outward looking trade regime with a reduction of restrictive trade policies, strengthening market access for Kenyan exports and further integration into the world economy.

The removal of quantitative restrictions and reduction in tariffs started in 1980, and by 1991 were only used when health and public safety was at issue. There has been a policy to harmonize the structure and reduction of tariff levels. The import-weighted tariff was reduced from 30 percent (1984-1985) to 23 percent in 1991-1992 and about 18 percent in 1999. Tariff dispersion has been lowered and the number of tariff bands reduced from seven in the 1980s to only three in 2001. The highest tariff level has decreased from above 70 percent in the 1980s to 35 percent in 1999.

On becoming a member of WTO, the country bound its tariffs at 100 percent for all agricultural products. The country also committed itself to the elimination of all non-tariff barriers on agricultural imports. Tariff levels have since been substantially reduced from between 40 percent and 60 percent to below 35 percent for most of agricultural commodities and processed products. The tariff levels have never reached the bound ceilings, although suspended duties are sometimes used to raise the level of protection. This has occurred for sugar whereby the tariff rate plus suspended duties were 100 percent in 2001.

Agricultural sector policy reforms

In agriculture, the focus was on removing the government monopoly in the marketing of agricultural commodities, lifting associated price controls, and ending government controls on the importing, pricing, and distribution of farm inputs. Implementation of reforms in the early period was reported to have been accompanied by considerable official ambiguity and covert and overt resistance (Ikiara *et al*., 1993), but reforms began to be implemented with greater commitment in 1993. Most of the major reforms shown in Table 7 have been implemented.

TABLE 7
Policy changes by agricultural commodity and year

Commodity	Policy before change	Policy after change	Implementation
Coffee and tea	No retention of foreign currency by exporters at auction	Retention of foreign currency by exporters at auction permitted	1995
Sugar	Producer prices and imports controlled	Minimum prices established and variable duties used to protect local producers	1994
Maize	NCPB only importer; producer and consumer prices controlled; NCPB maintain strategic reserves	Private sector can import, but variable duty imposed; minimum (floor) prices, based on NCPB prices; foreign exchange reserve of US$60 million established	1993
Wheat	Producer prices controlled; NCPB only importer	Minimum (floor) prices based on long-term import parity prices; imports controlled using variable duties	1993
Milk and dairy products	Price controls and Kenya Co-operative Creameries monopoly in processing and marketing; Kenya Dairy Board monopoly on imports	Prices decontrolled; private sector participation in processing and marketing; Liberalized imports but duties to control imports	1993
Cotton	Domestic marketing, trade, and prices controlled	Complete deregulation of domestic marketing and pricing	1993

Source: Nyangito, 2001a and 2001b.

Input policy reform

Prior to market liberalization, the Government controlled input marketing through price controls, import licensing and quotas; and subsidized some inputs such as fertilizers, improved seeds, pesticides, vaccines, and machinery and artificial insemination services. With the reforms, input markets have been liberalized and the country has developed a network of markets for agricultural inputs. However, this has been accompanied by problems associated with input quality, availability and affordability. Only a few farmers (mainly in the large scale and plantation sectors) use high levels of purchased inputs, due to high prices, a lack of credit and inadequate extension advice. In cases where credit is offered in kind (e.g. in tea and sugarcane) by processing and marketing agencies, farmers have been known to divert fertilizers to other uses.

Before market liberalization, formal agricultural credit was provided at subsidized rates through the Agricultural Finance Corporation (AFC). However, the parastatal could not recover loans and had to stop lending at subsidized rates. Although there is a legal requirement that banks lend between 17 and 20 percent of their loan portfolio to the agriculture, the local banking system has been reluctant to lend to this sector because of the associated risks.

The situation has been made worse by the liberalization of interest rates, which makes it difficult for small-scale farmers to access credit. The total credit provided to agriculture is estimated at less than 10 percent of the total credit provided through the domestic financial system. Most agricultural credit is provided for short-term working capital requirements. Term lending to private sector agriculture amounts to approximately 3 percent of agricultural GDP. It is estimated that only one-third of total rural credit was allocated to smallholder producers. Although women comprise 70 to 80 percent of the agricultural workforce, their access to rural credit through the

financial system is negligible. For short-term borrowing, both a land certificate and evidence of a regular, non-farming source of income is required. Most rural women have neither. Some credit is provided to women through NGO-managed schemes, revolving credit schemes, and from friends. However, the amounts are relatively small compared to what could be productively absorbed by female agriculturalists.

Food security related policies

Prior to the reforms, the NCPB had the monopoly to market all cereals and to import whenever there were deficits or export whenever there were surpluses. The agency was mandated to maintain strategic reserves of foodstuffs, particularly maize, which would be released onto the market at time of shortage. With liberalization, the NCPB marketing monopoly has been dismantled. It now acts as buyer and seller of last resort and otherwise acts on a commercial basis. However, it still has the function of maintaining strategic food reserves and a foreign exchange reserve of $60 million has been established to allow the NCPB to purchase food when the need arises – i.e. at times of food shortages or to purchase from farmers during glut periods.

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 real exchange rate, improvements in the efficiency of domestic marketing systems etc. It is difficult to isolate policies that have been beneficial or harmful to agricultural performance because 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.

Trends in international and domestic prices

The trends of average real prices received by farmers for various commodities are shown in Table 8. There was greater price instability during the 1990s than in the 1980s, accounted for by the liberalization of domestic markets combined with world market price volatility.

The real prices of food crops have generally increased during the 1990s, possibly due to the liberalization of domestic marketing. The price variability for industrial crops was higher during the 1990s, possibly due to increased competition from imports of processed commodities such as textiles and sugar.

The mixed trend for the prices of export crops may be attributed to instability in world market prices (Table 9). The prices for coffee show a mixed, but generally declining, trend, while those for tea indicate an increasing trend during the post reform era.

Decomposition of price changes

The sources of change in domestic prices for cereals (maize, wheat and rice) and for exports (coffee and tea) were decomposed into changes in world prices, exchange rates, and other sources of change (e.g. tariffs, domestic marketing margins, transport).

TABLE 8
Average real prices of selected commodities 1980-2000 (K Sh/tonne 1982 prices)

Year	Maize	Wheat	Rice	Tea	Coffee	Sugar cane
1980	1 263	2 180	2 007	21 151	35 017	177
1981	1 189	1 986	1 784	21 101	26 859	172
1982	1 070	1 880	1 500	19 410	27 800	170
1983	1 364	1 966	1 576	19 341	30 889	201
1984	1 463	2 249	1 488	43 334	32 132	190
1985	1 391	2 015	2 544	20 033	29 540	201
1986	1 458	2 158	1 563	24 908	36 972	219
1987	1 441	2 034	2 265	17 235	25 246	207
1988	1 386	2 202	2 512	13 190	28 911	232
1989	1 295	1 987	2 254	15 783	25 048	214
1990	1 537	2 642	1 427	20 675	21 351	263
1991	1 463	2 393	766	18 420	22 279	249
1992	1 619	1 911	399	9 975	14 141	136
1993	2 017	1 407	1 307	23 007	24 610	206
1994	2 065	2 609	1 976	19 016	31 365	338
1995	1 626	2 643	2 086	13 797	32 458	316
1996	1 966	2 913	2 988	14 740	25 934	289
1997	2 351	3 030	2 735	18 281	43 050	266
1998	2 043	2 688	3 354	21 151	40 900	275
1999	2 064	2 703	3 292	18 618	23 283	258
2000	2 022	2 305	3 251	21 240	16 058	281

Source: Republic of Kenya, Statistical Abstracts (various years) and authors' calculation.

TABLE 9
Average world market nominal prices for selected commodities, 1990-2000 (US$/tonne)

Year	Maize	Wheat	Rice	Coffee	Tea
1990	120.1	159.2	287.4	-	-
1991	123.0	168.0	314.4	-	-
1992	116.8	200.1	287.4	-	-
1993	107.6	207.4	269.7	1 540	1 850
1994	129.5	242.3	357.4	3 270	1 830
1995	153.8	277.1	327.8	3 290	1 640
1996	183.5	238.6	349.3	2 650	1 770
1997	134.6	191.5	303.9	4 100	2 400
1998	116.7	178.0	303.9	2 900	2 400
1999	110.2	165.5	270.9	2 280	2 090
2000	109.7	162.4	202.4	2 030	2 030

Source: IMF/IFS Data Base (various years).

The results (Tables 10 and 11) indicate that, ignoring change in other factors, sources of change of domestic prices for cereals and export crops before the reforms mainly arose from exchange rate movements. After the reforms, the impact of the exchange rate on domestic price changes is also positive, but is not dominant across all commodities as in the previous period. In the same period, the impact of world prices is generally negative during the reform period (except in the case of tea) as is the impact of other factors (except in the case of rice).

TABLE 10
Decomposition of the sources of change in domestic prices, pre-liberalization 1990–1994

Commodity	Change in domestic price	Change in world price	Change in exchange rate	Change in other factors
Maize	13.5	1.6	23.5	-11.6
Wheat	5.5	8.5	23.5	-26.5
Rice	6.0	4.4	23.5	-21.9
Coffee	5.5	7.9	23.5	-25.9
Tea	3.1	4.4	23.5	-24.8

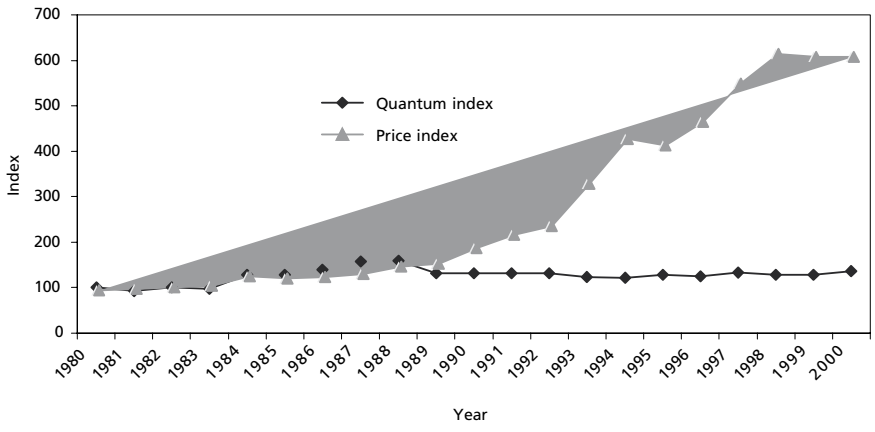
Source: Authors' compilation.

TABLE 11
Decomposition of the sources of change in domestic prices, post-liberalization 1995–2000

Commodity	Change in domestic price	Change in world price	Exchange rate	Other factors
Maize	-0.4	-2.8	5.1	-2.7
Wheat	-2.0	-6.6	5.1	-0.5
Rice	8.3	-9.5	5.1	12.7
Coffee	-11.2	-7.9	5.1	-8.2
Tea	-0.8	0.9	5.1	-6.8

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' compilation.

FIGURE 2
Agricultural input indices (1982 = 100)



Source: CBS, Economic Surveys (Various years).

Inputs use and prices

Input use among farmers, particularly smallholders, has been low. The quantum index for all non-factor inputs has been almost constant since 1986, while the price index has been increasing and recorded a dramatic increase after 1993. The rapid increase can be attributed to inflationary conditions and the weakening of the Kenyan shilling. The level of input use has, however, remained more or less constant since the mid-1980s. Despite some improvement in the input distribution system – more input dealers have been licensed and inputs are sold in less bulky quantities – access by small-scale farmers remains low due to increased prices and the credit constraints that have accompanied the reforms.

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 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 difficult agroclimatic context within which they operate, as described in Section 1a.

Agricultural production for the period 1980 to 2000 shows mixed trends for various commodities. Most commodities have shown a decline in production in recent years. The worst decline has occurred for maize, sisal and coffee (Figures 3 and 4). The decline in production is largely due to falling yields, since the area under production has generally risen (Figure 5). There has been an increase in the area under food crops (maize and wheat) and cash crops (tea and coffee). However, there has been a general decline in the area under industrial crops, particularly sisal.

Yields for most crops have stagnated since 1980 although some increases have occurred for a few crops, such as tea and wheat (Figure 6). However, a common feature for all crops is periodical fluctuations in yields. Stagnating and/or declining

FIGURE 3

Domestic production of food crops ('000 tonnes) 1980-2000

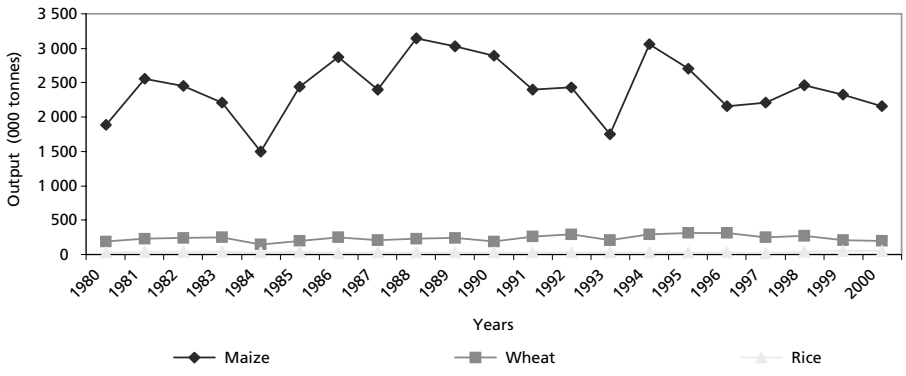


FIGURE 4
Domestic production of industrial crops ('000 tonnes), 1980-2000

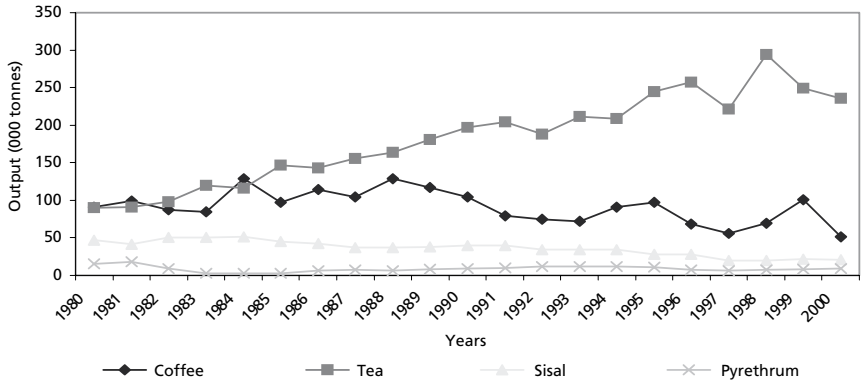
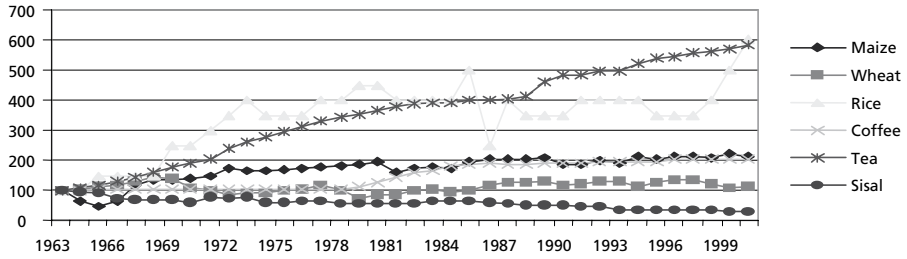
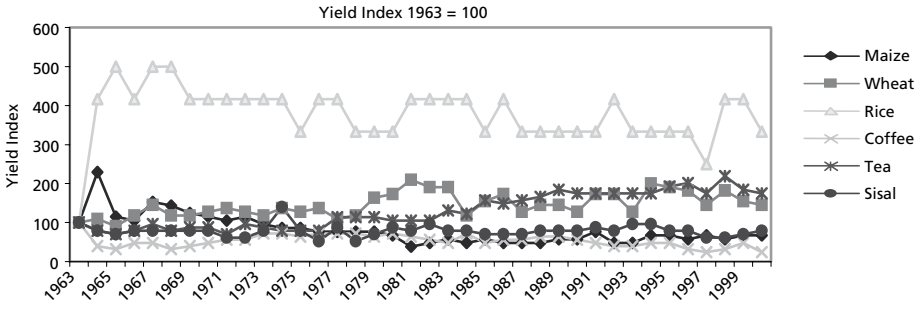


FIGURE 5
Area index (1963 =100) under major crops 1963-2000



Source: CBS, Economic Surveys (Various years).

FIGURE 6
Yields for major crops, 1963-2000



Source: CBS, Economic Surveys (Various years).

yields is a reflection of poor crop husbandry practices, low levels of fertilizer and agrochemical use, and poor quality seed. Maize production has had one of the worst yield declines (compared to gains in the 1960s) owing to persistent droughts and poor adoption of recommended husbandry practices.

Policy shifts, particularly liberalization of markets and prices, which affected producer incentives, are partly responsible for the poor performance of maize, wheat and rice. Other more traditional cereals (millets and sorghums), for which there is a more limited domestic demand, were not subject to the government's pre-reform price controls. Nevertheless, they are affected by price policy, insofar as production typically rises when the prices of maize, wheat and rice are low and falls when those prices are high.

Coffee production declined from about 130 000 tonnes in 1987 to a mere 50 000 tonnes in 1998, a decline of more than 50 percent. It recovered to 95 000 tonnes in 2000. The production decline in the smallholder sub-sector has been most pronounced (from 80 000 to about 30 000 tonnes over the same period). Coffee quality has also been adversely affected, with the proportion of coffee in the prime classes declining and the proportion of inferior qualities increasing. This can be attributed to falling world market prices, high input costs, erratic weather, disease and pest outbreaks, and inefficient management of cooperatives, amongst other factors. Average coffee prices have declined from about US$1.6 per kilogram of clean coffee in 1987/88 to just below US$1.2 in 1998. Kenyan coffee production costs are among the highest in the world, at about US$1.5 to US$2 per kilogram of Arabica coffee compared to the world average of about US$1.3.

Tea is the leading export commodity accounting for 20 percent of total export earnings. Production has expanded tremendously to over 200 million kg and is projected to reach 310 million kg by 2005 at the present growth rate.

Opportunities for increasing agricultural production exist in the high potential areas where the adoption of improved technologies could help intensify production and raise yields. Similarly, improved technologies, such as drought-tolerant crop varieties, and infrastructure developments to improve market access for livestock and livestock products would enhance the exploitation of low potential areas.

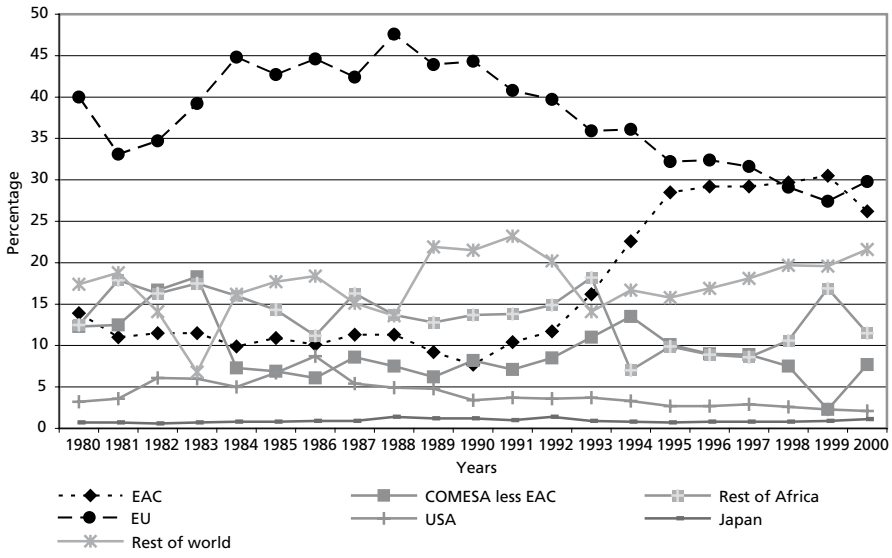
Effects on imports and exports

In general, market access for Kenyan products has not been favourable in recent years. Trade with other African countries has increased since 1994 – particularly with EAC and COMESA - possibly because of regional integration efforts. However, trade with the rest of the world has increased only marginally, while a significant decline (about 9 percent since 1990) has occurred in trade with the EU, despite special trading preferences under ACP (African Caribbean Pacific) Lomé Agreement with the EU.

Liberalization has not greatly affected the main destinations of agricultural exports, which continue to be the European Union for coffee, horticulture and tea; Asian countries for tea and coffee; and COMESA and EAC countries for tea and processed food products.

Agricultural commodities dominate exports (Table 12), while manufactured goods dominate imports. Agriculture's share of export earnings has averaged 55 percent for the past ten years. Tea, coffee, pyrethrum, and horticultural products are the main

FIGURE 7
Destination of exports as a percentage of total exports 1980-2000



Source: CBS, Economic Survey (various years)

TABLE 12
Agricultural exports, 1985-2000 (000 tonnes)

Commodity	1985	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Coffee	104	98.0	114	84.1	78.1	88.3	76.9	88.5	116.7	68.2	50.7	69.7	87.0
Tea	126.3	163.3	166.4	175.6	166.5	188.4	174.9	217.9	262.1	199.2	263.8	260.2	217.3
Canned pineapples	44.5	61.3	-	71.5	67.5	67.3	67.8	75.0	92.0	71.0	79.3	51.6	56.2
Hides and skins, undressed	10.5	10.2	1.1	12.7	0.4	0.7	2.7	2.2	2.3	2.6	2.1	7.3	7.6
Sisal	40.0	32.9	30.1	27.7	32.0	27.3	25.4	21.2	21.7	19.2	17.6	16.8	16.8
Pyrethrum products	0.7	0.5	0.5	0.4	0.3	0.3	0.4	0.4	0.6	0.4	0.3	0.6	0.2
Meat products	3.7	0.4	1.6	2.1	0.4	0.7	0.9	1.1	1.2	1.2	1.3	1.2	1.3
Butter & ghee	0.3	0.3	0.4	0.05	0.08	0.1	0.07	0.2	1.6	0.2	0.2	0.07	0.03
Sugar & products	37.0	0.0	-	-	-	-	-	-	7.5	10.4	9.2	8.6	13.3
Cotton, raw	1.7	0.0	-	-	-	0.004	-	1.0	-	0.08	0.09	0.05	0.2
Wool, raw	0.7	0.4	-	0.02	1.0	0.4	0.3	0.3	0.3	0.4	0.2	0.06	1.2
Maize, unmilled	17.7	110.2	159	18.7	0.4	0.1	1.7	154.3	221.5	2.6	9.1	30.5	0.5
Animal feeds	9.7	11.2	7.9	34.7	14.2	13.4	12.3	11.0	2.1	0.7	0.7	0.8	0.6
Live animals('000)	62.1	366	183	101	140	529.2	961.3	1 254	636.6	667.7	2 024	1 590	1 250

Source: Republic of Kenya, Statistical Abstracts (various years).

agricultural exports. Coffee dominated exports until 1988 when it was overtaken by tea. Horticultural crops also overtook coffee in 1998 to become the second most important agricultural export. Except for tea and crude vegetables, the performance of traditional exports was poor in the 1990s, with growth averaging 7.4 percent compared to over 20 percent for non-traditional exports (Mwega, 2000). The high

TABLE 13
Imports of major food commodities 1980-2000 (000 tonnes)

Year	Maize	Wheat	Rice	Sugar	Dry milk
1980	323	48.5	1.2	3.1	12 888
1981	77.3	49.2	4.6	2.1	11 210
1982	89	139.3	11.9	2.2	4 210
1983	0	81.9	44.8	2.4	4 532
1984	405.4	149.9	0.5	1.7	11 108
1985	125.5	14.8	0.6	39.1	6 677
1986	0.7	115.3	61.7	126.3	1 508
1987	0	217.9	39.2	49.1	545
1988	0	75.6	10	42	82
1989	0	123.5	30	80	15
1990	0	322.6	28	64	48
1991	0	242.6	61.2	59.7	65
1992	414.9	100.8	58.9	153.8	829
1993	12.9	314.4	37.2	184.8	747
1994	650.4	353.1	93.5	256.1	2 319
1995	12	364	30.7	244	679
1996	10.8	486.9	47.9	65.8	309
1997	1 101.1	388.1	62.4	52.4	863
1998	774	478.9	62.8	186.5	2 500
1999	73.5	579	53.4	55.6	2 694
2000	409.4	636	105.8	91.6	1 749

Source: Republic of Kenya, Statistical Abstracts (various years).

performance of non-traditional exports can be attributed to the removal of restrictive trade policies by importing countries, particularly in Europe. High performance in 1992-1996 overlaps with trade liberalization and is explained by the removal of bureaucratic bottlenecks and availability of foreign exchange.

Agricultural imports are dominated by food items (particularly cereals and dairy products, Table 13) and fluctuate according to changes in domestic production. The level of food imports for most commodities was low between 1987 and 1991, as the country was largely self-sufficient in these years. However, since 1992 imports have been high due to falling per capita production. The bulk of food imports are from the developed countries, where food production is often highly subsidized. Cheap imports from these countries reduce domestic prices, benefiting Kenyan consumers, but acting as a disincentive to Kenyan producers. This conflict of interest is a major policy dilemma.

CONSEQUENCES OF REFORMS: TARGET VARIABLES

National food security

Table 14 analyses domestic food supply according to three indicators:

- the food production index (FPI): the quantity of food produced in a given year divided by the total food production in the base year, 1989;
- the cereal self provision ratio (CSPR): the total amount of cereals available from domestic production as a proportion of that required to cover consumption requirements each month. The number of months in which a 100 percent ratio is achieved is used to indicate the capacity of a country to meet domestic consumption needs from domestic supplies;

TABLE 14
Food production index, cereal import dependency ratio and cereal self provision ration 1982-2000

Year	FPI 1989=100	CIDR	CSPR
1982	76.0	0.11	12
1985	80.4	0.10	12
1988	98.4	0.04	12
1991	99.4	0.13	10
1994	103.6	0.36	10
1997	106.1	0.48	10
2000	107.7	0.50	9

Source: World Bank (2002) and FAO FAOSTAT Database (various years).

TABLE 15
Protein, dietary fat and cereals supply per person* (g/day) 1982-2000

Year	Protein supply	Fat supply	Cereal supply
1982	15.0	41.9	140.1
1985	15.7	40.9	140.4
1988	18.4	42.1	117.9
1991	17.7	46.4	106.2
1994	15.9	45.2	120.6
1997	15.6	46.4	119.1
2000	15.2	46.9	115.6

* per Adult Equivalent (man aged 30-60 years, weighing 60 kg).
Source: FAO FAOSTAT Database (various years).

- the cereal import dependency ratio (CIDR): the ratio of cereal imports to total domestic production in a year.

The FPI was below the baseline before 1989 but slowly increased from 1994, to reach 7 points above the baseline in 2000. The FPI includes all food crops. Hence the decline in maize production has to a certain extent been offset by increases in other food crops (e.g. millets, sorghums, pulses, potatoes etc.) However, the low percentage increase in food production is an indication that the overall agricultural supply response to reform has been limited.

The CSPR indicator shows declining self-sufficiency in cereals. In the 1980s, production was in theory sufficient to meet domestic demand for 12 months of the year, although restrictions on internal movements of food products often made it difficult to realize this in practice. In the 1990s, the cereal provision capacity covered only ten months, and this fell to nine months in 2000 because of the droughts of 1999. The CIDR, on the other hand, increased during the reform period, rising to a level of 0.5 in 2000 as the level of cereal imports rose in relation to domestic production.

Data on per capita supplies of cereals, proteins and fats also provide insights into food security (Table 15). The per capita supply of animal protein reached a peak in the late 1980s and early 1990s, before falling back towards its 1982 level by the end of the 1990s. The Free Primary School Milk Policy of the early 1980s may account for the rise at that time, by creating incentives for increased milk production. This policy was however discontinued in 1990 in the face of tightening fiscal policies. The decrease in the animal protein supply per capita during the 1990s could also be explained by drought, which reduced the availability of livestock products.

TABLE 16
National food security indicators, 1980-2000

Year	Per capita food production (kg)	Self sufficiency ratio (%)	Ratio of value of food imports to agricultural exports	Ratio of value of food imports to total exports
1980	25.4	0.74	0.21	0.09
1981	25.8	1.60	0.12	0.05
1982	25.0	1.48	0.13	0.07
1983	26.2	2.13	0.09	0.06
1984	25.8	0.75	0.19	0.12
1985	25.9	1.40	0.12	0.08
1986	27.0	1.45	0.11	0.07
1987	26.2	1.77	0.12	0.07
1988	25.4	2.41	0.06	0.04
1989	25.7	1.57	0.11	0.07
1990	23.0	0.58	0.15	0.12
1991	23.4	1.17	0.09	0.06
1992	21.4	0.54	0.21	0.16
1993	21.1	0.53	0.11	0.08
1994	20.7	0.33	0.29	0.19
1995	23.6	0.97	0.09	0.06
1996	25.1	0.58	0.14	0.09
1997	19.9	0.27	0.28	0.19
1998	21.0	0.36	0.22	0.15
1999	20.4	0.41	0.15	0.11
2000	15.4	0.26	0.18	0.15

Source: Kenya, Statistical Abstracts (various years).

The dietary fat supply per person increased at a slow rate in both the pre-reform and post-reform periods. This increase is attributed to the consumption of fats in urban centres, with large importations meeting this demand. The percentage of total food expenditure spent on oils and fats is limited to 6.7 percent for the urban poor and 6.3 percent for the non-poor.

Per capita cereal supply decreased in both the pre-reform and post-reform periods. The decline in availability is partly explained by the decline in maize, wheat and rice production.

Food import capacity

The country depends on food imports, especially for maize, wheat, rice and sugar. It has become much less self-sufficient during the 1990s and imports have increased significantly. However, the capacity to import has declined because of the poor performance of exports. The ratios of the value of imports to the value of total exports and to the value of agricultural exports have increased as the country has spent an increasing proportion of its export earnings on food imports (Table 16), limiting resources available for importing goods useful for investment in long-term development.

Trends in the incidence of malnutrition

The malnutrition level measured using the percentage of stunted children shows a decrease between 1982 and 1987 (except in Coast Province) and an increase between 1987 and 1997 for all provinces (except for Coast and Nyanza). The stunting trend,

TABLE 17
Incidence of malnutrition for children aged 6 to 60 months by region, 1982-1997

Region	Percent stunted (below 2SD)				Percent wasted (below 2SD)			
	1982	1987	1994	1997	1982	1987	1994	1997
Central	33.6	25	28.7	37	4	2.5	4.9	5.7
Coast	48.6	49.1	38.3	41.9	3.5	3.7	7.8	7.9
Eastern	39	38.5	38.5	40.7	3.5	3.7	7.8	6.2
Nyanza	43.1	41.3	36.4	38.1	5.5	6.2	5.5	9.7
Rift Valley	31.4	26.9	32.2	35.1	5.4	4.6	8.2	6.4
Western	40.5	22.4	37	40.6	3	3.5	8	4.6

Source: CBS, 1996; CBS, Economic Surveys 1998 & 1993; Republic of Kenya, 2000.

and therefore malnutrition, is closely related to changes in household incomes and food production in the country. The period 1982 to 1987 showed an increase in incomes and agricultural growth while there were major declines from 1994 to 1997.

The percentage of wasted children shows mixed trends – an increase between 1982 and 1987, except for Central and Rift Valley provinces; an increase between 1987 and 1994 in all provinces, except for Nyanza province; and improvements for Eastern, Rift Valley and Western provinces in 1997. The observed deterioration for 1987 to 1994 corresponds to declines in household incomes and agricultural production during the period for all regions.

In conclusion, the data on food supply and food security at the national level indicates that both per capita and total domestic food supply has been on the decline and the country is increasingly depending on imports for its food needs. The capacity to import food has weakened due to the poor performance of agricultural exports, making the country more food insecure.

Household level food security

Household level food security needs to be assessed against an understanding of the demographic and poverty context. The population of Kenya increased from 21.4 million in 1989 to 29.7 million in 1999. The average population growth rate was 3.4 percent per annum between 1979 and 1989 and 2.9 percent per annum during 1989-99. The urban population, which was only about 18 percent of the total population in 1980, grew to about 25 percent in 2000, placing increasing demands on agricultural production and marketing. The 1999 population census indicated that over 50 percent of the population was under 15 years, implying that the majority of the population was dependent on the working age group between 15-64 years. However, about 14.6 percent of the working age group is unemployed while about 22.6 percent are full time students (Republic of Kenya, 2002). About 74 percent of the labour force is self-employed in the rural areas, mainly in agriculture and informal off-farm work or in family businesses, and the remaining 26 percent work in wage employment.

Poverty is highest in the rural areas, and was estimated at about 60 percent of the rural population in 2000 (Republic of Kenya, 2002). The rural poor depend much more on agriculture than the non-poor. The distribution of the poor according to regions indicates that poverty levels are highest in Coast, North Eastern and Eastern provinces. These areas have fewer agricultural opportunities due to climatic

TABLE 18
Poverty incidence 1981-2000 (% of population in the region)

Region	1981/82	1992	1994	1997	2000
Central	25.7	35.9	31.9	31.4	35.32
Coast	54.6	43.5	55.6	62.1	69.88
Eastern	47.7	42.2	57.8	58.6	65.90
Rift Valley	51.1	51.1	42.9	50.1	56.38
North Eastern	na	na	58.0	65.48	73.06
Nyanza	57.9	47.4	42.2	63.1	70.95
Western	53.8	54.2	53.8	58.8	66.11
Nairobi	NA	26.5	25.9	50.2	52.56
Rural	48.8	46.3	46.8	52.9	59.56
Urban	NA	29.3	28.9	49.3	51.48
National	46.8	46.3	46.8	52.3	56.78

NA = Not available.
Source: CBS, Economic Surveys; Republic of Kenya (2002).

conditions or have been overexploited due to population pressure in the case of high agricultural potential areas. Factors considered to be the cause of poverty include low agricultural productivity and poor marketing; unemployment and low wages; inaccessibility to productive assets, particularly land; poor infrastructure; gender imbalance; high costs of social services, bad governance and HIV/AIDS (Republic of Kenya, 2002).

Most rural households are net food purchasers: on average 70 percent of food is purchased and approximately 30 percent is own-food production. Households spend about 54 percent (56 percent in the rural and 41 percent in urban) of their budget on food (CBS, 1996). There has been a shift to dependence on off-farm and remittance incomes, reflecting the diminishing role of farm incomes as a major source of food security for rural households associated with the declining performance of the agricultural sector.

During income stress periods, the food-poor cope by borrowing, begging and relying on food aid. The redistribution of income or food through remittances and famine relief programmes plays a key role in supporting household food consumption during such times of stress. In rural Kenya, food insecurity is greatest in drought prone or marginal areas, among poor pastoralists, as well as among resource-poor households in the high potential agricultural areas. The rising population has led to reduced plot sizes in high potential areas and the removal of livestock (e.g. in Samburu, District, and Rift Valley Provinces) to more marginal and drought-prone areas. These trends will ultimately result in long-term household food insecurity in these regions.

About 50 percent of rural farming households are involved in off-farm income-generating activities and about 36 percent have at least one salary earner living away from the farm (KRDS, 2002). About a third of households receive remittances. On average 30 percent of rural household income is derived from farm income while 70 percent is derived from off-farm income, which includes remittances. However, these ratios vary from region to region with farm incomes forming a low proportion (18 percent) in Eastern Province and a high proportion (60 percent) for Rift Valley Province (Republic of Kenya, 1997).

TABLE 19
Average land and household size, 1994 and 1997

Region	Average farm holding (percent of population)								Average household size (no.)	
	1994				1997					
	Landless	0.01-1.99 ha	2.0-3.99 ha	4.0+ ha	Landless	0.01-1.99 ha	2.0-3.99 ha	4.0+ ha	1994	1997
Central	27.4	65.3	5.6	1.7	15.8	49.7	24.7	9.8	5.1	4.3
Coast	49.4	32.4	10.5	7.7	13.3	19.3	33.2	34.2	5.3	5.3
Eastern	11.5	55.6	17.4	15.5	11.4	26.3	28.5	33.8	5.8	5.5
Nyanza	10.6	64	15.9	9.5	9.9	32.4	35.9	21.8	5	4.8
Rift Valley	26.8	46.5	14	12.7	14.3	28.2	26.3	31.2	5.3	4.9
Western	7.5	69.1	16.1	7.3	6	45.2	26.2	22.6	5.8	5
Rural	13.6	60.9	14.8	10.7	11.5	33.2	29.4	25.9	5.6	4.9

Source: Calculated from CBS, 1996; Republic of Kenya, 2000.

TABLE 20
Real income of rural households by source (percentage contribution to total) and total for region (K Sh per annum, 1986=100), 1982-1997

	1982				1994				1997			
	Farm	Off-farm	Remit-tance	Total K Sh	Farm	Off-farm	Remit-tance	Total K Sh	Farm	Off-farm	Remit-tance	Total K Sh
Central	38.5	42.5	19	16 659	34.6	62.7	2.7	24 017	38.7	54.4	6.9	6 185
Coast	37.4	51.3	11.3	13 046	22.6	72.2	5.2	25 640	24.9	66	9.1	7 246
Nyanza	35	46.7	18.3	11 827	35.2	57.7	7.2	17 493	21.9	67	11.1	5 785
Western	41.7	40.7	17.6	10 991	37.9	54.9	7.3	19 851	35.7	43.2	21.1	4 661
Rift valley	67.3	27.7	5.1	15 031	50	46	4	31 727	71.5	26.6	1.9	17 791
Eastern	50	36.9	13.1	15 564	36.3	59.2	4.5	17 033	21.8	66.6	11.7	6 078
Total rural	48	38.2	13.7	14 028	146.4	48.3	5.2	22 051	49.7	43.6	6.7	8 679

Source: CBS, Economic Survey 1988; CBS, 1996; CBS, 2002.

The characteristics of households considered below represent the averages of sampled households in six provinces of Kenya namely, Central, Coast, Nyanza, Western, Rift Valley and Eastern.[2]

The majority of the rural households (60.9 percent) had farm sizes ranging between 0.01 and 1.99 ha in 1994 (Table 19). The proportion declined to about 33.2 percent in 1997, indicating a general increase in the size of holdings. Nevertheless, in 1997 most households (74.1 percent) still had farm sizes of less than 4 ha. The majority of households with smaller farm sizes (less than 2 ha) are in Central, Nyanza, Western and Eastern provinces, symptomatic of the scarcity of land in these regions. However, the proportion of the landless has declined from the level observed in 1994. This might be due to resettlements that have occurred between 1994 and 1997. The average size of rural households has declined from 5.6 persons in 1994 to 4.9 persons in 1997, due to reductions in population growth rates. This trend has occurred for all regions except Coast Province where the size has remained the same.

The sources of income are summarized in Table 20 and detailed in Annexes 1 and 2. Incomes vary from one province to another, as do their source. They are highest in Rift Valley and lowest in Western Province.

[2] The sources of the data were the Rural Household Budget Survey of 1981, the Welfare Monitoring Survey (II) of 1994 and the Welfare Monitoring Survey (III) of 1997.

TABLE 21
Sources of income according to head of household, 1997

		Farm K Sh (% of total income)	Off-farm and remittances K Sh (%of total income)
Central	Male	2 560 (39.4)	3 936 (60.6)
	Female	1 816 (33.1)	3 676 (66.9)
Coast	Male	1 860 (23.7)	5 980 (76.3)
	Female	1 316 (14.5)	7 783 (85.5)
Nyanza	Male	1 781 (24.4)	5 530 (75.6)
	Female	646 (19.4)	2 680 (80.6)
Western	Male	1 738 (29.5)	4 159 (70.5)
	Female	1 552 (36.5)	2 701 (63.5)
Rift valley	Male	14 946 (67.0)	7 351 (33.0)
	Female	8 106 (62.4)	4 884 (37.6)
Eastern	Male	1 225 (18.3)	5 474 (81.7)
	Female	714 (19.6)	2 932 (80.4)

Note: Income for 1982 and 1994 were not disaggregated by sex.
Source: Calculated from CBS, 2002.

TABLE 22
Formal sector employment 1992-2000 (% of total formal employment)

Sector	1994	1997	1998	1999	2000
Agriculture, forestry, and fishing	18.7	18.6	18.5	18.6	18.5
Mining and quarrying	0.3	0.3	0.3	0.3	0.3
Manufacturing	13.1	13.0	13.0	13.1	13.0
Services	61.5	61.9	62.0	61.9	62.1
Others including public sector	7.4	6.2	6.2	6.1	6.1

Source: CBS, Economic Surveys (various years).

The relative contribution of farm income has declined over time in most provinces, whilst the contribution of off-farm income has increased. In general this represents a shift towards the services sector. The contribution of off-farm income was highest in 1994 but declined for some regions in 1997, although it remained dominant in most regions. Remittances are also gaining prominence as a major source of income for households in some provinces.

The contribution of crop sales to agricultural income declined greatly between 1994 and 1997, whereas the contribution made by the sale of livestock and livestock products increased substantially over this period (Annex 1). This can be attributed to lower crop prices combined with a reduction in production compared to livestock and livestock products.

Average household incomes increased for all regions between 1982 and 1994 but declined between 1994 and 1997. This trend applies to all the regions and for all sources of household income. The data shows that rural households have become worse off since 1994 (i.e. under the reforms).

Households headed by females had lower incomes than those headed by males in all regions except Coast in 1997 and are especially vulnerable (Table 21).

Unemployment is a major problem. Insufficient jobs have been created in the formal sector because of slow economic growth and declining levels of in (Table 22). During the 1990s, formal sector employment expanded by only 1.8 percent per

annum, while labour force grew by 3.5 percent. The role of wages as the major source of non-farm income diminished between 1994 and 1997 and was overtaken by the informal sector which is now the major source of employment for the majority of Kenyans. However, productivity in the informal sector is low because of inadequate technological skills and a lack of credit and institutional support.

Household expenditure

Table 23 shows that expenditure on food represents a high proportion of total household expenditure. Real expenditure on food increased from 1982 to 1984, but fell between 1994 and 1997. Changes in expenditure match changes in income discussed in the previous section.

Maize, vegetables, beans, milk, meat, sugar, cereals and roots comprise about 82 percent of the food items for most rural households, although the composition of the food basket varies from region to region. The percentage of total food expenditure by rural households is highest for maize and vegetables and lowest for roots.

As mentioned above, amongst the rural population about 70 percent of food is purchased and approximately 30 percent is own-food production. The poor are

TABLE 23

Real household expenditure (% on item) and total K Sh per annum (1986=100 per region)

Region	1982			1994			1997					
	Food	Non-food	Total K Sh	Food	Non-food	Total	Food	Non-food	Total	Food	Non-food	Total
Central	70.3	29.7	11 104	71.5	28.5	17 130	81.7	18.3	5 927	65.3	34.7	13 467
Coast	68.5	31.5	6 828	73.4	26.6	18 995	83.1	16.9	7 344	68.8	31.2	14 719
Nyanza	65.5	34.5	7 301	72.8	27.2	15 705	83.5	16.5	5 669	73.7	26.3	12 376
Western	68.8	31.2	7 910	74.7	25.3	14 867	82.4	17.6	5 576	72.6	27.4	13 767
Rift valley	69.8	30.2	8 146	72.2	27.8	19 660	81.9	18.1	6 057	69.9	30.1	13 375
Eastern	71.3	28.7	9 431	69.3	30.7	14 152	83.5	16.5	5 632	73.3	26.7	13.240
Total rural	64	36	8 890	75	25	16 497	83	17	7 494	70	30	17 829

Note: Share of each expenditure category is provided in the brackets.
Source: Computed from Rural Household Budget Survey 1981/82 reported in the Economic Survey of 1988; WMS II of 1994 Basic Report of May 1996; Second Report on Poverty in Kenya, 2000 Volume II.

TABLE 24

Expenditure of rural poor on food items (percent of total expenditure on food)

Region	Cereals	Maize	Meat	Milk	Vegetables	Beans	Sugar	Roots	Others
Central	5.4	26.6	5.7	9.4	13.4	9.7	7	5.1	17.7
Coast	2.9	45.4	6.1	2.7	7.9	5.7	6.8	2.1	20.4
Eastern	4.6	33.6	4.7	6.1	10.6	16.9	5	4.2	14.3
Nyanza	10	18.8	10.2	6.2	16.1	5.3	6.4	6.1	20.9
Rift Valley	4.5	26.2	8.1	13.6	11.4	8.3	7.8	3	17.1
Western	3.6	21.8	9.5	7.0	17.6	4.6	8.2	9.2	18.5
Total rural	5.7	26.8	7.7	8.1	13.2	8.7	6.8	5	18

Source: Republic of Kenya, 2000.

TABLE 25
Share of own and purchased food, 1997 for rural households

Region	Non-poor		Poor	
	Share of own food %	Share purchased food %	Share of own food %	Share purchased food %
Central	26.1	73.9	21.7	78.3
Coast	17.2	82.8	12.6	87.4
Eastern	34	66	28.5	71.5
Nyanza	37.7	62.3	38.5	61.5
Rift Valley	38	62	39	61
Western	36.3	63.7	30.1	69.9
Average rural	32.8	67.2	31.6	68.4
Average urban	2	98	2.5	97.5

Source: Republic of Kenya, 2000.

particularly reliant on food purchases. Their food expenditure and access is therefore vulnerable to changes in household income.

Purchasing power

The performance of the agricultural sector during the reform period (after 1994) has been poor and has had knock-on effects in other parts of the rural economy, leading to falling rural wages in the off-farm sector. The result has been declining rural incomes and reduced purchasing power that has negatively affected food security for the rural poor.

Purchasing power has been eroded, as shown in Table 26: the wages price index (WPI) has risen more slowly than the cereals output price index (COPI) and the consumer price index (CPI). This is especially so in rural areas where wages are often below those captured in the WPI.

Among poor farmers purchasing power is further weakened by having to sell their staple food crops at harvest time when prices are low. The need for cash at harvest

TABLE 26
Indices of consumer price[1], cereals output price[2] and wages[3] 1982-2001

Year	CPI 1986=100	COPI 1986=100	Wage index 1986=100
1982	71	58	73
1983	79	76	77
1985	96	94	91
1986	100	100	100
1987	109	105	104
1989	137	116	128
1991	190	148	151
1993	359	343	186
1995	467	447	271
1997	569	673	398
1999	618	677	586
2001	653	680	771

[1]Based on Nairobi lower income group.
[2]Based on selling price to marketing boards [3]Based on public sector wages.
Source: CBS, Economic Surveys (various years).

time, a lack of storage capacity, and the small size of their harvest, means that those same farmers face high prices when buying food in the deficit season.

POLICY LESSONS

The major problems hampering economic growth in Kenya include an unstable macroeconomic environment, especially with regards to inflation, exchange rates and balance of payments; risks and inefficiencies in the financial sector; decreasing and unsustainable real wages; a lack of social safety nets and a poorly performing agricultural sector.

Macroeconomic policy needs to provide a stable economic environment to foster private sector development and investment. Microeconomic policies need to focus on stimulating domestic and external trade, inducing technological change to increase productivity, reducing the dominant role of public corporations (parastatals) in favour of private sector enterprises, and encouraging development of strategic industries.

Policy makers need to commit themselves to reviving the fortunes of the agricultural sector. Agriculture continues to be a major sector in terms of generating incomes and employment for rural households and contributing to economic growth, foreign exchange earnings and industrialization. The linkages between the performance of the agricultural sector and household incomes indicate that when the performance of the sector is poor, household incomes are also low. This is because, although the role of agriculture in its direct contribution to household incomes is diminishing, the close linkages between rural off-farm job opportunities (such as in agroprocessing, farm input supply and other goods and services) and the agricultural sector ensure that agriculture still plays a leading role in the welfare of rural households, especially the poor.

The poor are concentrated in both marginal and over-exploited high agricultural potential areas. Strategies that enhance agricultural productivity and production in both these areas are needed to support the food security status of the rural poor. For example, despite some improvements in input marketing, input use by smallholders remains low owing to high prices and a lack of credit – constraints that may have been worsened by reform.

Efforts have been made to improve food security by maintaining strategic food reserves, but this has not prevented a deterioration of food security. Agricultural exports help finance the growing need for food imports. Appropriate agricultural trade policy is therefore important. High dependence on a few key export commodities and small number of trading partners creates risks. Policy makers need to help reduce the risks by encouraging diversification, as well as promoting greater productivity in more traditional export sub-sectors, which have performed poorly in recent years.

The response of agricultural production towards policy reforms has unfortunately been dismal. Climatic factors and unstable world market prices have played a role, but the major problems appear to be policy related. There has been poor coordination and sequencing of policies and a lack of commitment. Kenya has equated liberalization and privatization with an abdication of government responsibility for economic development. However, after years of government monopolies in production and marketing, private entrepreneurs lack the ability

to take over. These problems need to be addressed if Kenya is to benefit from the reform process.

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ANNEX I

Average agricultural income per annum by activity (% contribution) for region and total (K Sh 1986=100)

Region	1982	1994						1997				
	Total income K Sh	Total crop income	Live-stock sales	Live-stock prods.	Other income	Own consump-tion	Total agricul-tural income	Total crop income	Live-stock sales	Live-stock prods.	Other income	Total agricul-tural income
Central	6 410	50	10	5	1	35	8 310	31	23	45	1	2 394.526
Coast	4 876	54	12	2	1	31	5 791	16	56	12	17	1 801.053
Nyanza	4 142	27	26	2	1	43	6 149	20	38	16	26	1 265.684
Western	4 578	38	21	7	1	33	7 514	19	38	22	21	1 665.053
Rift valley	10 112	36	18	6	1	39	15 853	3	14	82	2	1 2727.16
Eastern	77 830	24	30	4	2	40	6 190	22	46	22	10	1 323.579

- Own consumption: includes income forgone from crop, livestock and livestock products produced for subsistence.
- Other farm income includes land sales, interest, sale of home brewed beer/wine, sale of crop products like flour, fishing, etc. The 1982 statistics did not disaggregate income into various categories.

Source: Calculated from CBS, Economic Survey 1988; CBS, 1996; Republic of Kenya, 2000.

ANNEX 2

Average non-agricultural income per annum by source and region (K Sh 1986=100)

	1982	1994				1997			
		Wages/ profits	Informal - business	Remit-tances	Other non-agricultural income	Wages/ profits	Informal - business	Remit-tances	Other non-agricultural income
Central	6 410	4 153	799	422	59	2 337	6 750	750	539
		(76)	15)	(8)	(1)	(23)	(65)	(7)	(5)
Coast	4 876	3 125	722	99	64	1 447	4 704	280	1 005
		(78)	(18)	(2)	(2)	(19)	(63)	(4)	(14)
Nyanza	4 142	1 689	1 602	130	60	2 167	4 995	259	478
		(49)	(46)	(4)	(2)	(27)	(63)	(3)	(6)
Western	4 578	2 869	1 560	506	73	2 036	6 104	323	632
		(57)	(31)	(10)	(1)	(22)	(67)	(4)	(7)
Rift valley	10	5 767	2 902	927	130	4 977	12 877	377	1 758
	112	(59)	(30)	(10)	(1)	(25)	(64)	(2)	(9)
Eastern	7 783	1 495	1 882	218	110	2 019	5 028	291	606
		(40)	(51)	(6)	(3)	(25)	(63)	(4)	(8)

Notes:
Proportion of income in each category in percentages (percent) are given in the brackets.
Remittances: income transfers either in kind or cash.
Informal - business: revenue from non-agricultural business as well as from cash and in-kind revenue from informal activities.
Other non-agricultural income includes: pensions, rent, fees, interest, etc.
The 1982 statistics did not disaggregate income into various categories.
Source: Calculated from CBS, Economic Survey 1988; CBS, 1996; Republic of Kenya, 2000.

Malawi

Ephraim W. Chirwa and Christina Zakeyo[1]

EXECUTIVE SUMMARY

Pre-reform

In the 1960s and 1970s, the Malawian economy grew at an average rate of 6 percent per annum. During this period, the marketing of smallholder agricultural produce was controlled by the state marketing agency, ADMARC. Prices were pan-territorial, pan-seasonal and pre-announced. There was a network of agricultural extension services and subsidized credit and inputs to smallholder farmers.

Negative economic growth rates in 1980 and 1981 followed a crisis triggered by the oil shock of 1979, an international transport bottleneck due to the civil war in Mozambique and the structural rigidities of the economy.

The reforms

The economic crisis resulted in the adoption of a series of structural adjustment loans. The reforms were slow initially, involving periodic adjustment in output and input prices. Major economic reforms took place between 1987 and 1995. Most of the policies targeted the agricultural sector, notably deregulation of agricultural marketing activities in 1987, removal of fertilizer subsidies between 1984 and 1992, deregulation of smallholder crop production by 1992, devaluation of the Malawi kwacha (MK) and its eventual flotation in 1994, and the liberalization of prices from 1995/96. These policies were reinforced by other economic reforms, such as removal of trade barriers, liberalization of the financial sector and interest rates, and implementation of trade agreements.

Impact on intermediate variables

Real prices for tradable commodities fell substantially and although changes in the exchange rate had a positive impact on real domestic prices, these were more than offset by the negative effects of international prices and the poor mix of other economic policies. The degree of market integration increased, particularly for cash food crops in which private sector participation in marketing was high, and for commodities whose prices were completely liberalized. Improvement in the integration of maize markets, a commodity in which price controls were still maintained, was marginal.

[1] Ephraim W. Chirwa, University of Malawi, Chancellor College, and Christina Zakeyo, Ministry of Commerce and Industry, Malawi.

While both international and domestic prices have been declining, the production of Malawi's main crops has, surprisingly, been increasing. This may be the result of smallholder farmers expanding their production to maintain a target level of income or consumption. Smallholder farmers continue to face credit constraints, exacerbated by the collapse of the government administered Smallholder Agricultural Credit Administration in 1992.

The structure and composition of agricultural exports did not change. Export earnings in dollar terms have declined and agricultural exports remain dominated by tobacco, tea and sugar.

Impact on target variables

The analysis suggests that economic reforms have had little impact on improving the food security of rural households. Per capita food and nutrient supply increased, but the supply of the main staple, maize, declined. The structure of production remains the same; diets are still dominated by maize consumption; real expenditures, and hence real incomes, have declined; producer prices and international prices have fallen; the nutritional status of children has marginally increased, food and cash crop production at the household level have declined. Overall, the food security situation at the household level has worsened over time, with an increased proportion of food insecure households compared to five years ago.

Because of increases in input prices, and decreases in producer prices, the profitability of major crops such as burley tobacco, cotton, paprika, cassava and groundnuts declined substantially between 1996 and 2001.

Policy lessons

Most indicators have remained constant or declined, despite a long history of economic reforms. The sequencing of some policies was poor and the high macroeconomic instability may have offset the positive impact of some policies.

While the constraints on private sector participation have largely been eliminated it has not responded optimally and trade is dominated by a few enterprises. Private trading in domestic agricultural markets remains limited and continues to face constraints and a high risk market environment.

Adjustment policies were implemented hastily without considering the necessary conditions for effective reform. For example, some of the government services that benefited smallholder farmers, such as extension services, credit facilities and state-marketing activities were withdrawn without credible replacement. The reform process did not recognize the need for additional policies to complement market liberalization and compensate for some of its more serious effects.

INTRODUCTION: CONTEXT AND NATURE OF THE REFORMS

The role and level of development of the agriculture sector

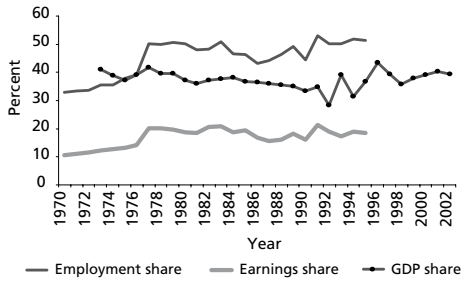
The Malawian economy is predominantly agro-based with agriculture accounting for more than a third of gross domestic product and more than 80 percent of foreign exchange earnings. Crop production accounts for 74 percent of all rural incomes and agriculture is the most important occupation for 71 percent of rural population. The dominance of agriculture is conditioned by the country's natural resources.

TABLE 1
Importance of the agricultural sector, 1970–2001

Indicator	1970-79	1980-89	1990-94	1995-2001
Share of agriculture in GDP (%)	39.6	36.6	33.4	36.9
Share of agriculture in employment (%)	40.6	47.3	50.2	51.2
Manufacturing/agriculture wage ratio	3.4	3.7	3.4	2.6

Source: Chirwa and Chilowa (1999) and NEC (2002).

FIGURE 1
Agricultural sector share in employment, earnings and GDP, 1970-2002



Source: Computed by authors from Reserve Bank of Malawi, *Financial and Economic Review*.

Table 1 and Figure 1 show that structural adjustment programmes have had little impact on the structure of the economy. Prior to the adjustment reforms the agricultural sector contributed 39.6 percent of real domestic product and 40.6 percent of total formal employment. The share of agriculture in GDP fell to 36.6 percent in 1980-89 and further to 33.4 percent in 1990-94 before increasing to 36.9 percent in the 1995-2001 period. The share of the agricultural sector in total employment has been increasing during the adjustment period, and accounted for more than 50 percent in the 1990s.

The Government distinguishes between smallholder farmers and estate farmers, the latter being large-scale commercial farmers (GoM, 1987). The smallholder sector can be divided into three groups: net food buyers, intermediate farmers and net food sellers. Net food buyers are those farmers with less than 0.7 hectares. They cannot produce enough food to satisfy their subsistence needs and remain dependent on off-farm activities. Intermediate smallholder farmers are those with land holdings between 0.7 and 1.5 hectares. They produce just enough for subsistence, but have very little for sale. Net food sellers produce a surplus over and above their subsistence needs and are farmers with land holdings of more than 1.5 hectares. Rural households with landholdings of less than 0.7 hectares are the most prone to food insecurity.

The agricultural sector is characterized by low productivity. In 1994, the yield per hectare for maize was 32 percent of the potential yield, while for tobacco and

TABLE 2
Proportion of households engaged in food, cash crop and livestock production, 1998

Food crops		Cash crops		Livestock	
Crop	Percent	Crop	Percent	Livestock	Percent
Maize (local)	59.6	Tobacco	65.1	Chickens	42.1
Maize (hybrid)	45.0	Soybeans	17.4	Goats	21.8
Groundnut	34.0	Cotton	9.8	Pigs	6.0
Cassava	12.1	Sugarcane	7.2	Cattle	5.1
Beans	11.4	Sunflower	3.3	Ducks	4.6
Rice	7.7	Tea	3.0	Doves	4.4
Sorghum	4.0	Other crops	5.3	Rabbits	1.7
Millet	3.4			Sheep	1.1
Other food crops	14.7			Other	0.8
Sample households growing food crops	5 883	Sample households growing cash crops	2 582	Sample households	10 698

Source: NSO, 2000d.

rice it stood at 38 percent of potential. Due to increasing population pressure and the resulting fragmentation of land, the national mean land-holding size has fallen from 1.53 hectares per household in 1968 to 0.80 hectares per household in 2000 (GoM, 2001). It is estimated that 33 percent of smallholder households (which produce 70 percent of agricultural output) cultivate between 0.5 and 1 hectare of land per household. In many cases, the small land-holding size poses a challenge for the adoption of productivity-enhancing technology. The limited adoption of technology, low levels of fertilizer use and declining soil fertility are major factors contributing to low agricultural productivity.

The main agricultural products grown by smallholder farmers are maize, cassava, groundnuts, pulses, sorghum and millet, sweet potatoes, cotton and tobacco. Exports are dominated by tobacco; tea, sugar, and cotton are also exported, but to a much lesser extent. Pulses, coffee and rice have emerged as important non-traditional exports, whilst the importance of groundnut exports has diminished. Tea, sugar, tobacco and coffee are largely grown by corporations and large scale farmers. Food crops account for about 70 percent of agricultural value added (World Bank, 2003).

Table 2 shows the relative importance of various food and cash crops in household production. Although households grow a diversity of crops, maize is the most important food crop in the consumption basket of most households, and is grown by 93.2 percent of households (45 percent grow hybrid maize and 59.6 percent grow local maize). The other important food crops include groundnuts, cassava and beans. Tobacco is by far the most important cash crop.

Analysis of the impact of reforms on food security will in this study focus on maize, groundnuts, cassava, rice, beans/soybeans (pulses), tobacco and cotton, given the relative importance of these crops.

Cassava is being promoted by the Government as an alternative food crop because of its drought resistance. It is estimated that cassava accounts for only 6 percent of total smallholder cultivated land and is a main staple for only 2.8 percent of households. It is a predominantly non-tradable food crop and is mainly consumed within the country. Non-maize food production has increased since the 1990s, partly

due to strengthened root crop research and promotion of cassava and other root crops as drought resistant crops. Rice is an alternative food crop to maize, particularly in the urban areas. In some areas it is also a cash crop for some households. Rice is mainly grown in the lakeshore districts. Rice has also become an important export crop since the late 1990s.

Groundnuts are mainly grown in the central and northern regions and account for about 5.4 percent of smallholder cultivated land. Groundnuts used to be the third most important export product in the 1970s, but export earnings declined in the 1980s and the export market was lost by the 1990s.

Pulses comprising pigeon peas, soybeans, beans and cow peas account for 16.8 percent of smallholder cultivated land. Pulses are also emerging export crops and an important cash crop for smallholder farmers. They are mainly grown by smallholders.

Tobacco is the main export commodity, accounting for more than 60 percent of export earnings since the 1990s, 23 percent of the economy's tax base and 10 percent of GDP (World Bank, 2003). Five main types are grown: flue-cured, fire-cured, sun/air-cured, burley and Turkish tobacco. Prior to liberalization, the Special Crops Act ensured that the production of flue-cured and burley tobacco was restricted to estates, whilst other types of tobacco were grown by smallholders. Cotton is also exported crop and accounts for 2.3 percent of smallholder cultivated land. It is grown mainly by smallholders and is concentrated in central and southern Malawi.

Degree of openness of the economy prior to the reforms

The performance of the economy after independence in 1964 until the late 1970s was relatively encouraging, with high growth rates, favourable balance of payments and improvements in food availability and food security. The development strategy in the1970s was based on limited industrial import-substitution and increasing the role of the agricultural sector. The trade regime was focused on stimulating agricultural exports; as a result, the economy was relatively open, tariffs were generally low and direct restrictions on imports were minimal (Harrigan, 1991).

The development strategy in the post-independence period up to 1979 was based on increased government involvement in the production process through acquisition of agricultural land and the establishment of state holding corporations. This was justified by the lack of an indigenous entrepreneurial class.

National food security was at the centre of development strategies in the post-independence era when the main objective of development was "to enhance the social welfare and incomes of the agricultural community and the prosperity and stability of the nation as a whole by means of both improving self-sufficiency in food products and expanding and diversifying export receipts from agricultural produce" (GoM, 1987, p.22).

Within this framework, the strategy has been to increase agricultural productivity with special emphasis on the productivity of smallholder farmers with land holding sizes of less than one hectare. More specifically, increasing maize production and promotion of drought-resistant food crops such as cassava have been the main strategies in achieving self-sufficiency in food.

Policies included fostering the ownership of the estate sector by Malawians; developing the smallholder sector through investments in agricultural extension

services; provision of subsidies on agricultural inputs; state-led marketing of smallholder produce; control of agricultural produce prices; control of interest rates and the institutionalization of preferential rates to the agricultural sector; management of the exchange rate; international trade controls on agricultural products; and other administrative measures.

Industrial goods and smallholder agricultural produce were subject to price controls. The state marketing agency, the Agricultural Development and Marketing Corporation (ADMARC) monopolized the purchase of tobacco and cotton from smallholder farmers as well as the sale of subsidized agricultural inputs. ADMARC implemented the government pricing policy on food crops through pan-territorial and pan-seasonal prices that were announced in advance of each season. The Government, through the Smallholder Agricultural Credit Administration (SACA), provided agricultural credit to smallholder farmers organized into farmer clubs.

However, the economy was relatively open to trade, with only limited protection accorded to manufacturing through tariffs, combined with a variety of non-tariff trade barriers such as import and export licensing. In addition, the exchange rate was overvalued at a fixed peg, which combined with trade restrictions, provided incentives for import substituting industries and moderated the cost of agricultural inputs.

These policies were reinforced by a stable macroeconomic environment characterized by low inflation and price stability, low balance of payments pressure, low interest rates and a manageable fiscal budget deficit.

Motivations for the reforms

By 1980, however, Malawi faced an economic crisis. Real GDP growth fell from 8.3 percent in 1978 to 3.9 percent in 1979, followed for the first time by negative growth rates of -1.1 percent in 1980 and -4.7 percent in 1981. This has been variously attributed to a combination of factors, including the oil-shock of 1979, an international transport bottleneck caused by the intensification of war in Mozambique, adverse weather conditions, weakening internal demand and other structural rigidities in the economy.

The crisis drove Malawi into the adoption of World Bank structural adjustment programmes and IMF stabilization measures to address the internal and external imbalances (Harrigan, 1991; Kaluwa et al., 1992; Mhone, 1992).

Preparatory work for the first Structural Adjustment Loan (SAL) identified six structural weaknesses in the economy: (i) the slow growth of smallholder exports; (ii) the narrowness of the export base and increased reliance on tobacco; (iii) dependence on imported fuel and on a declining stock of domestic fuel wood; (iv) the rapid deterioration of the finances of state owned enterprises; (v) the increasing budget deficits of the late 1970s; and (vi) the inflexible system of government-administered prices and wages.

Macro and sectoral components and the policy instruments used

In this study, the period before 1981 is identified as the pre-reform period, the period between 1981 and 1994 as the adjustment period, and the period from 1995 as the post-reform period. The major policy reforms affecting agriculture directly were implemented by 1995. These include liberalization of smallholder agricultural

produce marketing in 1987, liberalization of agricultural input marketing and removal of fertilizer subsidies in 1991, and liberalization of producer prices for agricultural crops with effect from the 1995 agricultural season.

Macroeconomic reforms

Since 1981, Malawi has had eight loans to support her structural reform measures, three of which were structural adjustment programmes (SALs) and four were sectoral adjustment loans:

- SAL I was implemented between 1981 and 1983 with the World Bank making available US$45 million. The objectives were to diversify the export base; encourage efficient import substitution; ensure appropriate price and incomes policy; improve the public sector's financial performance; and strengthen government economic planning and monitoring capabilities. SAL I was supported by three IMF Stand-by facilities which aimed at reversing the unfavourable balance of payments trends and reducing the fiscal imbalance.
- SAL II was implemented in 1984-85 with US$55 million from the World Bank. The policy objectives and measures were essentially the same as in SAL I. However, under SAL II, prices for most industrial goods were decontrolled and two further devaluations were pursued (15 percent in 1985 and 9.5 percent in 1986).
- SAL III was implemented in 1986 to 1987 with the additional objective of expanding the role of the private sector in the marketing of smallholder crops and improving its financial performance and operational efficiency.

Sectoral adjustment credit facilities from the World Bank were first implemented in 1988:

- The Industry and Trade Policy Adjustment Credit (ITPAC) was implemented in 1988/89 to consolidate the existing reforms. The main objective of ITPAC was to improve the policy environment for the manufacturing sector in order to increase the efficiency of resource use (including imported resources) and to expand exports.
- The Agriculture Sector Adjustment Credit (ASAC) was made available in 1990 to 1991. While continuing the principles of the previous loans, the main objectives were to increase efficiency and improve the incomes of smallholder farmers, increase the efficiency of land use and protect the environment, and improve the macroeconomic environment through further import liberalization and public expenditure restructuring.
- The Entrepreneurship Development and Drought Recovery Programme (EDDRP) was instituted in 1992 in response to the drought that hit southern Africa in 1991/92, providing $210 million worth of financial resources to the Malawi Government. This was augmented by supplementary resources in 1995. The EDDRP aimed at supporting: an improved environment for entrepreneurial activities and investment in labour intensive activities; the adoption of policies aimed at deepening financial markets; the reorientation of fiscal and labour policies towards human capital development; the reduction in balance of payments pressure due to drought-related imports; and the alleviation of the impact of drought.
- The first Fiscal Restructuring and Deregulation Programme (FRDP I) commenced in 1996. FRDP had several objectives including prioritizing,

TABLE 3
Selected macroeconomic performance indicators, 1973-2001

Indicator	1973-1979	1980-1989	1990-1994	1995	1996	1997	1998	1999	2000	2001
GDP Growth (%)	5.9	2.0	0.6	13.8	10.4	7.0	2.2	3.6	2.0	-1.5
Inflation (%)	8.4	16.6	20.0	83.5	47.8	9.2	29.7	46.0	29.5	27.2
Fiscal Deficit/GDP (%)	-7.16	-9.64	-7.42	-12.4	-7.2	-9.0	-11.5	-12.6	-15.0	-15.9
Money Supply Growth (%)	13.3	18.3	28.5	44.0	24.0	16.7	57.4	33.2	37.2	8.9
Current Account /GDP (%)				-12.0	-12.0	-15.7	-10.3	-16.9	-14.2	-12.9
Exchange Rate (MK/$)	0.85	1.07	2.22	15.3	15.3	21.2	43.9	46.4	80.1	65.2

Source: Chirwa and Chilowa (1999) and NEC (2002).

protecting and expanding inter-sectoral and intra-sectoral allocations to social sectors; accelerating the consolidation of structural measures under previous adjustment facilities, including complete removal of the remaining pricing and marketing constraints on smallholder agriculture, and removal of binding constraints to broad-based private sector entry and development; restructuring the civil service to improve efficiency and control the growth of civil service wages and salaries; development of land policy and rationalization of tariffs and surtax. FRDP II in 1998 and FRDP III in 2000 both reinforced the objectives and the policy reforms stipulated under FRDPI.

Most of the policies formulated in these various programmes were implemented, although there have been a few policy reversals.

Table 3 shows macroeconomic performance indicators between 1973 and 2001. Recent macroeconomic performance is characterized by slow growth compared to the pre-reform era, large fiscal deficits and rapid growth in the money supply. High inflation and volatile interest rates and exchange rates have resulted in uncertainty over input and output prices.

The World Bank (2003) attributes poor growth in the economy to the Government's failure to implement key policies that would have reduced the risks facing economic agents. There has been substantial depreciation of the Malawi kwacha against the major currencies since its floatation in 1994. The World Bank finds positive and significant relationships between depreciation, inflation and growth in the money supply.

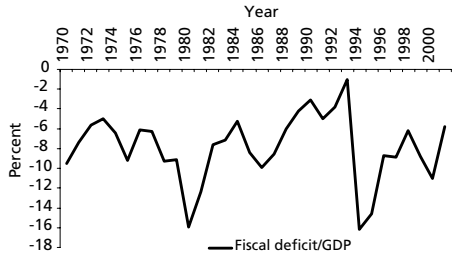
The policy measures here are grouped into fiscal policies, monetary policies, trade policies, institutional reforms, agriculture sector reforms, and other policy measures.

Fiscal policies

The implementation of economic reforms led to a reduction in the budget deficit between 1986 and 1993 (Figure 2). However, the deficit rose sharply again after 1993 at a time when the Government introduced a cash budgeting system that was expected to control over-expenditure by government agencies. The deficit has since fallen but has yet to recover its pre-1993 position.

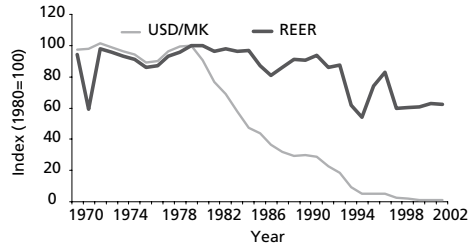
Several key fiscal policy measures have been implemented under the adjustment programmes. There have been increases in the recurrent budget allocation to agriculture and other key economic and social sectors between 1982 and 1995. Under FRDP II, non-wage budgetary allocations to the agricultural sector increased by 22 percent in 1998/99.

FIGURE 2
Ratio of fiscal deficit to GDP, 1970-2000 (percent)



Source: Computed by authors from Reserve Bank of Malawi, *Financial and Economic Review*.

FIGURE 3
Nominal and real effective exchange rate, 1970-2002

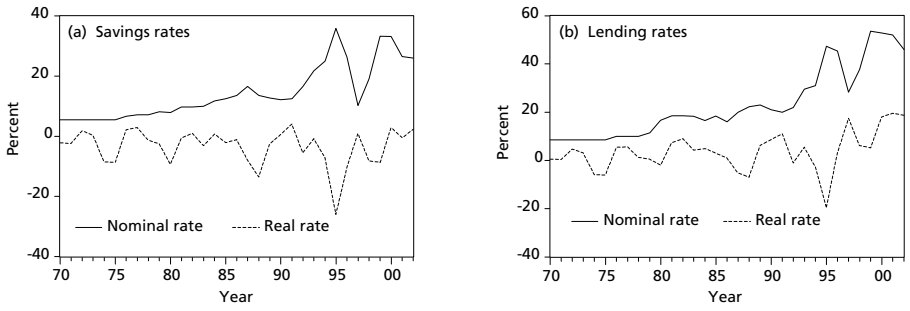


The Government took over the financing of the strategic grain reserves from ADMARC in the 1987/88 season. Scarborough (1990) argues that the management of the strategic grain reserves by the state marketing agency contributed to the low operational efficiency of ADMARC. In 1999, the National Food Reserve Agency (NFRA) was established under a Trust Deed, replacing the strategic grain reserves managed by ADMARC. NFRA is focused purely on emergency relief operations through procurement and marketing of maize in times of drought.

Monetary policies

The Government pursued an active exchange rate policy through periodic devaluation of the Malawi kwacha from 1982 until the end of 1993. Over the period 1983-93, the kwacha was devalued by more than 300 percent. In 1991, the system of foreign exchange allocation by the Reserve Bank was abolished and the foreign exchange market was therefore completely liberalized. In February 1994, the kwacha was floated. Figure 3 shows the continuous depreciation of the kwacha since 1981. However, this does not seem to have had a consistent impact on the movements of the real effective exchange rate. Real depreciation occurred between 1985 and

FIGURE 4
Interest rates, 1970-2002



Source: Computer by authors based on Reserve Bank of Malawi, *Financial and Economic Review*.

1987, and between 1990 and 1994. Otherwise, there have been some episodes of real appreciation.

Another area of monetary policy reform has been in the domestic financial sector. In the initial period of structural adjustment programmes, monetary policy focused on periodic adjustment of interest rates between 1982 and 1986. However, the Government eventually liberalized lending rates in 1987 and removed preferential lending and interest rates to the agricultural sector in 1990. In addition, the monetary authorities eased credit ceilings and credit rationing in 1989, and completely removed direct bank credit controls in 1995. The implementation of interest rate reforms is reflected in the upward trend of nominal interest rates on savings and loans from the early 1980s and the substantial increase in the early 1990s (Figure 4). Although nominal interest rates have increased, real interest rates on savings have been largely negative due to the high levels of inflation during the adjustment and post-adjustment periods. Real lending interest rates have, however, been positive in the post-adjustment period.

Although the number of banks increased following deregulation, the structure of the banking sector remains highly oligopolistic and spreads between lending and deposit interest rate have widened during and after reform, due to monopoly power, high bank discount rates and high inflation (Mlachila and Chirwa, 2002).

Trade policies

Trade reform measures were aimed at removing constraints to both domestic and international trade and at providing improved incentives for private market operations. International trade policies have concentrated on removing the barriers to international trade.

The Government reduced the scope of import and export licensing in 1989. The Reserve Bank of Malawi removed the requirement for prior allocation of foreign exchange for 65 percent of all imports in 1989, and in 1991 completely liberalized the foreign exchange allocation except for a narrow and temporary negative list covering certain luxury items. In 1994, the negative list of imported commodities was

abolished. In addition, under the Export Incentives Act and Investment Promotion Act in 1992, the Government provided for additional tax incentives for the export of non-traditional agricultural products. In 1997, all licensing requirements on imports and exports were abolished except for items related to health, security, and environmental considerations. The maximum tariff on imports was reduced from 70 percent in 1988 to 25 percent in 1998. Since 1989, under ITPAC, there has been a phased reduction in tariff rates and base surtax rates.

Other major trade policy issues relate to the implementation of policies under trade agreements since 1990. The bilateral and regional trade agreements include the Malawi-South Africa non-reciprocal free trade agreement in 1990; the Malawi–Zimbabwe reciprocal trade agreement in 1995; the Common Market for Eastern and Southern Africa (COMESA) free trade area regional agreement in 2000; and the Southern African Development Community (SADC) Trade Protocol in 2001. These regional agreements introduced duty-free access to products on a reciprocal basis among member states. However, the SADC protocol's provision on protecting infant industries allowed restrictions on imported livestock commodities such as eggs and chicken meat. Malawi also benefits from a number of non-reciprocal, preferential trade agreements such as the European Union's African Caribbean and Pacific countries (EU-ACP) agreement, the Cotonou agreement, the European Union Everything but Arms (EBA) agreement, and the multilateral African Growth Opportunity Act agreement with the United States of America.

Institutional reforms

Most institutional reforms that have taken place since 1981 have been driven by the desire to encourage private sector development. These include the reduction of government involvement in economic activities through privatization, abolishing or changing legislation that impeded private sector development, and the introduction of new legislation aimed at facilitating private sector development.

The Government has implemented the privatization policy since 1984 in two phases (Chirwa, 2000). Between 1984 and 1995 the investment portfolio of ADMARC was targeted, in order to improve its operational efficiency in its marketing activities and to enable it to compete effectively with private traders in the marketing of agricultural produce and inputs. The second phase commenced in 1996 with the enactment of the Public Enterprises (Privatization) Act and the creation of the Privatization Commission. Privatization of state enterprises has mainly been implemented during the post-reform period. Nonetheless, most of the privatized enterprises are manufacturing and service industries with indirect effects on the agricultural sector.

The Government also established the Malawi Investment Promotion Agency in 1992 as a one-stop investment centre. New investment incentives and export incentives were introduced following the Investment Promotion Act of 1992, including the introduction of a 25 percent tax allowance on international transport costs for non-traditional exports.

Agricultural sector reforms

A summary of the reforms affecting agriculture is given in Table 4. The main area of domestic reform was the deregulation of agricultural produce and input marketing

TABLE 4
Major sectoral policies affecting selected crops

Year	Policy actions	Crops directly affected
1981-1986	Annual adjustments in smallholder produce prices	All crops
1987-1988	Liberalization of smallholder agricultural produce marketing	All crops, except tobacco and cotton
1989-1990	Reduction in the scope of export licensing in 1989	All selected crops except maize and cassava
	Preferential lending to agricultural sector abandoned in 1990	All selected crops
1991	Liberalization of marketing of agricultural inputs	All selected crops
	Liberalization of burley tobacco production and introduction of two payment system for tobacco	Tobacco
	Removal of fertilizer subsidies	All selected crops
1995	Repeal of Special Crops Act and liberalization of agricultural produce prices	All selected crops except prices for maize
	Temporary export levy (10 percent) on tobacco	Tobacco
1996	Introduction of a producer price band for maize	Maize
	Lifting remaining constraints on burley tobacco production	Tobacco
	Export levy on tobacco reduced to 4 percent	Tobacco
1997	Removal of all import and export licensing requirements	All selected crops
	Introduction of 'starter pack' free input distribution for food insecure households	Maize
1998	Elimination of the export levy	Tobacco
1999	Reduction of maximum tariff rate to 25 percent	All selected crops, except cassava, the non-tradable
2000	Elimination of the price band for maize	Maize
	Implementation of the Agricultural Productivity Improvement Programme	All selected crops, mainly food crops

Note: Selected crops are those analysed in detail in the study including maize, cassava, rice, groundnuts, pulses, cotton and tobacco.

activities which prior to 1987 were dominated, and for some crops monopolized, by the state marketing institution, ADMARC.

The deregulation of agricultural marketing was initiated under SAL II in 1987 through the enactment of the Agriculture (General Produce) Act. This legislation essentially eliminated ADMARC's quasi-monopoly power over smallholder agricultural marketing by allowing private traders to operate under regulation through the licensing process. The number of private traders officially registered with the authorities increased, although most of the private traders were small-scale operators. Most private traders faced problems of transportation, storage, pricing, grading, crop procurement, marketing and finance, raising questions about their effectiveness in providing the necessary competition to ADMARC (Harriss and Crow, 1992; Mkwezalamba, 1989).

In 1991, the Government also liberalized the production of burley tobacco by smallholder farmers. This was followed by the repeal of the Special Crops Act in 1995, thus removing restrictions that prevented smallholder farmers from producing and marketing high value crops such as tobacco, coffee, tea and sugar. Under the FRDP I - III, further emphasis was placed on the deregulation of agricultural markets, culminating in the abolition in 1996 of the system requiring private traders

to obtain a licence to conduct trade in rural areas. Similarly, the marketing of agricultural inputs, such as fertilizers, was liberalized from 1990 under the ASAC. In 1996, under the FRDP, the Government removed the licensing and registration procedures for private traders in seeds and fertilizer marketing.

Prior to these market reforms, the Government set prices for agricultural produce and inputs and other selected industrial commodities. The pricing reforms commenced with periodic adjustments between 1982 and 1986 of the pan-territorial and pan-seasonal prices for agricultural products, particularly maize. In 1982, the Government adopted the international trade parity pricing approach and the producer price of maize was consequently increased by 68 percent. By 1988, prices of most crops were liberalized, with the state marketing agency acting as a buyer of last resort at minimum guaranteed pan-territorial and pan-seasonal prices. Private traders were therefore free to negotiate their own prices, and by 1995 prices of all crops, except for maize, were fully liberalized (Chirwa, 1998).

Maize remains at the centre of food security policy. While prices of all other products were liberalized, maize remained under limited pricing control. Maize exports are still subject to licensing requirements, and maize is only imported in a national food crisis. Maize is only semi-tradable.

Maize pricing policy has historically sought to protect smallholder producers from falling nominal prices and to enable wage earners to purchase enough maize for a calorie-adequate diet. Harrigan (1988) and Kandoole *et al.* (1988) noted that the twin objectives seriously conflicted, leading to changes in pricing policy in the reform period. ADMARC was free to determine the producer price of maize within a fixed band while the consumer price of maize remained pan-territorial and pan-seasonal. However, due to increased marketing of maize by private traders, it became difficult for ADMARC to defend the price band, which was abandoned in 2000 and the price of maize increased significantly.

In contrast to maize, rice, groundnuts and pulses have been far less regulated. Trade restrictions have been minimal and private traders have dominated the marketing of these crops.

The marketing of cotton prior to liberalization was governed by the Agricultural and Livestock Marketing Act of 1964 that gave ADMARC monopsony power to purchase and sell smallholder cotton. However, the export potential for cotton has been declining over time, particularly during the 1980s and early 1990s. Pan-territorial and pan-seasonal prices of cotton were adjusted annually after 1981, significantly increased (by 18 percent) in 1987 and were completely liberalized in 1995.

The marketing of smallholder tobacco was also an ADMARC monopoly before 1991, when the Government liberalized the production of burley tobacco by smallholder farmers. In 1996 the remaining constraints were lifted. Since then there has been a shift from estate based flue-cured tobacco to smallholder burley tobacco. About 19 percent of smallholder households cultivate burley tobacco.

In addition to agricultural produce pricing policies, the Government implemented a phased programme of decontrolling prices for industrial commodities, including prices of inputs to the agricultural sector. Under ASAC and beginning in 1990, the Government started upward adjustments in land rents for estates.

Subsidies of fertilizers were removed by phases, with an increase in the price of fertilizer by 21 percent in the 1983/84 season. However, due to a reduction in the

application of fertilizers by smallholder farmers, the removal of subsidies in the 1986/87 season was postponed to the 1989/90 season. The phased removal continued in the 1990/91 season following the deregulation of fertilizer marketing under which private traders were allowed to engage in the marketing of agricultural inputs. Since 1985 the Government has also pursued a phased privatization programme that was supposed to reduce the pressure of state-owned enterprises on public finance (Chirwa, 2000).

The Smallholder Agriculture Credit Administration (SACA), the only supplier of agricultural input credit since independence, collapsed in 1992 and was replaced in 1995 by the Malawi Rural Finance Company (MRFC). While the drought in the 1991/92 season had contributed to difficulties in repayment, it was the political changes that were taking place during the transition period to a multiparty democracy that eventually led to the collapse of SACA (Buckley, 1996; Msukwa *et al.*, 1994).

The number of microfinance institutions has increased. However, access to these credit facilities remains limited and smallholder farmers have experienced severe credit constraints since the collapse of SACA, as MRFC has not effectively replaced it. MRFC's agricultural lending portfolio is exclusively designed for and accessed by tobacco farmers at commercial interest rates, while SACA offered credit to farmers producing all kinds of crops at subsidized interest rates through agricultural clubs that no longer exist. Most other microcredit institutions operate local programmes and tend to support non-farm business activities.

The 1990s also witnessed the proliferation of non-governmental organizations (NGOs) in local food security interventions. The development of farmer cooperatives started in 1998 through the National Association of Smallholder Farmers of Malawi (NASFAM), but membership remains limited, consisting mainly of medium scale farmers with more than 1.5 hectare of landholdings. NASFAM is currently funded by the United States Agency for International Development (USAID) and is the only institution actively involved in the creation of cooperatives among smallholder farmers.

The sequencing of agricultural policy reforms has not always been optimal. For example, the removal of subsidies on inputs was initiated in advance of increases in the maize producer price. Agricultural produce price controls were still in place until 1995. However, subsidies on fertilizers were completely removed in 1990, which coupled with exchange rate devaluation, led to a large rise in fertilizer prices.

The sequencing of other policy intervention has facilitated the development of private marketing. For instance, the removal of fertilizer subsidies and decontrol of industrial prices in the 1980s paved the way for the liberalization of input markets; and the restructuring of ADMARC in the early 1980s preceded the deregulation of marketing activities so that the state marketing agency would be prepared to operate in a competitive environment with private operators.

Instability in the economy has raised the risk of business in Malawi. The volatility of exchange rates and interest rates, and unpredictable input and output prices have not combined to provide improved incentives to smallholder farmers.

Other reforms and programmes

Since the 1990s, the Government has been implementing policies intended to minimize the impact of adjustment on poor and vulnerable groups in society. In

1990 the Government initiated the Social Dimensions of Adjustment (SDA) project aimed at integrating the poor into the national development planning process. The activities of SDA were to (i) strengthen the institutional capacity to collect and analyse socio-economic data; (ii) develop a social support system through which the Government would tap the experiences of non-governmental organizations; (iii) testing new ways for cooperation between government and non-governmental organizations in economic development and poverty alleviation; and (iv) provide a small fund to be used to test, monitor, and evaluate various interventions with a scope for replication.

In the late 1990s, the Government, with the support of bilateral donors, introduced a series of safety-net programmes for resource-poor smallholder farmers. These included:

- the "starter pack" programme which provided free inputs to resource-poor farmers from 1998/99 – 1999/2000;
- in 1998, the Agricultural Productivity Improvement Programme (APIP) which provides inputs on credit to resource-poor farmers;
- in 2000, the Targeted Input Programme which provides free inputs to resource-poor farmers, including cereal seeds, legume seeds and fertilizer.[2]

In addition, in 1996, the Government introduced the Malawi Social Action Fund (MASAF) project to implement a public works programme (cash-for-work) in areas of the country that were food insecure.

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

Trends in international and domestic prices

Real international prices for selected commodities reveal a general decline as shown in Figure 5. Export earnings have declined by almost 20 percent since 1997, primarily due to a decline in export prices (World Bank 2003).

The behaviour of real domestic producer prices is depicted in Figure 6, which shows sustained decreases since the early 1980s, except in the case of rice prices which have been stable in the 1980s and risen in the 1990s.

Decomposition of price changes

A decomposition of real domestic prices into real world price effect, exchange rate effect and other factors has been undertaken to determine the relative importance of

[2] In the 2001/02 season, the number of beneficiaries of APIP was reduced to 41 800 from 160 000 in 2000/01 season as a result of the high default rate among smallholder farmers (NEC, 2002).

FIGURE 5
International prices for selected commodities, 1970-2000

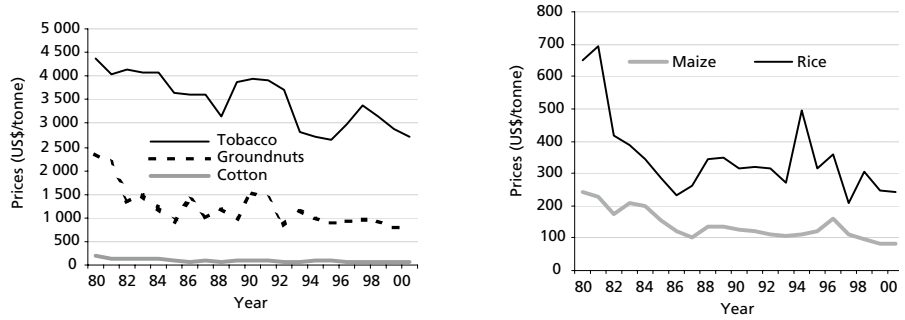
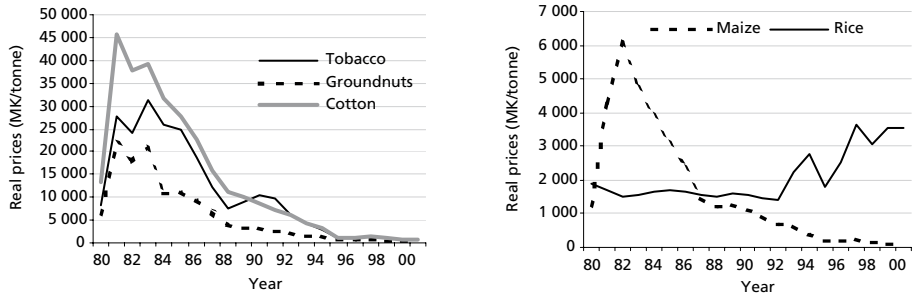


FIGURE 6
Domestic real prices of selected commodities, 1970-2000



these potential drivers of change in domestic prices for selected commodities (Chirwa and Zakeyo, 2003). Table 5 shows that real domestic prices for most tradable crops have fallen in relation to the base period (1980-84). Real exchange rate movements had a positive impact on real domestic prices in all periods, but in most cases, did not outweigh the negative effects of reductions in real world prices. The impact of changes in other policies and factors on the domestic price was positive during the reform period for all selected products except groundnuts and cotton. Large price increases for the majority of smallholder export crops were announced by the Government in the 1983/84 and 1984/85 growing seasons. However, in the post-reform period, changes in domestic policies had a negative effect on the domestic prices of export crops, whilst for the two food crops the impact was positive.

Only rice recorded an increase in real domestic prices during the post-reform period, largely due to positive changes in other policies. On the other hand, cotton has the largest fall in real domestic prices during the post-reform period mainly as a result of decreases in real world prices and the negative effects of other policies.

TABLE 5
Sources of change in real domestic prices of selected commodities (percent of 1980-1984 period)

Crop	Period	Change in real domestic price	Change in real world price	Change in real effective exchange rate	Change in other policies and factors
Tobacco	1985-89	-3.3	-14.3	10.7	0.3
	1990-94	1.9	-18.9	17.4	3.4
	1995-00	-9.5	-33.0	41.6	-18.1
Groundnuts	1985-89	-36.0	-44.7	10.7	-2.0
	1990-94	-65.2	-37.4	17.4	-45.3
	1995-00	-16.9	-58.0	41.6	-0.5
Cotton	1985-89	-19.4	-49.2	10.7	19.1
	1990-94	-43.5	-57.7	17.4	-3.2
	1995-00	-38.2	-68.0	41.6	-11.8
Maize	1985-89	-27.4	-48.0	10.7	9.9
	1990-94	-33.6	-59.7	17.4	8.7
	1995-00	-13.0	-64.7	41.6	10.1
Rice	1985-89	-2.6	-52.5	10.7	39.2
	1990-94	13.2	-37.4	17.4	33.2
	1995-00	60.8	-58.0	41.6	77.1

Notes: Prices and exchange rate used are real prices and real effective exchange rates, respectively.
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 authors from Reserve Bank of Malawi, Financial and Economic Review and IMF, International Financial Statistics.

Although it is difficult to single out the effects of single policies, the 1991 liberalization of tobacco prices might explain positive effect of other policies in second period of reform in contrast to the other export crops which had already been liberalized.

As discussed in the previous section, the periods during and after economic reforms have been characterized by high macroeconomic instability reflected in high levels of inflation and interest rates. This, along with inefficient marketing, may have worked against improvements in domestic producer prices. Market integration analysis (Chirwa and Zakeyo, 2003) shows that for major markets, integration was better in the period after price liberalization than in the period before, indicating an improvement in the efficiency of the marketing system. However, for remote areas where most farming households live and where transport costs are high, the results are less conclusive and the transmission of positive price developments is likely to be poor.

Price analysis (Chirwa and Zakeyo, 2003) has revealed a weak relationship between international export prices and real producer prices, suggesting that increases in export prices have not filtered down to domestic producers. One likely reason for this is the fact that marketing, and especially the export of agricultural commodities, is uncompetitive and dominated by a few enterprises with the power to suppress farmgate prices. The problem is compounded by the fact that Malawi is a landlocked country and therefore faces particularly high transport costs.

Although prices for most food products have been liberalized, it seems there has been little change in the structural constraints facing private traders. Prices in the main cities of Lilongwe and Blantyre were found to be key drivers of price movement in other markets for beans, and maize and groundnuts. For rice, Karonga, a border town with Tanzania and the main rice producing area, was found to be central to price formation in other markets. The Government can therefore influence the prices of food crops in rural markets through market operations in these three markets. Blantyre for maize and groundnuts, Blantyre and Lilongwe for beans, and Karonga for rice represent the potential focus for government price stabilization policy.

The weak integration of domestic markets can be explained by poor infrastructure, particularly in the rural areas. Mkwezalamba (1989) and Harris and Crow (1992) note that the problems of transport infrastructure, high transport costs, slow access to information, and lack of marketing skills and finance prevented private traders from effectively replacing the state marketing agency. These factors have not changed significantly over time and they remain the most important problems in commerce and trade (ECI and NSO, 2001). In addition, most private traders in the rural areas are small buyers operating locally and do not have the capacity to store products to take advantage of inter-seasonal arbitrage (Fafchamps and Gabre-Madhin, 2001; Mvula et al., 2003). The oligopolistic behaviour of private traders in local markets is seen by some as disadvantageous to unorganized farmers. Similarly, the deregulation of agricultural input marketing has not led to increases in the number of private traders dealing in input markets. One reason for the limited response from the private sector in agricultural input marketing is the fact that such trade requires substantial capital compared with produce marketing. This limits participation to large firms who are usually unable to meet the needs of small farmers.

Agricultural marketing was deregulated in 1987 and the pricing reforms for all agricultural products except for maize were finalized in early 1995. Chirwa and Zakeyo (2003) suggest that market integration is higher in products in which there has been complete price liberalization (groundnuts, beans and rice), and this may indicate that the fixed-price band that existed for maize up to 2000 could have constrained the activities of private traders. In rice, for example, the operation of private traders has been more significant.

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 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.

Against this background, the growth rate of aggregate agricultural output[3] has been erratic, particularly during the period of the reform programmes. During the

[3] Agricultural production estimates tend to overstate food production and area under cultivation (World Bank, 2003). While it is recognized that land is a major constraint, the area under cultivation for all major crops has according to the data been increasing and there appears to have been no major crop substitution. Estimates of cassava production and potatoes are overstated since these crops are grown by only a small proportion of rural households.

BOX 1
Agroclimatic conditions

Malawi is a small landlocked developing country in southern central Africa with an area of 11.8 million hectares, of which 9.4 million hectares is land. One-fifth of the surface is water - Lake Malawi. The country is bordered by Mozambique to the south, south-east and south-west, Tanzania to the north and north-east and Zambia to the west and north-west.

Topographically, the country is characterized by a diverse physical environment with rift valley floors, rift valley escarpments, highlands and plateaux (GoM, 2001). Soils are also diverse - latosols, one of the best agricultural soils in the country, cover about 2.2 million hectares.

Malawi has a tropical climate, with mean maximum temperatures of about 30°C on the southern Shire Valley floor and 25°C on the plains on the centre and the north. Rainfall ranges from 600 millimetres to 2 000 millimetres per annum. During the wet season, from mid-November to early April, an average of 1 200 millimetres of rain falls. The wet season provides the single growing season with most cultivation being rain-fed. This makes the agricultural sector and the economic development of the country especially prone to adverse natural conditions. Recently, drought-and weather-related disasters have occurred in southern Africa more generally and in Malawi in particular. Most parts of the country experienced severe food shortages in 1992 and 1994 through drought, and in 1997 and 2001 because of heavy rains.

Of the 9.4 million hectares of land area, 48 percent is under cultivation, but only 32 percent is suitable for rain-fed cultivation under the prevailing management systems. This implies that 16 percent of cultivation is taking place in marginal and unsuitable land areas. There is little irrigated farming, and in most cases irrigation is on large-scale farms and on smallholder farms on government or NGO schemes. Only 7 404 hectares was under irrigation between 1960 and 1990 (GoM, 2001). Although the potential for irrigation along the lakeshore and the Shire River basin is high, the country has not fully utilized its water resources for irrigation agriculture.

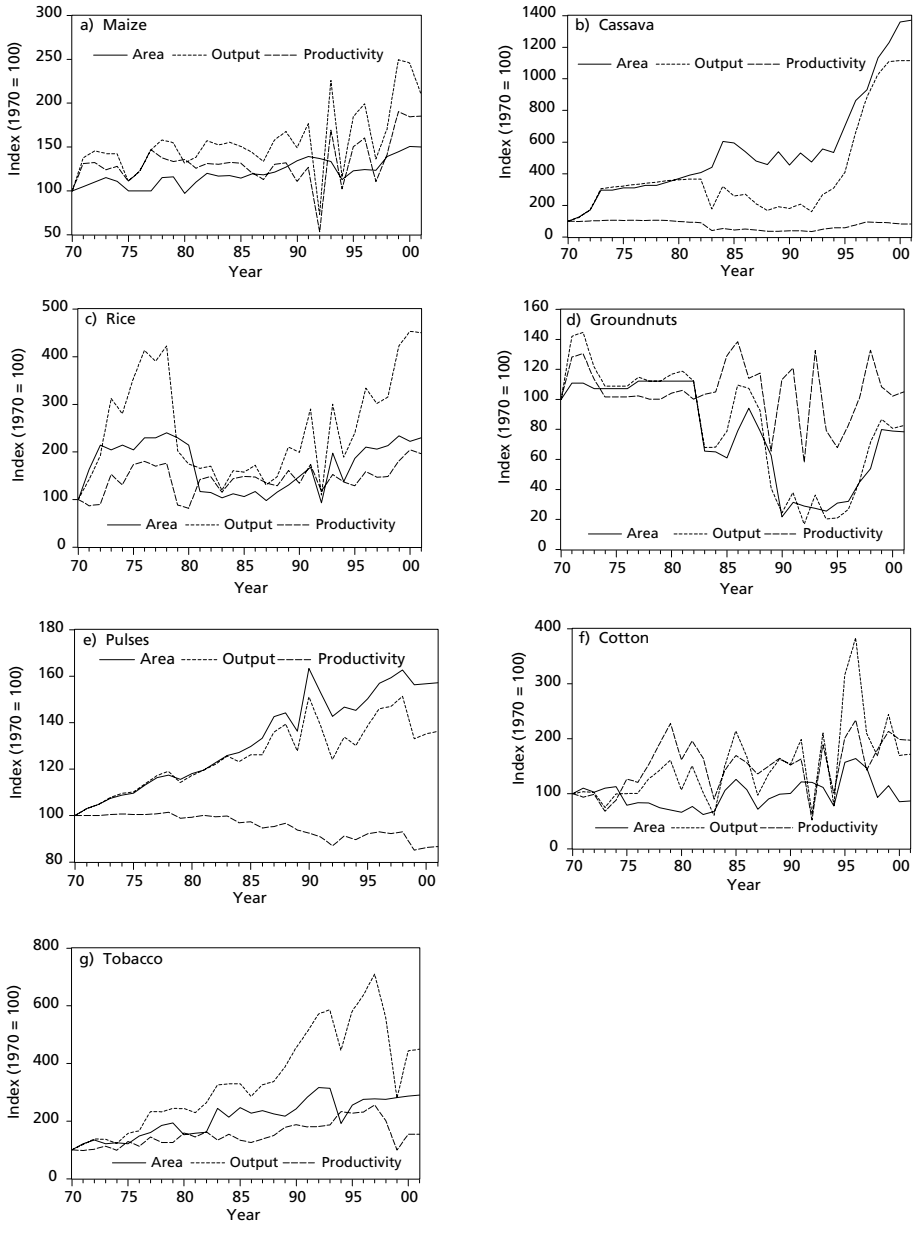
1970s, the agricultural sector grew at an average rate of 6.6 percent per annum, but growth rates were lower in the first decade of reforms – averaging 3 percent per annum – and declined further to 2 percent per annum in the 1990-94 period and to 1 percent per annum in 1995-2001.

The relative effects of changes in area under cultivation and changes in productivity on output growth are reflected in Figure 7. Overall, there has been growth in the production of key crops, particularly in the 1990s, with increased area under cultivation accounting for most of these increases.

For maize, the area under cultivation has marginally expanded over time, but production and productivity have been characterized by swings and slumps, particularly around the drought years of 1992, 1994 and 1997. There have been

FIGURE 7

Cultivated area, output and productivity for selected crops, 1970-2001



Source: Computed by authors based on FAOSTAT data.

marginal increases in average yields of maize, and these small increases are attributed to increased adoption of hybrid and composite maize seeds distributed through the free input programmes. Indeed, in years where increases in food production have occurred it has been largely attributed to non-price factors such as good weather and the implementation of the agricultural safety net programmes, including the free "starter pack", the targeted input programme, and the input credit facilities under the agricultural productivity and improvement programme and from the Malawi Rural Finance Company (World Bank, 2003).

The area under cultivation has also been the driving force for increased output of cassava and pulses, where productivity has remained relatively stable or in the case of pulses has declined over time.

The area under groundnuts cultivation generally fell substantially between 1980 and 1996, while productivity remained relatively constant around the 1970 level. This period was also characterized by substantial reduction in the real producer price for groundnuts in the domestic market. For tobacco, production grew by 5.7 percent with a productivity fall of nearly 1 percent offset by area under cultivation increase of 6.6 percent during the 1995-2001 period.

The decrease in the yields of maize and other food crops is attributed to fragmentation of land through subdivisions within the family, poor soil fertility due to overuse of plots, lack of inputs such as fertilizers, and increases in the prices of inputs, particularly fertilizers. Most poor households cannot afford fertilizers and used to rely on the government agricultural input credit scheme that is no longer available.

The upward trend in output for most crops is somewhat surprising, given that real domestic producer prices and international prices for tradable crops have been falling. Unless producers are expanding production to maintain their income levels, this negative relationship between prices and supply may be purely a reflection of the poor quality of production data, as noted by World Bank (2003).

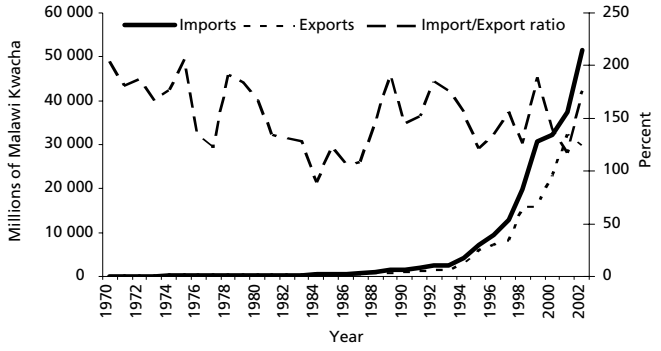
This perverse supply response is further revealed in a regression analysis of individual crops' output on real prices, area under cultivation and real effective exchange rate (Chirwa and Zakeyo, 2003; Danielson, 2002; Lamb, 2000). The analysis shows a generally weak supply response, with negative supply responses in tobacco and rice. Only cotton and maize reacted positively to price incentives. In all the models, production increases primarily due to increases in area under cultivation. The real depreciation of the kwacha (an increase in REER) provided incentives for increased production only in cotton and maize production.

Effects on imports and exports

The balance of trade continues to be adverse. Exports and imports have been increasing in value at similar rates over the period, but the visible trade balance has actually worsened. Chirwa and Chilowa (1999) note that as a proportion of GDP, imports have generally been higher than exports. The visible trade deficit in the early 1990s was more than ten times the deficit recorded in the 1970s. The trend in imports and exports in Figure 8 show the impact of international trade policy reforms in the 1990s. The steady increase in the volume of imports and exports from 1990, and substantially from 1995, indicates greater openness of the economy.

The agricultural sector contributes more than 90 percent of foreign exchange earnings but the export basket is dominated by the traditional exports of tobacco,

FIGURE 8
Imports and exports, 1970–2002



Source: Computed by authors based on Reserve Bank of Malawi, *Financial and Economic Review*.

TABLE 6
Composition of exports by main commodity, 1970-2001 (percent)

Commodity	1970-79	1980-89	1990-94	1995-2001
Tobacco	47.7	54.0	68.7	61.4
Tea	21.2	16.3	9.6	8.6
Groundnuts	7.7	2.5	-	-
Cotton	2.9	1.0	1.0	1.3
Sugar	7.2	11.7	6.5	8.3
Coffee	-	-	-	1.6
Pulses	-	-	-	0.8
Rice	-	-	-	0.4
Other	13.3	14.5	14.1	17.6

Source: Chirwa and Chilowa (1999) and NEC (2002).

tea and sugar (Table 6). There has been little change since the implementation of economic reforms: tobacco remains the principal export accounting for more than half of the total export earnings and its share in exports has increased from 47.7 percent in the 1970s to 62.8 percent between 1990 and 2001. Tea is the second largest foreign exchange earner but its significance has declined from 21.2 percent in the 1970s to 8.6 percent in the late 1990s. Non-traditional exports that have emerged in since the late 1990s include coffee, pulses and rice, although they still contribute less than 3 percent to total exports, while groundnut exports became insignificant during the 1990s. Although the international price for groundnuts has been stable, the export market for Malawian groundnuts collapsed. One likely reason for this is that, prior to liberalization of agricultural marketing services, groundnuts bought from smallholder farmers were being exported by ADMARC, but after liberalization ADMARC's role has substantially diminished. Domestic trade in groundnuts is dominated by small private traders who eventually sell to domestic manufacturers.

Overall, export earnings in dollar terms have been declining since the late 1990s, due to declining international prices, declining profitability in smallholder agriculture

resulting from disproportionate increases in input prices, high transport costs and the poor macroeconomic environment (World Bank, 2003).

The analysis of production and prices has shown that economic reforms have not led to a substantial transformation of agricultural production. The price transmission mechanism between international prices and domestic prices for agricultural tradables is weak for most commodities, although there is evidence of improved spatial market integration among some domestic markets.

While the policy constraints on private sector participation have largely been eliminated, the private sector has not responded as hoped. International trade is still dominated by a few enterprises; private traders in agricultural marketing in the domestic market remain small and continue to face business constraints and a high risk market environment; farmers remain unorganized and are in a weak bargaining position in relation to traders.

CONSEQUENCES OF REFORMS: TARGET VARIABLES

National food security

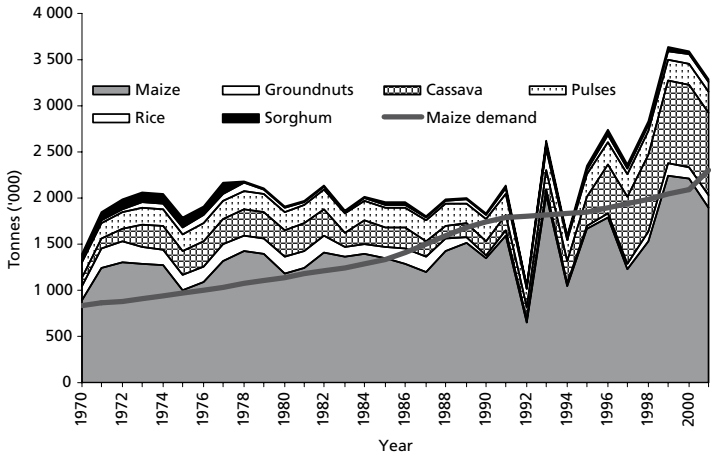
National food security is defined by the Government in terms of accessibility to maize, the main staple food. Thus, even if total food production is above the minimum food requirement, the nation is deemed to be food insecure if maize supply is below this requirement. Other food crops such as rice and cassava are alternatives to maize in some parts of the country, but maize has remained the main staple food, in spite of government policy to promote other crops, particularly those that are resistant to drought, such as potatoes and cassava. In a study of recipients of free inputs in the 1999/2000 season, 96.4 percent of households reported that maize was the staple food, while cassava is a staple for only 2.8 percent and rice for 0.5 percent of the sampled households (NSO, 2000c). Cassava is the main staple only in one northern district.

Measured against the minimum maize requirement, Malawi was self-sufficient in maize production in the 1960s and 1970s. During these periods, records indicate that no maize imports were required to augment domestic supply.[4] Msukwa (1994) notes that with increases in the population since the mid-1980s, Malawi moved from a situation of national self-sufficiency in food production to recurring food deficits. The period of economic reforms has been characterized by increased imports of maize to satisfy domestic demand, partly due to poor weather conditions, low maize productivity and high population growth. According to the World Bank (2003), per capita maize production in the last decade has fluctuated between 170 and 220 kg, with sharp declines in 1992 (67 kg) and in 1994 (105 kg).

ADE (2000) estimated that imports of maize were typically between 100 000 and 150 000 tonnes during the years of shortages after 1987. Taking maize as the main staple food and using a consumption of 185 kg per capita, the national food situation was relatively better in the 1970s compared to the situation since the late 1980s. In some cases, other food crops such as cassava, pulses, rice and sorghum are substituting for maize production. Estimates of cassava production show

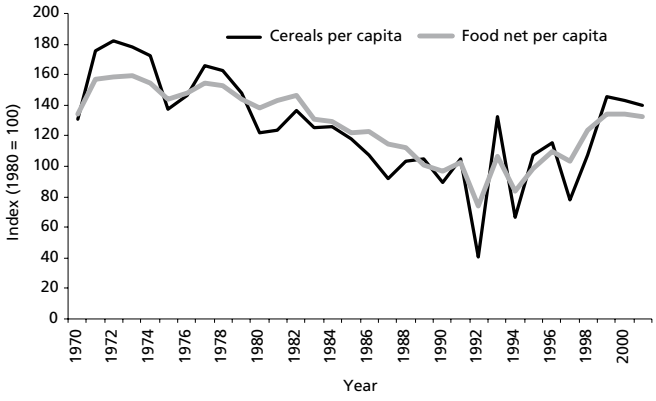
[4] However, data from FAO indicate that Malawi has been importing maize almost every year since independence.

FIGURE 9
Production of main food crops, 1970-2001



Source: Computed based on FAO data

FIGURE 10
Cereal and food production indices, 1970-2001



Source: Computed based on FAO data

substantial increases in the late 1990s, but, as observed above, only a few households produce cassava and estimates for root crops (cassava and sweet potatoes) tend to be overstated, thus understating potential food shortages. In the 2001/02 season, the national food security situation worsened following a couple of relatively good years in terms of production (Figure 9).

The trends in national food security are revealed in per capita production of cereals and food crops between 1970 and 2001 (Figure 10). Per capita production of both

TABLE 7
National food supply, 1988-90 and 1998-00 (thousand tonnes)

Type of food crop	1988-1990				1998-2000			
	Production	Imports	Exports	Total supply	Production	Imports	Exports	Total supply
All Food	10 418.96	401.36	289.79	10 511.83	17 095.61	460.91	261.90	16 397.48
Maize	1 425.39	132.55	0.43	1 580.84	2 251.04	119.06	0.08	1 936.68
Cassava	340.00	0.01	0.01	340.01	876.59	0.00	0.46	876.13
Rice	26.97	0.41	3.75	23.62	57.69	0.87	5.40	53.15
Millet	0.00	0.14	0.00	0.14	19.79	0.05	0.02	19.82
Sorghum	11.05	0.00	0.00	11.05	39.89	0.92	0.31	40.50
Potatoes	0.00	0.01	0.00	0.01	1 731.57	0.01	0.17	1 731.41
Beans	0.00	0.41	0.01	0.40	64.96	0.48	0.92	64.52
Peas	81.33	0.00	0.00	80.00	0.00	0.05	1.73	-1.67
Other pulses	152.60	0.60	7.90	145.11	169.17	0.60	14.47	156.47
Soybeans	0.00	0.03	0.02	0.01	0.00	0.07	4.04	-3.96
Groundnuts	55.98	0.00	12.01	43.96	84.45	0.00	2.10	82.36
All other	8 325.64	267.20	265.66	8 286.68	11 800.46	338.80	232.20	11 442.07

Note: Total supply includes changes in stock that are not reported in the table.
Source: FAOSTAT.

cereals and food crops has followed a declining trend, particularly between 1980 and 1991 during the early period of adjustment, although production per capita has increased since then. There is also high variability in per capita cereal production, particularly in the 1990s, due to the droughts in 1992, 1994 and 1997.

Most of the agricultural sector reforms, particularly the domestic pricing reforms that took place in the 1990s, seem to correlate with increases in total cereal and food production. However, per capita cereal and food production during the adjustment programmes (1981-2001) has on average been substantially lower than in the pre-adjustment period. While the total food supply per capita increased by 36 percent, the per capita supply of maize has fallen from 149.4 kg per year in 1988-90 to 134.3 kg per year in 1998-2000, representing a decline of 10 percent in both total per capita supply and in per capita calories per day. The decline for maize has been compensated by increases in the supply of other food crops particularly cassava and potatoes. Aggregate data, however, mask food security problems at the household level where alternatives to maize are not always available or desired.

Trends in malnutrition

An indicator of nutritional status of the population is the nutritional status of children under five years of age. Table 8 presents three protein-energy malnutrition indicators: stunting (low height-for-age), representing chronic malnutrition; wasting (low weight-for-height), representing acute malnutrition; and underweight (low weight-for-age), describing the overall measure of malnutrition. CSR (2002) and GoM/NSO (1996) note that wasting is a sensitive indicator; and its levels can change rapidly with food availability or disease prevalence.

All three indicators show rising levels of malnutrition followed by declines, but over the whole period between 1992 and 2000 the situation did not improve. The late 1990s was characterized by episodes of drought or bad weather, which may account

TABLE 8
Nutritional status of children under-five years, 1992- 2000 (percent)

Indicator	1992 (DHS)	1995 (MIS)	1998 (IHS)	2000 (DHS)
Stunting	48.7	48.3	59.1	49.0
Wasting	5.4	7.0	9.3	5.5
Underweight	27.2	29.9	29.6	25.4

DHS = Demographic and Health Survey, MIS = Multiple Indicators Survey, IHS = Integrated Household Survey.
Sources: CSR (2002), GoM/NSO/CSR (1996), NSO and ORC Macro (1994, 2001).

for the rising levels of malnutrition during that time. The trends are linked to those in food production and per capita supply of maize.

Household level food security

Household level food security needs to be assessed against an understanding of the demographic and poverty context. In 1998 the population of Malawi was estimated at 9.9 million people growing at 1.9 percent per annum. About 17 percent of the population was under five years and 33 percent was between 5-17 years. The labour force constitutes about 41 percent of the population. The southern region is the most densely populated region with 146 persons per square kilometre compared to the density of the central region of 114 persons and the northern region with 46 persons per square kilometre.

About 65 percent of the population is poor, with consumption of basic needs falling below the minimum level of MK10.47 per day in 1998 (GoM, 2002). In addition, 28.2 percent of the total population live under dire poverty conditions. Consumption inequalities are also evident, with a Gini coefficient of 0.40. For example, the richest 20 percent of the population consumes 46.3 percent of total consumption of goods and services while the poorest 20 percent consume only 6.3 percent.

Poverty is more prevalent in the rural areas, where most of the population lives, than in the urban areas: 66.5 percent of the rural population is poor compared to 54.9 percent in the urban areas. The indices of inequality in consumption also show that the distribution of consumption is more unequal in rural areas, with the Gini coefficient of 0.37 compared to 0.52 for urban areas. There are also spatial variations in the extent of poverty: southern Malawi has the highest poverty level with 68.1 percent of the population being poor, followed by central Malawi with 62.8 percent and northern Malawi with 62.5 percent of the population living below the poverty line. According to the World Bank (2003), poverty has virtually remained unchanged over the past decade.

The groups that are most affected by the state of deprivation include land-constrained smallholder farmers; labour-constrained female-headed households, estate workers or tenants; casual workers; disadvantaged children; persons with disabilities; low income urban households; the uneducated and the unemployed (GoM, 2002).

The main causes of poverty include low levels of education, poor health status, limited off-farm employment opportunities, rapid population growth putting pressure on land, lack of access to productive assets or facilities, and the HIV/AIDS pandemic. Illiteracy is estimated to be 40.8 percent, being higher among females (54.7 percent) than among males (36.2 percent) (NSO, 2000a). Average life expectancy is 37 years, while infant and child mortality rates are estimated at 104

and 189 per 1 000 live births, respectively. The greatest threat to the population and the labour force is the problem of HIV/AIDS with the nation-wide prevalence rate estimated at 15 percent, and in urban areas at 23 percent.

Whilst the national aggregate data on food supplies and food security show that food supply has been adequate for many years, the picture at household level is completely different. The national food balance shows that the supply of food per capita and nutrients per capita have increased between 1990 and 2000, although the supply for the main staple food, maize, has declined.

The trends in household food security are difficult to capture because of the absence of periodic national level surveys. Nonetheless, the available information indicates that most households in the rural areas rely on own food production, particularly maize. Of the incomes of the rural poor and non-poor, 63.7 percent and 59.1 percent respectively are from subsistence agriculture in the form of own production consumption (GoM, 2002). The poor and non-poor also spend 80.9 percent and 69.7 percent of the value of total consumption on food products. In urban areas the poor spend 57.5 percent of their incomes on food, compared to 29.8 percent for the non-poor. According to NEC (1999), nearly 60 percent of households experience food shortages, especially between the months of December and February – the lean season.

On average, rural households only have enough food from their own production for 6 to 7 months. This implies that most rural households and urban households have to buy maize and other food products from the market. However, in recent years the prices of food products have increased substantially. For instance, the food price index increased at the average rate of 33.3 percent per annum between 1995 and 2001. This, coupled with the fact that poverty levels have remained unchanged in the past decade, implies that most households are at risk for part of the year, although the entitlement to food may vary tremendously between households.

Data from the two districts of Mulanje and Mangochi (CSR and IDS, 2003) indicate that households describe the food security concept in terms of own food production and ability to acquire food from the market. In many focus group discussions, a food secure household was defined as a household that had enough maize and other food crops from its own production to last up to the next harvest and/or as a household that is able to buy food without problems. Three categories of household were typically defined in terms of food security: food secure, moderately food secure, and food insecure. The food secure usually produce enough food or enough cash crops to enable them buy food to last the household for a year. The food secure also have livestock and operate small businesses and usually apply fertilizers to their plots. The moderately food secure will usually harvest maize and other food crops that would last for three to four months and struggle to buy food from the market after that. The moderately food secure have little livestock and a few operate small businesses but cannot afford fertilizers. The food insecure usually either produce maize to last the household for a month or eat the maize while green and rely on casual employment to purchase food throughout the year.

Changes in food production at household level

Food crop production trends between 1998 and 2002 are presented for various categories of rural farming household in Table 9. The land size category of less than

TABLE 9
Mean food crop production of farm households by land size, 1997/8 and 2002 (kg)

	IHS 1998				CPS 2002			
Land size (ha)	**0.00–0.69**	**0.70–1.49**	**1.50–1.99**	**Over 1.99**	**0.00–0.69**	**0.70–1.49**	**1.50–1.99**	**Over 1.99**
Maize (local)	157	371	534	828	-	449	235	200
Maize (hybrid)	341	611	673	859	-	350	414	278
Cassava	599	1 671	1 976	1 642	-	175	637	332
Groundnuts	231	242	261	499	-	134	132	95
Rice	652	796	572	326	-	250	197	251
Millet	-	273	25	-	-	33	13	38
Beans	6	50	45	101	-	2	15	13
Sweet potatoes	-	-	-	-	-	55	64	43
Soybeans	-	-	-	-	-	-	270	4
Pigeon peas	-	-	-	-	-	17	9	15
Other	111	83	620	38	-	-	-	-
No. of households	270	161	39	23	254	24	151	140

Notes: IHS = Integrated Household Survey; CPS = Complementary Panel Survey.
Source: Computed from NSO (2000d) and CSR (2002).

0.7 hectares has 125 households that are landless in 1998 while all households in this land-holding category appear to have become landless by 2002.[5] The number of landless households has increased. Aggregate maize production fell for households with more than 0.70 hectares of cultivated land. However, other food crops such as sweet potatoes, soybeans and pigeon peas have emerged as alternative products. Recent studies in the rural areas tend to show that the structure of food crop and cash crop production has remained the same, many households producing the same food crops as they were producing 5 or 10 years ago (Mvula *et al*., 2003). What has changed is the area cultivated to meet the subsistence needs of the household, particularly in the case of maize.

Households also practise intercropping in response to land shortages. In a study of four districts in southern Malawi, Chirwa *et al*. (2003) find that intercropping is practiced on more than 75 percent of surveyed plots. In some cases, production of other food/cash crops has increased, as in the case of some villages in Phalombe and Mulanje where the cultivation of rice and bananas as a cash crop has increased in order to fund the purchase of maize. Although both rice and bananas are food crops, households tend to prefer maize.

In the 1996/7 season, 3.9 percent and in the 2001/02 season (particularly between January and March) about 78 percent of farming households were without food from own production (NEC, 2002). A survey of farming households found that 83 percent of respondents run out of maize before the next harvest, with 64 percent being without food for 6 months or more Nthara (2002). Data from the 2002 complementary panel survey revealed that 94.8 percent of the 501 households produced maize as their staple food and about 40 percent ran out of stocks by the middle of the year (CSR, 2002).

[5] The figures for 2002 should be interpreted with caution because the reference agricultural season – 2001/2002 – was a drought year which may have affected production levels. In particular the number of households classified as landless may be influenced by a significant number of crop failures.

The analysis of changes in food security at the household level from the CSR and IDS (2003) data shows that in many areas in Phalombe and Mulanje districts the food security situation has worsened. The scoring from focus group discussions on the trend in food security at household levels suggest that the proportion of households that is food secure (though already small) has declined while the proportion of food insecure households has substantially increased in the last five years. This is because the yields in food and cash crops have declined and because prices of food crops have increased and many households are finding it difficult to procure maize and other staple foodstuffs.

Alternative sources of acquiring food

In order to meet the shortfall in own food production, insecure households increasingly tend to acquire food from individual private traders, at a local produce market or from the state marketing agency, ADMARC (Table 10). In 2001/02 the proportion of households acquiring food from ADMARC was lower than in 2000/01, mainly due to the fact that ADMARC was not active in the purchase and sale of maize, as a result of financial constraints (Mvula *et al*., 2003). A good proportion of households in the 2001/02 season had to rely on donations from government agencies and non-governmental organizations, while in 2000/01 most contracted informal loans to finance their food requirements. The increase in the proportion receiving government donations may be a result of the food crisis in 2002. The vast majority (81.8 percent) of households in the fourth round of the complementary panel survey revealed that they found it difficult to procure their staple (largely maize) in the 2000/01 season. The main reasons were high prices of maize and the fact that it was not readily available at ADMARC and local markets.

When farming households run out of food they also tend to cope by participating in the casual labour (*ganyu*) market for in-kind or cash payments and through distress sales of household assets to obtain cash to purchase food. Some engage in begging and some obtain consumption loans from money lenders. The focus group discussion in Phalombe and Mulanje reveal that households also cope by eating unconventional or inferior foods, reducing the size or quantity of meals, and selling forest products such as firewood (CSR and IDS, 2003).

TABLE 10
Alternative sources of acquiring food for food insecure households (percent of food insecure respondents)

Source	2000/01	2001/02
Purchase from individuals	21.36	41.18
Purchase from local market	35.00	29.41
Purchase from ADMARC	29.77	11.18
Gift from relatives	2.27	4.12
Gift from friend/neighbour	0.23	1.18
Donation from government/NGO	1.59	4.71
Credit	6.36	-
Other sources	3.41	8.24
Total	100.00	100.00
No. of households	440	170

Source: Computed from CSR (2002) data.

Changes in income and expenditure patterns

Because of data limitations in the pre-reform period, the impact of economic reform is explored by using two recent data sets that contain a matched sample of households. First, in 1997/98 the NSO (2000b) conducted the integrated household survey based on a national sample. The data for this period captures the early period in the post-reform era. Secondly, since 2000 the Centre for Social Research has conducted a panel study of a sub-sample of the 1998 household integrated survey. Four rounds of this sub-sample panel have been completed, and the fourth round data is used for comparison with the 1998 data in an attempt to capture the effects of reforms.

The absence of employment surveys in Malawi means that it is not possible to track changes in wages and employment opportunities. This study has therefore been unable to address the impact of the reforms on rural labour markets.

The data presented in Table 11 suggests that household welfare has not improved during the post-reform period.[6] Land size is seen to be a positive determinant of household welfare, with average expenditure increasing with larger land sizes in both periods. As a proportion of total expenditure, food expenses fall as land sizes increase.

What is also apparent is that both real expenditure and average expenditure on food substantially declined in 2002, suggesting that household welfare has worsened in the post-reform period. This can be explained by declining per capita production, weaker international prices, and declining real domestic prices.

Studies show that private traders operate as local oligopolists when buying produce from smallholder farmers, often reducing payments to farmers by underweighing their produce (Mvula *et al.*, 2003). During times of food supply shortages, these private traders charge high prices for maize which most rural consumers cannot afford.

Because of increases in input prices resulting from the depreciation of the kwacha and the declining prices for key crops, there has been a decrease in the profitability of some major crops grown by smallholder farmers. The World Bank (2003) shows that average gross margins for burley tobacco, cotton, paprika, cassava and groundnuts declined substantially between 1995 and 2001. Not many farmers belong to marketing co-operatives – most sell their produce to private traders and lack bargaining power in such transactions (Mvula *et al*., 2003).

POLICY LESSONS

Malawi has implemented most of the recommended economic policies, but the performance of the economy and the development of the agricultural sector are not promising. The analysis of economic and trade reforms shows that major policy reforms were completed by early 1995, although problems of programming and sequencing were evident during the adjustment period. In addition, the Government has at times been hesitant in implementing policy, leading to policy

[6] Income levels are difficult to estimate or recall in rural areas and there is a tendency for respondents to overstate or understate the true level of income. Here, we assume that consumption expenditure data is more representative of trends in household welfare and income.

TABLE 11
Annual real expenditure of farm households by land size, 1997/98 and 2002 (average Malawi kwacha per household at 1998 prices)

Land size (ha)	IHS 1998				CPS 2002			
	0.00–0.69	0.70–1.49	1.50–1.99	Over 1.99	0.00–0.69	0.70–1.49	1.50–1.99	Over 1.99
Food expenses	4 461	8 092	11 452	13 205	4 217	6 876	6 690	7 495
House expenses	750	566	1 750	420	724	553	452	630
Clothing	1 218	1 181	2 114	2 697	414	790	1 109	614
Household expenses	422	322	699	752	241	90	211	277
Medical expenses	118	141	97	255	161	114	137	175
Education expenses	138	114	43	512	586	112	252	1 944
Farm inputs	164	313	552	5 355	-	1 018	863	1 944
Other expenses	166	84	53	208	865	99	253	469
Total expenses	7 438	10 814	16 762	23 404	7 208	9 653	9 967	11 908
No. of households	270	161	39	23	254	24	151	140

Notes: IHS = Integrated Household Survey; CPS = Complementary Panel Survey.
Of the households with land sizes of less than 0.7 ha, 125 households and all the 254 households in 1998 and 2000 were landless.
The 2002 expenditure figures were deflated by the consumer price index using 1998 as the base.
Source: Computed from NSO (2000d) CSR (2002).

reversals. Uncertainty about the direction of reforms and the degree of government commitment to the process created an unfavourable environment for private sector-led development and growth.

The case of Malawi demonstrates the importance of implementing an appropriate sequence of market reforms. Efforts to improve the competitiveness of markets can cause problems if the process is not well designed. For example, agricultural price controls were left in place, while input subsidies were removed and a large currency devaluation implemented that put fertilizer prices out of reach of most smallholder farmers. Controls on the marketing system were lifted in 1987, but price controls, along with import and export licensing requirements, were still in place in the first half of the 1990s. This resulted in limited price incentives for the private sector to engage in agricultural trade.

Markets for agricultural produce do not seem to have operated effectively and efficiently since liberalization. The private sector has not responded to the withdrawal of state marketing services in the less well-connected areas. Private traders continue to experience problems of transport due to poor infrastructure and a lack of financial capital. As a result, there is little competition in local markets, with the result that farmers are usually in a weak bargaining position. An unstable macroeconomic environment contributes to the risks and transaction costs associated with rural investments and marketing.

There was often insufficient ex-ante analysis of how policy reforms would impact upon different groups, especially the most vulnerable. Such analysis would have allowed policy makers to design additional polices to complement market liberalization or to compensate for some of its more harmful effects. As it was, the importance of such policies was not sufficiently recognized.

Adjustment policies were implemented hastily without considering the necessary conditions for effective policy. For example, some of the government services that benefited smallholder farmers, such as extension services, credit facilities and state-

marketing activities, were withdrawn without credible replacement institutions and without the creation of a conducive market environment and regulatory framework.

Smallholder farmers continue to face credit constraints exacerbated by the collapse in 1992 of the government administered SACA which offered subsidized credit at a national level. The MRFC, which replaced SACA, offers credit on commercial terms but agricultural credit is confined to the tobacco growers and its network is not as extensive as its predecessor's. Although the number of microfinance institutions has mushroomed in the past decade, they tend to specialize in financing off-farm business activities, with much of the available agricultural credit confined to the tobacco sector.

The collapse of SACA was also followed by the collapse of farmers' clubs that were a vehicle for the delivery of credit facilities and extension services. Many smallholder farmers remain unorganized and very few have formed co-operatives. Although the National Smallholder Farmers' Association of Malawi (NASFAM) is bridging the gap through the formation of marketing cooperatives, it operates in a limited area where accessibility is not a major problem. Membership is drawn mainly from smallholder farmers engaged in commercial agriculture, and usually food secure, rather than the food insecure who would particularly benefit from better farming practices and higher prices.

The quality and adequacy of infrastructure such as domestic and international road networks and telecommunication facilities were accorded low priority during the adjustment period. The poor road network poses a major challenge to the development of the agricultural sector and without adequate infrastructure the integration of markets and price transmission is likely to be weak, with poor implications for the ability of the private marketing system to provide production incentives to farmers. For example, the withdrawal from marketing by ADMARC has created problems of input supply and produce marketing in remote areas. Private traders engaged in agricultural input trade are located in urban areas and those engaged in produce marketing tend to operate in areas where accessibility is not a problem. Given that no regulations were developed prior to the liberalization of agricultural markets, many private traders behave as local monopsonists and tend to offer reduced prices to farmers.

The main challenges facing Malawi today remain how to achieve sustainable growth and to reduce poverty. Since 1994, government policy has emphasized the need to reduce poverty through the development of the agricultural sector and other sectors of the economy. Poverty reduction has been at the centre of government policy since the 1990s, particularly in the Poverty Alleviation Programme which emphasized raising national productivity through sustainable, broad-based economic growth and socio-cultural development. However, safety net compensatory measures have been insufficient to protect the most vulnerable from food insecurity.

In 2002, Malawi formulated its poverty reduction strategy paper with the objective of achieving sustainable poverty reduction through empowerment of the poor (GoM, 2002). The Malawi Poverty Reduction Strategy Paper (MPRSP) proposes a number of strategies in order to reduce poverty, including promotion of micro and small enterprises, provision of necessary agricultural services to smallholder farmers, improving access to credit facilities, improving rural infrastructure and provision

of safety nets. The agricultural sector is identified as the main source of pro-poor growth in the MPRSP, as it remains the most important source of income for many Malawians. The main strategies in the development of the agricultural sector include expanding and strengthening access to agricultural inputs, improving research and extension services, improving access to domestic and international markets, reducing land shortages and degradation, increasing investment in irrigation and developing farmer co-operatives and associations.

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Morocco

Abdelaziz Sbai, Mohamed Jaoad and Azzouz Jakhjoukhi[1]

EXECUTIVE SUMMARY

Pre-reform
Unlike many other developing countries, Morocco's development strategy since the 1960s gave priority to agriculture and to investment in large-scale irrigation infrastructure. On average between one-third and one-quarter of public investment and between one-half and two-thirds of agricultural investment went to irrigation. To encourage farmers, the Government provided subsidies, cheap loans, and in many cases guaranteed outlets for production. The authorities tried to regulate staple product prices of such goods as cereals, milk and certain industrial crops (sugar beet, cotton, sunflower, etc.) for the domestic market, but at the same time made a great effort to encourage export.

The reforms
The structural adjustment policy affected agriculture directly through the 1985 Medium Term Adjustment Programme for the Agriculture Sector, which aimed at liberalizing production and trade. Loans and programmes were linked to redefining the role of public intervention agencies and applying commercial principles to their management; removing obstacles to domestic and external trade (monopolies, quotas and other restrictive regulations on the trade in agricultural products); abolishing state subsidies for production inputs and introducing economic pricing for inputs and outputs; reforming agricultural credit; and privatizing some of the land and livestock that had previously belonged to the state. However, reform was more difficult to achieve than expected, and initiatives were often delayed or only partly implemented.

Impact on intermediate variables
The decomposition of prices indicates that there are three categories of product. For some, such as maize and barley, domestic prices can be partially explained by world price changes; for others, such as groundnuts or sugar crops (beet and cane), domestic price changes are mainly due to changes in other factors; a third category concerns products for which world price changes only had an impact on domestic prices during the latter period: soft wheat and sunflower. Exchange rate changes (devaluation) since the pre-reform period had a positive impact on the prices of all commodities.

[1] Abdelaziz Sbai, Département des Sciences Humaines, Institut Agronomique et Vétérinaire Hassan II, Mohamed Jaoad, Ministry of Agriculture and Azzouz Jakhjoukhi, Agroconcept, Morocco.

The cereals sub-sector was more strongly supported after adjustment than before. After a major cereal shortage between 1975 and 1985 (some 20 million quintals per year) Morocco's situation improved from 1985 thanks to a remarkable increase in output until production began to fall, from 6 700 000 tonnes (1986-90) to 4 159 000 tonnes (1997-2001), entailing a fall of 40 percent in the cereal self-sufficiency rate.

The sugar crop sub-sector was originally slightly supported at a price support (PSE) level of 8 percent, and moved to widespread protection (43 percent PSE) during the adjustment period. Oilseeds are actively supported by the Government at production and marketing stages. The PSE averaged 71 percent in 1991-93, compared with average support of 29 percent in 1980-83.

The fruit and vegetable sub-sector (tomatoes and oranges) is taxed but slightly less than before reform. (-3 percent instead of 13 percent). Vegetable farming has developed considerably. The acreage under vegetables has increased by 40 percent over 10 years

The meat sub-sector as a whole is still broadly supported, and this increased in the adjustment period to reach 58 percent for red meat and 59 percent for white meat, and is much more pronounced for meat than for milk. Red meat production has varied widely in line with fluctuations in rainfall. Milk production fell during the 1980 droughts, then recovered in 1985 until 1992 before once again falling after the droughts in 1992/93. In 1997-2001 it grew by 34 percent.

With regards to trade, the stability of increased export revenues is remarkable when one compares it to the fluctuations in production for the domestic market. The value of imports tends to vary much more, reflecting the fluctuations in domestic production and in world prices.

Impact on target variables

Despite the higher level of instability resulting from both climatic events and reductions in border protection, the reforms coincided with greater self-sufficiency for a number of commodities, especially animal products and edible oils, but with the notable exception of cereals.

The incidence of poverty fell between 1984/85 and 1990/91, but worsened during the 1990s. In 1998/99 over one Moroccan in five (22 percent) was below the poverty threshold, compared to just over one in ten (13 percent) in 1990/91. The incidence of poverty is greater in rural than in urban areas. In 1998/99 it was 29 percent compared with 16 percent in the urban areas. In 2000 the agriculture sector generated an annual income per active person 30 percent below the national income per active person.

Policy lessons

The agriculture sector has benefited from relatively high levels of support, enhanced by the devaluations during the process of reform, and the relatively slow, and resisted, implementation of price reforms. However, the high levels of protection have tended to serve the interests of large farmers and those in areas with a high agricultural production potential, and not the small producers in the semi-arid and arid zones who mainly farmed to meet their own subsistence requirements, and had few marketable surpluses.

The enduring feature in Morocco's poverty profile is its rural dimension and the shortcomings in rural living standards: poverty is both more frequently found

and more severe in the countryside than in the towns. The population has tripled since independence (1956), and the delay in taking account of this population trend has wiped out the impact of efforts made 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 economic and social imperatives.

INTRODUCTION: CONTEXT AND NATURE OF THE REFORMS

The role and level of development of the agriculture sector

Morocco's economy grew on average by 2.6 percent each year between 1990 and 2001, compared with an average population growth rate of 1.7 percent per year (Table 1). This gives a per capita GDP growth rate of about 0.9 percent per annum. In 2001 average per capita GDP was about Moroccan dirham (DH) 13 000 per year (US$1 150).

Agriculture's contribution to the economy is significant (Table 2), accounting for 15-20 percent of GDP, 40-50 percent of employment and 15 percent of exports. However, the drought years have revealed the extreme vulnerability of the economy to the vagaries of climate. In 1995 for example, agricultural GDP fell by 45 percent and GDP by 7.6 percent. The current account deficit widened to 4.7 percent of GDP, and the budget deficit to 5.8 percent.

Agricultural GDP has almost doubled from DH 10.5 billion in the 1970s to over 19 billion in the 1990s (at constant 1980 DH). However, the annual average increase in GDP from agriculture fell during the period 1970-80 to 1991-98. The agricultural trade deficit also worsened during the 1990s, growing to more than DH 3 billion (three times the 1991 figure), mainly because of increasing cereal imports due to drought.

TABLE 1
Annual average growth rate of macroeconomic aggregates in constant (and current) prices, 1981-2001 (percent)

	1981-85	1986-1991	1992-98	1999-2001
GDP	3.4(12)	5.0(11)	2.1(5.0)	2.1(3.2)
Domestic Consumption	3.0(12)	5.3(11)	0.8(4.0)	2.5(3.2)
Fixed capital formation	0.5(19)	3.9(10)	3.9(5.0)	2.58(4.03)
Exports	6(13)	8.0(11)	2.9(5.0)	6.9(10.8)

Source: Direction de la Statistique, Annuaires statistiques du Maroc.

TABLE 2
The structure of GDP, 1980-2001 (percent)

	1980	1985	1991	1998	2001
Agricultural GDP	18.4	16.6	20.8	16.0	15.6
Non-Ag GDP	81.6	83.4	79.2	84.4	84.4

Source: Direction de la Statistique, Annuaires statistiques du Maroc.

Non-agricultural GDP has grown at an annual average rate of 3.1 percent over the past decade. This growth was driven by energy (6.2 percent), transport and communications (5.6 percent), trade (2.9 percent) and manufacturing (2.8 percent).

Of the active population, 41 percent (4.4 million people) worked in agriculture in 2000. In relation to agricultural GDP, this indicates low labour productivity (DH 3 500 per employed person), compared with the average of DH 12 000 for all commercial activities, and DH 26 000 per person employed in manufacturing and energy).

The vulnerability of agricultural GDP, which varies between 11 and 21 percent of GDP depending upon the year, is explained by the importance of cereals. These account for 80 percent of the value of crop output (excluding fruit and vegetables) and occupy between 50 and 60 percent of the land under crops, 70 to 75 percent of the rainfed area (*bour* land) and 30 to 40 percent of the irrigated lands. They absorb one-quarter of household food expenditure. The small cereal farmers on *bour* land make up the majority of the agricultural population, and cereals are their main source of livelihood.

Although cereals are important everywhere, there are large regional differences in the proportion of cultivated land devoted to cereals. For example, during the 1995/1996 season, the Tanger-Tétouan region devoted only 46 percent of cultivated land to cereals, in contrast to 82 percent in Marrakech-Tensift-El Haouz and Chaouia-Ouardigha.

For oilseeds, the region of Gharb-Cherarda-Beni Hssen stands out from the other regions as these crops account for 14.6 percent of the region's area used for farming (AUF) and account for about 74 percent of the country's total area devoted to oilseeds.

Fodder crops are present in virtually every region. They generally cover less than 2.4 percent of AUF, except Grand Casablanca, where the percentage is 11.3.

Land tenure structure is unequal: the 1996 Agriculture General Census showed that 70 percent of the farmers worked 24 percent of the total AUF (on farms of less than 5 hectares) while 30 percent of the farmers worked more than 75 percent of the total area. Collective lands account for 18 percent of the total AUF, an area of 1 544 656 hectares. State-owned land covers AUF of 270 153 hectares, or 3 percent of the total AUF.

Degree of openness of the economy prior to the reforms

Unlike many other developing countries, Morocco's development strategy since the 1960s has given priority to agriculture, with the objective of modernizing agricultural research and achieving self-sufficiency, while promoting exports. Based on the need to mobilize water resources in a country where climate constraints have always been decisive, the strategy was to develop a large scale system of dams and irrigation networks, the goal being to irrigate millions of hectares by the year 2000. On average, between one-third and one-quarter of public investment and between one-half and two-thirds of agriculture investment since the mid-1960s has been devoted to agricultural water management. The Government provided subsidized services and loans and guaranteed outlets for farm output. Water user fees were minimal and small and medium-sized farms were exempt. Irrigated land had to be used according to standards and rotation plans.

Agricultural pricing policy was selective. Prices of certain commodities, such as cereals, milk and some industrial crops (such as sugar beet, cotton and sunflower)

were regulated. Trade instruments were used where necessary to bring pressure on price levels in the 1960s. In 1972/73 a new policy was implemented which led to frequent producer price increases. Public subsidies were also provided in order to cushion the impact on consumer prices. With regard to imports, world price fluctuations were also absorbed by internal stabilization measures.

The Government's trade policy was also selective, aiming to encourage the sale of products which they hoped to develop within the framework of their dams policy.

Domestically, the marketing of industrial crops was promoted within the framework of crop contracts (mainly within the irrigated perimeters) and benefited from comparatively efficient and effective organization. Milk was organized around collection centres in the intensive production zones. Soft wheat was marketed by marketing cooperatives (which were managed and supported by the state). However, other domestically marketed foods, such as barley, durum wheat, fruits and vegetables, pulses, olive oil and meats, did not benefit from any organization or support measures.

The Government has also made a great effort to promote exports. In 1965 it set up the Marketing and Export Office (OCE) which until 1985 monopolized exports of the main commodities (citrus fruits, early fruit and vegetables, vegetable and livestock products). This organization finds new foreign markets and guarantees producers comparatively advantageous selling conditions. In 1969, Morocco signed the first association agreement with the EEC which was renewed and expanded in 1976. Its primary concern was to seek guaranteed access by these commodities to the Community market.

Macro and sectoral components and the policy instruments used

The structural adjustment policy affected agriculture directly in 1985 in the Medium Term Adjustment Programme for the Agriculture Sector (PAMTSA) and was mainly supported by World Bank loans and technical assistance agreements. It involved agriculture sector adjustment programmes and loans (PASA 1 and 2), large scale irrigation improvement schemes (PAGI 1 and 2), and agriculture investment schemes (PISA 1 and 2).

These programmes followed the general objectives of the overall adjustment policy which were to liberalize production and trade and adapt resource allocation to the market philosophy. However, the greatest emphasis was on improving resource allocation, fostering increased agricultural productivity, reducing government costs, and finding ways for the state to withdraw from its high level of engagement in agriculture, especially irrigated agriculture. Loans and programmes were linked to redefining the role of public intervention agencies and applying commercial principles to their management; removing obstacles to domestic and external trade (monopolies, quotas and other restrictive regulations on the trade in agricultural products); abolishing state subsidies for production inputs and introducing economic pricing for inputs and outputs; reforming agricultural credit; and privatizing some previously state-owned land and livestock.

Macroeconomic policy

Tight monetary and fiscal policy aimed at controlling inflation were a key element of the reform process, as was exchange rate devaluation. Between 1983 and 1987 the

nominal exchange rate was devalued by about 5 percent per year. Following this, the depreciation of the dirham continued, but at a slower rate (2.2 percent per year between 1988 and 1990). In May 1990, the dirham was devalued by a further 9.3 percent.

Since 1992, Morocco has been liberalizing exchange rate settlements, allowing foreign investors to repatriate profits or the proceeds from asset sales and also to give banks and companies access to foreign borrowing. This system has played a decisive role in the privatization process.

Bank loans to agriculture expanded under strong administrative supervision at the beginning of the 1980s. During this period the National Agricultural Credit Fund (CNCA) was virtually the only source of medium term agricultural credit.. The present situation is much more complex because problems linked to agricultural risks (drought, floods, slumps, land disputes, etc.) have compounded the problems of restructuring the CNCA.

The agriculture sector is underfunded. According to the Al Maghrib Bank, agriculture credits were DH 16.5 billion in 1995, 17.9 in 1996 and 18.2 in 1997. This accounts for 12 to 13 percent of total bank credits, while the contribution of agriculture to national income varies from 15 to 20 percent, depending on the year. The underfunding of agriculture is exacerbated by anti-inflationary monetary policy and high real interest rates.

Specific agricultural policy reforms

PASA 1 was implemented from 1985 to 1987, with the following objectives:

- reform of public sector expenditure and investment in the agricultural sector, with emphasis on short term investments with a high rate of return; irrigated agriculture; and the maintenance of existing production infrastructure;
- removal of agricultural price distortions whilst maintaining adequate incentives for agriculture via an Agricultural Development Fund (FDA);
- strengthening of government agriculture support services and improvement of cost recovery through a more commercial orientation;
- development of institutional capability in agricultural policy planning and analysis, with a focus on improving agricultural productivity and protecting the natural resource base;
- abolition of fertilizer subsidies and improvement of the water charge recovery rate to 90 percent was also initiated under PASA 1.

PASA 2 set ambitious targets from the outset. These included removing trade restrictions, particularly on imports, and abolishing basic foodstuff consumption subsidies. These measures were to be accompanied by the liberalization of the relevant markets (such as wheat flour, sugar, edible oils). However, it quickly became clear that these objectives would be more difficult to achieve than expected, and despite various changes to make the plan more flexible, it was only partly implemented. Consumption subsidies were maintained for sugar, seed oil and flour (although with an upper limit on the volume of flour to be subsidized) and market liberalization was far from complete.

The current policy regarding external trade and agricultural prices is the result of the reform begun in the 1980s under the adjustment policy for agriculture and of agreements with the European Union in 1995 and the WTO. Despite spectacular liberalization of progress in some sectors, the transition is not yet complete.

TABLE 3
Price policy for cereals, 2000

	Floor price DH/tonne	Price band DH/tonne	Consumer price	Observations
Soft wheat	2 500	2 500/2 800	Subsidy	Limited to a quota administered by ONICL
Wheat	None	3 000/3 400	None	
Barley	None	Variable according to the year	None	Subsidy distribution in case of drought
Maize	2 200	2 000/2 400	None	Seasonal protection

Source: ONICL. National Interprofessional Board for cereals and pulses.

Cereals

Price policy for cereals prior to reform was based on fixing producer prices for soft wheat and supporting prices for durum wheat, barley and maize. Support prices, based on estimates of production costs, were announced at the beginning of the agricultural season. However, financial constraints prevented the Government from effectively supporting prices and the collection of cereals through the official distribution system did not cover the majority of producers.

Cereals sector reforms (Table 3) involved the adoption of a new producer pricing formula based on world prices. Other initiatives involved abolishing domestic and soft wheat flour subsidies and price controls for all other flours; setting national wheat production quotas; deregulating international trade in wheat, barley and maize, using tariffs instead of quantitative restrictions; and deregulating the national seed marketing system. However, not all of these measures have been effectively implemented due to pressure from vested interests and resistance to the removal of consumer subsidies.

Sugar

Sugar beet and sugar cane is bought by the sugar factories at the government administered purchase price. The price is set on the basis of the production costs of the least-efficient producers. The refineries sell the granulated sugar to wholesalers at a fixed price.

A ban exists on increasing sugar refining capacity except in regions where the existing capacity is 100 percent utilized, and on condition that all future capacity increases are restricted to the most highly-performing zones. Sugar sector reforms involved price reforms, the privatization of some factories and gradual elimination of the burden of sugar on the state budget. Liberalization of sugar beet pricing and marketing was implemented gradually in 1987 and 1988 (Table 4).

TABLE 4
Border protection for sugar, 2000

Product	Customs protection	Tax	Target price band DH/tonne
Raw sugar	93 percent	15 percent	4 600/4 800
Granular sugar	95 percent	15 percent	5 550/5 850
Sugar cubes and pieces	103 percent	15 percent	6 350/6 650

Source: Base de Données. Conseil Général du Département de l'Agriculture.

TABLE 5
Border protection for oilseeds, 2000

Product	Customs protections	Tax	Target price band DH/tonne
Sunflower seeds	66 percent	15 percent	4 600/4 800
Raw oil	84.5 percent	15 percent	10 100/10 300
Refined oil	55 percent	15 percent	

Source: Base de Données. Conseil Général du Département de l'Agriculture.

Oilseeds

A formula, based on world prices, is used by the Government to set oilseed producer prices and cake prices. For imported seed an import licence is required (Table 5).

Meat

The marketing of red meat is less regulated than milk. The Casablanca and Rabat slaughter-houses are free to set their own carcass meat prices. In other slaughter-houses the selling price may be set by the municipal authorities, even though quality differences often make these prices difficult to apply in practice. In principle, meat used to be subject to a 45 percent customs duty, 12.5 percent tax and 19 percent VAT, but meat imports are virtually non-existent due to quantitative restrictions and beef is subject to a 380 percent customs duty following the WTO agreement. White meat prices are not state-controlled. The implementation of PASA led to various measures to restrict government intervention both with regard to domestic support and protection.

Dairy products

After 1971, the Government set consumer and producer prices for milk, as well as the processing margins. Milk consumer price compensation was established in 1975 and was abolished in two stages in 1978 and 1982. The Government then liberalized the prices of several milk derivatives (such as butter, UHT milk, cheese). The Government continued to set the producer price of fresh milk, the pasteurized milk processing margin and the consumer price of pasteurized milk; and also controlled the quantities and prices of imported dairy products, setting minimum prices at the border.

Powdered milk is governed by another set of import and utilization regulations. Since 1983, application requests have been refused and there have therefore been no powdered milk imports. To ensure that powdered milk does not compete with national dairy production, it is sold to the milk factories at prices that will ensure that the reconstituted milk produced from it is equal or above the price of milk supplied by farmers.

PASA has led to several attempts to limit government intervention in the dairy industry. These measures relate to the following: better use of resources in the dairy sector; deregulation of milk prices; liberalization of the dairy sector with: authorization for the production of skimmed milk; increased seasonal price difference to milk producers, 20 percent initially and subsequently higher; and the abolition of all consumer price controls on milk. The liberalization of dairy products has been implemented. Milk prices were liberalized in February 1993 under PISA 1.

Agricultural inputs

In general, agricultural inputs are duty-free or tax-free, or subject to the minimum of 2.5 percent. This applies to fertilizers and phytosanitary products, irrigation and agricultural equipment. The exceptions relate to certain seeds (cereals and potato), veterinary products and small agricultural implements.

Customs duty on imported feeds varies from 2.5 percent (bran, sugar beet pulp, dehydrated alfalfa) to over 60 percent. Variable rates are applied between these two extremes to cereals, cereal substitutes and oilseed cake.

Subsidies for consumable agricultural inputs have been gradually removed. Fertilizer subsidies were finally abolished completely in 1990. Subsidies for the use of selected seeds have been abolished but subsidies for producing them have not. Irrigation subsidies have fallen as water charges have risen, leading to the recovery of a major part of the operational and maintenance costs.

CONSEQUENCES OF REFORMS: INTERMEDIATE VARIABLES

In assessing the effects of reform on output incentives, the relationship between international and domestic price changes of commodities are investigated in relation to other possible drivers, such as the RER and improvements in the efficiency of domestic marketing systems. It should be noted that many of the reforms that have been implemented simultaneously or sequentially are aimed at removing structural bottlenecks that impede the proper functioning of the market mechanism. It is therefore difficult to isolate specific policies that have positively or negatively affected agricultural incentives.

International and domestic prices

The linkage between the domestic price, world price and other variables is analysed taking two complementary approaches. The first is to decompose the changes in domestic prices into several components: world price changes, real exchange rate changes and changes due to other factors (customs, import restrictions, other policies, etc.). The second approach tests the relationship between domestic prices of agricultural products and the explanatory variables. In both cases, price indices are expressed in real terms taking 1995 as 100. For sugar beet and sugar cane, domestic prices are related to the world price of raw sugar.

Decomposition of price changes[2]

The decomposition in Tables 6 and 7 are expressed first in relation to the pre-reform period (1980-85) and then in relation to the reform and post-reform periods. The tables suggest that there are three categories of products:

[2] In order to gauge the relative contribution of world prices, exchange rates and all other factors to changes in real domestic prices, a simple decomposition method using the following equation was employed:

$$ln(P_d^1 / P_d^0) = ln(P_w^1 / P_w^0) + ln(E^1 / E^0) + ln(t^1 / t^0) + ln(c^1 / c^0)$$

where superscripts 0 and 1 represent two time periods, P_d is the real domestic price, P_w is the world price, E is the exchange rate, t is the *ad valorem* tariff and c represents other transaction costs.

TABLE 6
Price decomposition. Changes in relation to the pre-reform period (percent change in relation to 1980-85 reference period)

	Period	Domestic price change	World price change	Change in real exchange rate	Change in other factors
Soft wheat	1986-90	15.1	-41.0	23.7	32.5
	1991-96	-0.3	-44.8	22.1	22.4
	1997-00	-18.5	-76.1	12.8	44.9
Maize	1986-90	-6.4	-48.4	23.7	18.4
	1991-96	-9.0	-49.5	22.1	18.4
	1997-00	-40.7	-76.6	12.8	23.1
Barley	1986-90	-25.2	-29.4	23.7	-19.4
	1991-96	-28.5	-30.9	22.1	-19.7
	1997-00	-31.8	-44.7	12.8	0.2
Groundnut	1986-90	-3.8	-26.6	23.7	-0.9
	1991-96	7.7	-42.6	22.1	28.2
	1997-00	1.4	-61.5	12.8	50.1
Sunflower	1986-90	12.9	-34.0	23.7	23.2
	1991-96	-13.3	-35.0	22.1	-0.4
	1997-00	-37.4	-70.5	12.8	20.3
Sugar beet	1986-90	1.6	-54.1	23.7	32.1
	1991-96	2.5	-60.8	22.1	41.2
	1997-00	-1.5	-93.3	12.8	79.0
Sugar cane	1986-90	14.7	-54.1	23.7	45.2
	1991-96	8.6	-60.8	22.1	47.2
	1997-00	2.1	-93.3	12.8	82.6

- products for which domestic prices can be partially explained by world price changes, such as maize and barley;
- products whose domestic price changes are mainly due to changes in other factors: groundnuts or sugar crops (beet and cane);
- products where world price changes had an impact on domestic prices only during the latter period: soft wheat and sunflower.

Exchange rate changes (devaluation) since the pre-reform period had a positive impact on the prices of all commodities.

The relationship between domestic price trends and world price trends was also analysed econometrically. In addition to world prices another explanatory variable is considered: real exchange rate (inverse). To isolate the effects of non-quantitative factors (non-tariff barriers), particularly import restrictions, a dummy variable (0 before the reform and 1 after) is introduced as an explanatory variable. The two formulations were tested: with and without the dummy variable.

The results in Table 8 are set out for the whole of the agriculture sector and for the main products. The explanatory variable for the whole of the agriculture sector is the wholesale price index of some 60 agricultural products.

Whereas for the whole of agriculture, the wholesale price seems to be linked to the world price (high quality of regression and significant elasticity for both formulations), domestic prices for most products are weakly related to the corresponding world prices. This paradoxical result can be explained by the fact that the wholesale price used, in the absence of a synthetic production price index for agricultural products, integrates implicitly the prices of certain products comprising

TABLE 7
Price decomposition. Changes in relation to the reform and post-reform periods (percent)

	Period	Domestic price change	World price change	Change in real exchange rate	Change in other factors
Soft wheat	1986-90/ 1980-85	15.1	-41.0	23.7	32.5
	1991-96/ 1986-90	-15.4	-3.8	-1.5	-10.0
	1997-00/ 1991-96	-18.2	-31.3	-9.3	22.5
Maize	1986-90/ 1980-85	-6.4	-48.4	23.7	18.4
	1991-96/ 1986-90	-2.6	-1.0	-1.5	0.0
	1997-00/ 1991-96	-31.8	-27.1	-9.3	4.7
Barley	1986-90/ 1980-85	-25.2	-29.4	23.7	-19.4
	1991-96/ 1986-90	-3.3	-1.5	-1.5	-0.3
	1997-00/ 1991-96	-3.2	-13.8	-9.3	19.9
Groundnut	1986-90/ 1980-85	-3.8	-26.6	23.7	-0.9
	1991-96/ 1986-90	11.5	-16.0	-1.5	29.1
	1997-00/ 1991-96	-6.3	-18.9	-9.3	21.9
Sunflower	1986-90/ 1980-85	12.9	-34.0	23.7	23.2
	1991-96/ 1986-90	-26.1	-1.0	-1.5	-23.6
	1997-00/ 1991-96	-24.1	-35.5	-9.3	20.7
Sugar beet	1986-90/ 1980-85	1.6	-54.1	23.7	32.1
	1991-96/ 1986-90	0.9	-6.6	-1.5	9.1
	1997-00/ 1991-96	-4.1	-32.6	-9.3	37.8
Sugar cane	1986-90/ 1980-85	14.7	-54.1	23.7	45.2
	1991-96/ 1986-90	-6.2	-6.6	-1.5	2.0
	1997-00/ 1991-96	-6.5	-32.6	-9.3	35.4

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.

an imported component and that, at the wholesale stage, the prices are partially influenced by international market fluctuations. The two synthetic indices used show few fluctuations and a regular rising trend.

Table 8 shows that the prices related to world prices refer to products such as sunflower, maize and soft wheat with elasticities of 0.46, 0.45 and 0.33, respectively. For the other products, domestic prices evolve practically independently of world market fluctuations. The elasticity for barley is not significant and contradicts the previous result on the breakdown of prices. This result is due to the fact that the two explanatory variables (world price indices and exchange rate index) are correlated, and hence the elasticity may be biased. When introducing the dummy variable to explain the evolution of domestic prices, it absorbs the effect of world prices and becomes the main explanatory variable.

Effects on agricultural output and value added

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

Cereals

The cereals subsector was more strongly supported after adjustment than before, mainly through prices and transport, which accounted for 75 percent of all support

TABLE 8
Relation between domestic and world price trends

	Explanatory variables				R^2	Number of observations	Period
	Constant	LN (real world price)	LN (real exchange rate)	Dummy			
(a) Without dummy variable							
Soft wheat	-0.605	0.333	0.797		0.41	21	1980-2000
Maize	-0.600	0.448	0.678		0.37	21	1980-2000
Barley	7.054	0.209	-0.738		0.27	20	1981-2000
Groundnut	-0.141	-0.141	-0.055		0.12	21	1980-2000
Sunflower	-1.048	0.464	0.770		0.45	22	1980-2001
Sugar beet	3.953	0.029	0.122		0.11	22	1980-2001
Sugar cane	1.447	0.080	0.626		0.54	22	1980-2001
Agriculture	-2.316	1.359	0.136		0.98	19	1980-1998*
(b) With dummy variable							
Soft wheat	3.151	0.036	0.286	-0.233	0.70	21	1980-2000
Maize	4.200	0.080	0.021	-0.318	0.74	21	1980-2000
Barley	10.791	-0.087	-1.248	-0.253	0.49	20	1981-2000
Groundnut	6.799	-0.269	-0.244	-0.119	0.25	21	1980-2000
Sunflower	4.265	-0.071	0.184	-0.427	0.78	22	1980-2001
Sugar beet	4.108	0.019	0.099	-0.020	0.14	22	1980-2001
Sugar cane	1.566	0.073	0.608	-0.015	0.55	22	1980-2001
Agriculture	-2.575	1.381	0.175	-0.021	0.98	19	1980-1998*

LN: natural log.
* The wholesale price index was not published after 1998.
The shaded coefficients are not significantly different from zero.

compared with 54 percent before that. Fertilizer support was cut back considerably, from 14 percent to 1 percent, irrigation support was from 28 to 20 percent, and credit and seed support stayed at the same low level (4 percent and 2 percent respectively). The subsector was taxed by the exchange rate even though this fell by 36 percent during the adjustment period following a series of national currency devaluations.

Price support was largely positive, rising from 4 percent on average in the 1980-83 pre-structural adjustment period, to an average of 8 percent in 1991-93 during the last three years of structural adjustment. Wheat was given most support, barley no support, with maize supported to a degree.

After a major cereal shortage between 1975 and 1985, the situation improved thanks to a remarkable increase in output, when there was an increase in the AUF, a large extension of land under cereals (about 1 million ha) and a reduction in fallow. Average production doubled over 30 years and reached record levels in 1986-90. After 1991, production began to fall from 6 700 000 tonnes (1986-90) to 5 159 000 tonnes (1997-2001), causing a decrease to 40 percent in the cereal self-sufficiency rate. Table 9 shows the overall evolution of cereal self-sufficiency, while Table 10 presents the change in domestic output for each of the principal cereals.

Soft wheat is favoured by supply, subsidy and production policies. After having stagnated for a long time, the area under wheat tripled between 1981 and 1991, and in recent years has exceeded 1.4 million ha. Production has increased five-fold to exceed 20 million quintals thanks to the concomitant improvement in productivity.

Durum wheat has covered 1.1 to 1.2 million ha for the past 15 years. Output fluctuates widely, but as with soft wheat (but to a lesser degree) there has been an

BOX 1
Agroclimatic conditions

Morocco lies in a subtropical zone with hot, arid conditions in the summer and cool, humid weather in the winter. Rainfall is highly variable in time and space.

Zone	Region	Rainfall (mm/p.a.)
Humid and sub-humid	Western and Central Rif, north-Atlantic region, massifs in the Middle Atlas and Upper Western Atlas Mountains	600
Semi-arid	Most of the Atlas area	300-400
Arid zone		Barely exceeds 200
Saharan zone	Southern part of the country	Agriculture only possible

Agricultural production conditions are difficult and provide few possibilities for intensive farming. These conditions make it equally difficult for farms to accumulate savings. Farmers prefer flexible production systems which they can easily adapt to meet the capricious climate conditions, rather than large investments,

Since about only one-tenth of the Area Used for Farming (AUF) is irrigated, and half the *bour* (non-irrigated) lands receive less than 400 mm/yr, water is a major constraint on agricultural production, varying in degree according to the region. Since the beginning of the 20th century there has been a drought virtually every three years. Over the past decade, five years had an average rainfall of under 320 mm/yr.

Water resources are rapidly being depleted and deteriorating. The artificially low price of water does not encourage economical use of it. Forecasts show that if demand continues at the present rate Morocco could be faced with a major water shortage by 2025.

In a global surface area estimated at 71 million hectares, about 39 million hectares are croplands, making up 55 percent of the total. The AUF is about 9 million hectares (or less than 13 percent of the total area), of which one-third is considered to be unfavourable to agriculture.

It is estimated that 22 000 ha of arable land are lost annually, and that 65 000 ha of rangelands are subject to overgrazing and illegal clearing. The effects caused by excess salinization are not known exactly, and the information is fragmentary (500 000 ha of large scale irrigation work in the southeast would be under threat and 37 000 ha of irrigated land is affected by salinization).

increase in productivity (over 30 percent) since 1985. During the period 1997-2001 the acreages devoted to these two types of wheat fell (by 22 percent for soft wheat and 18 percent for durum) because of unfavourable climatic conditions.

Barley covers about one-half of cropped land. It is mainly cultivated in the semi-arid and arid zones, in association with production systems associated with sheep

TABLE 9
Cereal self-sufficiency, 1968-2001 ('000 tonnes)

	Production	Imports	Apparent consumption	Self sufficiency rate (%)
1968-72	5 000	300	5 300	94
1973-77	4 000	1 200	5 200	77
1978-82	4000	1 900	5 900	68
1983-87	4 900	2 100	7 000	70
1986-90	6 700	1 600	8 300	81
1991-96	5 876	2 787	8 663	68
1997-01	4 159	6 014	10 173	41

Source: Direction de la Statistique, Annuaires statistiques du Maroc.

TABLE 10
Production of principal cereals, 1975-2001

	Wheat			Barley			Maize		
	Area ('000 ha)	Production ('000 tonnes)	Yield (qx/ha)	Area ('000 ha)	Production, ('000 tonnes)	Yield (qx/ha)	Area ('000 ha)	Production, ('000 tonnes)	Yield (qx/ha)
1975-80	1 794	1 756	9.79	2 196	2 035	9.27	428	347	8.11
1981-85	1 812	1 879	10.37	2 187	1 709	7.82	396	233	5.87
1986-90	2 435	3 559	14.62	2 420	2 739	11.32	384	349	9.08
1991-96	2 568	3 434	13.37	2 222	2 253	10.14	375	189	5.03
1997-01	1 999	2 775	13.88	2 709	2 174	8.02	1 278	295	2.31

qx = quintal.
Source: Madref, 2002.

farming. This is the cereal that has been most affected by climate changes, with the sharpest production fluctuations (between 10 and 30 million quintals). Since 1985, the areas under barley has stabilized between 2.2 and 2.4 million ha and productivity has improved (average yield of 10 qx/ha). During the 1990s output fluctuated significantly and has tended to decline.

Average yields of maize have fallen from 9 to 2 qx/ha since 1985.

Pulses

Pulses for human consumption, mainly beans but also chickpeas and lentils, are mainly grown on *bour* lands where annual rainfall exceeds 400 mm. After increasing considerably between 1960 and 1975, acreage and output declined from 1975 to 1985 to around 500 000 ha and 400 000 tonnes, with a slight improvement in productivity. Since then, acreage and output have continued to fall, and yields declined also, from 7.64 qx/ha during 1986-90 to 4.48 qx/ha in 1997-2001, a fall of 40 percent.

This decline can be explained by agronomic and economic factors including: diseased crops; stabilization of domestic prices at a level that is too low for producers; high wage costs – for harvesting in particular; and the loss of foreign markets because of sporadic bans on exports when there were shortages on the domestic market.

Sugar crops and sugar

Sugar beet was introduced into the Gharb perimeter in 1962 and sugar cane in the same perimeter in 1973. These two crops were developed in the search for self-reliance. Success has been spectacular because in 30 years the self-sufficiency

TABLE 11
Sugar beet and cane production, 1975-2001

	Beet			Cane		
	Area ('000 ha)	Production, ('000 tonnes)	Yield (tonnes/ha)	Area ('000 ha)	Production, ('000 tonnes)	Yield (tonnes/ha)
1975-80	61	2 073	34.3	4	216	57.7
1981-85	60	2 351	40.7	10	672	69.5
1986-90	61	2 845	46.7	14	948	67.2
1991-96	60	2 927	48.7	15	967	64.9
1997-01	57	2 932	51.7	16	1 207	75.0

Source: Direction de la Statistique, Annuaires Statistiques du Maroc.

TABLE 12
Refined sugar self-sufficiency, 1975 to 2001

	Production of sugar			Imports of sugar ('000 tonnes)	Apparent consumption ('000 tonnes)	Self sufficiency rate (%)
	Beet ('000 tonnes)	Cane ('000 tonnes)	Total ('000 tonnes)			
1975-80	280	21	300	305	606	49.6
1981-85	317	64	382	270	651	58.6
1986-90	384	91	475	279	754	63.0
1991-96	395	92	487	425	912	53.5
1997-01	396	115	511	537	1048	48.8

Source: Direction de la Statistique, Annuaires Statistiques du Maroc.

rates rose from 0 percent to 65 percent. Beet acreages rose rapidly in the first ten years (1963-73) but then stabilized around 60 000 ha (Table 11). Sugar beet is mostly irrigated. Cultivation on the rainfed *bour* lands is tending to decline (less than 25 percent) because sugar beet is less profitable there. Sugar beet production increased by over a third between 1975 and 1990 because of a sharp improvement in productivity. Since then, production has stabilized at about 2.9 million tonnes. Average yields exceed 45 tonnes/ha, reaching a maximum of 51 tonnes/ha during 1997-2001, with an average sugar content of 16.5 percent. There are major variations between the *bour* lands and the irrigated lands, and between the different regions.

Output per hectare for sugar cane is higher than for sugar beet. However, yields have not risen (65 to 75 tonnes/ha on average). The sugar content is less than that of beet, at 10.5 percent. It is a perennial crop, cultivated under irrigated monoculture conditions. Sugar cane acreage quadrupled between 1975 and 2001.

The sugar crop sub-sector was originally slightly supported (8 percent), and moved to widespread protection (an increase of over 43 percent) during the adjustment. The present price system comprises a high level of customs protection, a consumer subsidy of DH 2 000 per tonne and fixed consumer prices. Sugar beet and cane producer prices are indirectly regulated through the system and through negotiations between the sugar factories and the producers' associations. In addition, sugar crops are also grown as part of integrated operations with contracts between producers and sugar factories that advance inputs, provide technical assistance and seasonal credit, and guarantee prices and outlets for harvests.

Since 1996, sugar imports have been liberalized. The protection system is regressive and protection (customs and tax) is high, with tax rates varying between 108 percent

and 118 percent. Consumer subsidies are paid to the sugar factories/refineries by the Compensation Fund which receives its resources from the central government budget and the Support Fund. The prices paid to agricultural producers are around DH 350 per tonne for sugar beet and DH 255 per tonne for cane.

National sugar output covers 50-60 percent of the 900 000 tonnes average annual consumption. Imports are raw sugar locally refined. Household consumption is about 90 percent of the total, and industry only 10 percent.

National sugar production has averaged about 480 000 tonnes of which 80 percent is from beet. It grew by 1.6 percent per year during the period 1981-90, but then by only 0.8 percent per year over the following ten years.

Annual oilseed crops: sunflower and groundnuts

Oilseeds are actively supported by the Government at the levels of production and marketing. The PSE averaged 71 percent in 1991-93, compared with average support of 29 percent in 1980-1983. The current price regime comprises customs protection similar to that for sugar, a consumer subsidy paid to refineries of DH 5 365 per tonne of refined oil, and the setting of consumer prices. Oilseed producer prices are free, but indirectly regulated by this intervention system and stakeholder negotiations. Imports were liberalized in 1996, but with regressive protection (customs and tax levy) of around 80 percent. Agricultural producer prices are about DH 3 500 to 3 700 per tonne for sunflower, the main oilseed cultivated.

Sunflower acreage increased five-fold between 1985 and 2001, while production less than tripled (Table 13). Groundnut is the third largest annual oilseed after cotton. It only covers 21 000 to 25 000 ha and production was about 35 000 tonnes on average between 1985 and 2001. The oilseed crops for processing have covered 100 000 ha over the past five years with locally produced oil accounting for about 9 percent of current production of 380 000 tonnes of refined oil. Imports are mainly of crude oil for local refining. The crushing and refining industry is all handled by one company.

Vegetables and citrus fruit

The fruit and vegetable sub-sector (tomatoes and oranges) is taxed but slightly less than before the reforms (3 percent instead of 13 percent). The tax is mainly due to the over-valued national currency and taxation of the sub-sector. Taxes on diesel, used in pumping the water for production of these crops, rose as a result of increases in diesel prices. The net effect was heightened by the reduction in fertilizer subsidies, but was relatively attenuated by the subsidization of irrigation water.

The area under fruit and vegetables has increased by 40 percent over ten years, mainly as a result of the extension of areas under vegetables (an increase of 30 percent). Tomatoes and potatoes dominate both seasonal and early vegetables.

Total production remained unchanged between 1980 and 1990. In 1997-2001, tomato production declined while potato production remained unchanged. The early vegetable areas fell back in the 1970s to stabilize around 16 000 ha in 1990, of which 6 000 ha were under tomato and 8 000 ha under potato. Since then, potato areas have increased by 30 percent. In 1999-2000, out of a total of 233 000 ha under vegetable crops, early vegetables occupied about 23 000 ha (10 percent), seasonal vegetables 201 000 ha (86 percent) and agro-industrial vegetables 9 000 ha (4 percent).

TABLE 13
Oilseed production, 1975-2001

	Sunflower			Groundnut		
	Area (ha)	Production ('000 tonnes)	Yield (qx/ha)	Area (ha)	Production ('000 tonnes)	Yield (qx/ha)
1975-80	26	11	4.31	21	21	10.10
1981-85	20	15	7.31	28	36	12.71
1986-90	104	115	11.05	25	33	13.25
1991-96	162	77	4.74	19	25	13.41
1997-01	106	40	3.80	26	44	17.20

Source: Direction de la Statistique, Annuaires Statistiques du Maroc.

Output increased by 15 percent for early tomatoes and 17 percent for potatoes between 1980 and 1990; whereas it soared between 1990 and 2000: 105 percent for early tomatoes and 43 percent for potatoes. Seasonal vegetables have progressed well despite annual fluctuations due to the fact that many species are farmed on bour land with acreages of about 200 000 ha in 1997-2000.

Since independence, citrus fruits have increased in area, albeit from a small base, from 42 000 ha in 1956 to 76 000 ha in 2001. They have profited little from the dams policy and have been handicapped by problems of access to external markets. The most important citrus fruit plantations are in three irrigated perimeters: Souss-Massa, Gharb and Moulouya (70 percent of the acreage). The plantations are irrigated and intensive with an average yield of 15 tonnes per hectare. Production is highly concentrated: 75 percent of citrus fruit farming is concentrated in less than 10 percent of the citrus farms. The orchards are old, but a rehabilitation plan has been undertaken (with replanting and regrafting).

Livestock production

The meat sub-sector as a whole is still broadly supported – much more than milk – increasing in the adjustment period to reach 58 percent for red meat and 59 percent for white meat,. The taxation of imported maize has had a negative impact on the remarkable dynamism of the white meat sector. The prices paid to livestock farmers are mostly determined by domestic supply and demand because of high import protection levels. The prices of animal feed fluctuate from year to year around what is a generally high level due to the protection given to cereals.

The livestock population fell significantly in the drought period 1981-84. There were 16.7 million sheep in 1971 and 11 million during the 1981/82 drought. In 1992 the replenished population totalled 17 million. It fell back to 15.7 million in 1994 after the 1992 and 1993 droughts, and then to 15 million on average in 1997-2001. The cattle population has followed a similar trend throughout this period. In 1975 there were 3.4 million head. The number fell by 30 percent during the 1980s drought, and to 2.4 million due to the difficult climatic conditions in 1992/1993. Following the 1998/99 drought, there are now 2.6 million head. More generally the effect of the drought was much more serious on sheep because of their great dependence on grazing land and consequently on climate.

Ninety-one percent of the production of red meat comes from sheep, cattle and goats, at 40 percent, 43 percent and 8 percent, respectively. Red meat production was 93 000 tonnes in 1981, 350 000 tonnes in 1991, 260 000 tonnes in 1994

TABLE 14
Meat production, 1975-2001

	Red meat ('000 tonnes)	White meat ('000 tonnes)
1975-80	166	77
1981-85	179	109
1986-90	203	127
1991-96	256	168
1997-01	275	233

Source: Direction de la Statistique, Annuaires Statistiques du Maroc.

and 300 000 tonnes in 2001. These wide fluctuations correspond to periods of decapitalization during drought and livestock replenishment once the climatic conditions became favourable again. Table 14 shows that both read and white meat production have increased significantly.

Poultry farming developed rapidly in the 1970s in an industrial form encouraged by the Government to even out the emerging imbalance between domestic meat production and demand. White meat accounted for 12 percent of the total in 1970, and 35 percent by 1982. Since then it has remained stable. Since Morocco does not import meat products, the take-off of poultry farming enabled the country to maintain per capita white meat availability

Milk

The Government has given considerable encouragement to milk production by establishing milk collection centres and linking herds to the dairy industry and by reducing imports. Support has been reduced from 5 percent in 1980-83 to 3 percent in 1991-93. Although this sub-sector is taxed through the exchange rate, price support has largely offset the taxation. A targeted tariff system aims to protect the industry without penalizing consumers for certain sensitive products (butter and infant milk). Imports are now declining for the main products.

Although milk production is linked to such parameters as the genetic structure of the livestock, climate is a decisive factor because the feed system is so highly dependent on the quality of the agricultural seasons. Milk production therefore follows the pattern of rainfall: production fell during the 1980 droughts, then recovered in 1985 until 1992 at an average before once again falling after the droughts in 1992/1993 to 820 million litres in 1994, of which 40 percent were collected by the dairies. In 1997-2001 it grew by 34 percent.

TABLE 15
Evolution of milk balances, 1975-2001 ('000 tonnes)

	Production ('000 tonnes)	Imports ('000 tonnes)
1975-80	584	7
1981-85	482	14
1986-90	761	10
1991-96	871	16
1997-2001	1103	11

Source: Direction de la Statistique, Annuaires Statistiques du Maroc.

TABLE 16
Contribution of irrigation to agricultural production

Production	Irrigated area/sown agricultural area (percent)	Irrigated production/ national production (percent)
Sugar beet	75	80
Sugar cane	100	100
Cotton	100	100
Cereals	7	15
Vegetables	18	26
Market gardening	74	82
Fodder	67	75
Citrus fruits	100	100
Other arboriculture	21	35
Milk	-	75
Red meats	-	26

Source: Association Nationale des Améliorations Foncières et du Drainage, 2001.

Despite progress, milk production is inadequate and dairy product imports, mainly milk powder and butter, have reached 40 000 tonnes of dairy products/year.

Irrigation

Although irrigated land only accounts for between 12 to 15 percent of total AUF, it contributes an average of 45 percent of the value added by agriculture and 75 percent to agricultural exports. The contribution to value added by irrigated agriculture can reach 70 percent when rainfall is poor and contributions from the rain-fed production zones are limited. Irrigated plots contribute between 7 percent and 10 percent to GDP, depending on rainfall.

Irrigation has played a strategic role in improving food security. The rate of coverage of the water requirements of certain commodities is considerable. For example, sugar, milk, and market gardening are 70 to 100 percent covered.

Irrigation water is largely subsidized. The average charge was DH 0.17 per m^3, far less than the opportunity cost of water. Implementation of the PASAs has involved the launching of government measures raise the rate of water cost recovery to 82 percent in 1988.

Fertilizer use

Sixty percent of Morocco's fertilizer supplies are produced nationally (phosphate fertilizer and complex fertilizer) and 40 percent is imported (nitrogen and potassium fertilizers). The overall consumption of fertilizer has risen considerably from 60 000 tonnes in 1956 to 1 400 000 tonnes in 1990. But consumption levels are still low: barely 40 percent of the minimum crop needs according to Ministry of Agriculture estimates. Since 1987, the quantities of fertilizer used have fallen because of the abolition of subsidies and subsequent price rises.

Geographically, fertilizer use is uneven between the irrigated areas, the favourable *bour* land and the unfavourable *bour* land. For example, the irrigated sector, which only accounts for 15 percent of total AUF, has 58 percent of the tractors and consumes 58 percent of fertilizer.

Fertilizer prices have been controlled since 1974 using a benchmark pricing system and a fixed margin. The benchmark price is set by the Government at the port of

entry or at the factory. The difference between these prices and the real price of fertilizer is paid by the Government in the form of a subsidy.

The reaction of the agriculture sector to the structural adjustment measures: rapid appraisal

The study involved a rapid appraisal through interviews with farmers, in order to evaluate the impact of the reforms on farming structures and systems.

In the Méknès region the interviews related to the intensive farms based on horticulture (potatoes, onions and fruit trees) and dairy cattle raising and fattening; and to less intensive farms, based on cereals, oilseeds and sheep.

The interviews brought out the following points:

- All farmers complained of the effect of fertilizer and livestock feed price increases and production costs. Loss of soil fertility resulting from reduced fertilizer use was also noted by farmers in intensive horticulture.
- The increase in livestock feed prices have been tempered by the liberalization of milk prices in the case of cattle farming. As far as sheep fattening is concerned, the negative effect was not offset by better output prices.
- Because of the size of the fertilizer supply network and the emergence of new distributors, farmers do not seem to be concerned about the closure of the fertilizer retailing agency (FERTIMA) sales outlets at the Centre de Travaux agricoles (CTA) level.
- Liberalization of the prices of durum wheat and barley does not seem to have had much effect - in the case of durum wheat, because market prices have always been higher than the minimum guaranteed price. For barley the quantities marketed through the official channels are rarely significant.
- Liberalization of crop rotation did not affect this region.

The reactions of different farms varied from merely reducing purchases of inputs to the extreme case of disinvestment. Higher production costs and changing relative prices have led many farmers to alter their production patterns. Some have sought to improve the efficiency of input use, others have sought to diversify into crop marketing. The role of cooperatives and producer organizations was emphasized.

In the irrigated areas, discussions were held with farmers in Béni Amir and Béni Moussa, mainly regarding the changes following the liberalization of cropping patterns, the disengagement of the Office regional de Mise en Valeur de Tadia (ORMVAT) from associated support functions, and the introduction of attempts to recover irrigation water charges.

The interviews brought out the following points:

- Farmers were relieved of the obligation to comply with a fixed rotation system which had included sugar beet and cotton, enabling them to develop more profitable crops. But it also deprived farmers of part of the irrigation water that ORMVAT was required to supply. The freedom to choose crops also increased the price of farmland. These changes in the cropping systems encouraged the development of dairy and fattening cattle, and exports of the alfalfa surpluses to other regions.
- The end of collective rotation also created difficulties in the management and distribution of water.

- Smallholders viewed improvements in the collection of irrigation charges as an unwelcome price increase.
- The disengagement of ORMVAT left a gap in the provision of extension services and technical support.
- Liberalization of fertilizer prices did not immediately lead to price increases due to a competitive distribution network and because international prices of nitrogen fertilizers fell sharply in 1991, encouraging private businesses to import large quantities. However, prices began to rise considerably after 1994.
- Milk production price increases seem to have helped to increase milk output and to encourage the development of fodder crops.
- The reduction in acreages under sugar beet (-36 percent since 1988) and cotton (-96 percent since 1988) has had extremely negative repercussions on employment. Surplus household labour has been redirected towards livestock farming. But paid labourers have become unemployed and daily wages have slumped in some areas.

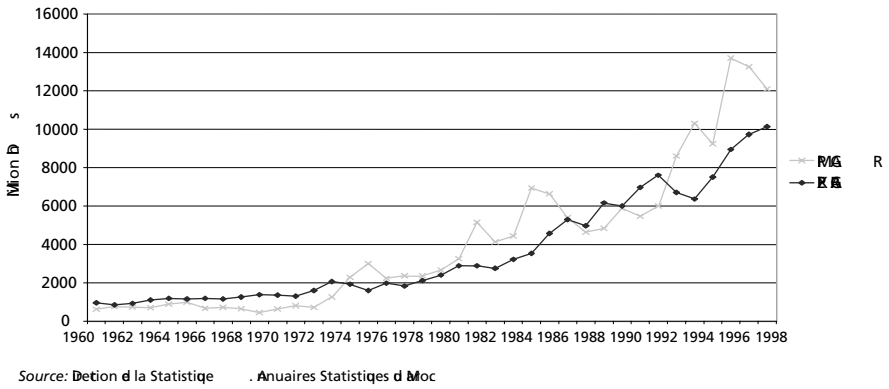
The problems created by irrigation management led to the 1995 law declaring water to be state property, and the organization of a colloquium on the promotion of participatory irrigation water management through farmers' associations. Eleven irrigating farmers' associations were set up after 1994, of which only one is working.

The combined effects of the disengagement of ORMVAT and increased production costs (irrigation, water, fertilizer and feed) encouraged an adjustment in favour of products, such as cereals and sheep farming, which use fewer purchased inputs and less water. The increase in dairy production has encouraged farmers to set up service cooperatives around the milk collection centres, enabling them to pool their livestock feed acquisitions at reduced prices.

Foreign trade in agriculture

Figure 1 reveals the growth trend for both exports and imports of agricultural goods. The stability of increased export revenues is remarkable considering the fluctuations

FIGURE 1
Agricultural exports and imports, 1960-1998



Source: Direction de la Statistique . Annuaires Statistiques du Maroc

that occur in production for the domestic market. The value of imports tends to vary much more, reflecting fluctuations in domestic production and in world prices.

Terms of trade

Morocco's terms of trade for the group of products "food, beverages, tobacco" fluctuated enormously in the period 1981-99.The period 1981-87 was characterized by a sharp improvement (13 percent per year on average), brought about mainly by the devaluation of the local currency between 1982 and 1985. Export prices for this group of products increased on average by about 11 percent per year, whilst import prices fell by about 2 percent per year over this period. For all trade, export and import prices during the same period increased on average by 7 percent and 6 percent, respectively, per year, reflecting an overall stagnation in the terms of trade.

Between 1988 and 1994, the terms of trade for the "food, beverages and tobacco" group of products declined to 50 percent of the 1981 level. The period 1994-99 saw an improvement in the terms of trade for this group (20 percent per year on average) to reach practically the same level as at the beginning of the 1980s. This was partly due to low inflation which did not exceed 3 percent per year. The value of agricultural and agro-industrial exports was about DH 6 billion, or 15 percent of Morocco's total exports.

Exports

The proportion of processed products more than doubled between the end of the 1960s and the beginning of the 1990s. This trend was then reversed and the composition of exports stabilized.

Fresh produce generally has preferential access to European markets. Processed products face more global competition, and the margins are reduced because of European producers' subsidies for olive oil and tomato concentrate. Early vegetables, after citrus fruit, are the main agricultural export. They suffer from concentrating exports on the European Union which protects its market, particularly since Spain and Portugal's accession to the EU in 1986. Early tomato exports are almost entirely exported to the EU. After falling back they stabilized at around 100 000 tonnes in 1976 (just under 40 percent of total output), and in 1997-2001 reached a remarkable 549 000 tonnes. Potato trade is exclusively with the EU, increasing to 65 000 tonnes in 1986-90 (53 percent of output) from 35 000 tonnes in 1981-85 (34 percent) and falling back by 17 percent in 1997-2001. Seed potato imports have also increased, from 26 000 tonnes in 1981-85 to 32 000 tonnes in 1986-90.

TABLE 17

Principal characteristics of fresh product exports, 2001

Indicators	Citrus	Vegetables	New products
Destination Europe (percent of total exports)	72	95	90
Destination France (percent of total exports)	32	74	50
Transport	Boat	Truck and boat	Truck, plane
Salary cost (percent of total cost)	15 to 20	11 to 20	10 to 30
Competition	Spain	EU	World
Market	World	Mediterranean	World

Source: **EACCE.** Établissement Autonome de Contrôle et de Coordination d'Exportation.