5. THE MESO SETTING: INTERMEDIATE PROCESSES AND LINKAGES

Meso level impacts are defined here as intermediate processes and linkages that directly and/or indirectly affect food security and poverty. These are most effectively measured through changes in input prices, output prices, productivity levels and social and development infrastructure at both the national and sub-national levels.

5.1 Effects and Impacts on Consumption, Savings and Investment[1]

In order to assess the effects of macro policies adopted during the late 1980s on macro- economic indicators, growth in GDP and changes in consumption, savings and investments between 1990 and 2000 have been analysed. Marginal propensity to consume is estimated at 0.867 between 1986 and 1996 (NHDR 1998), which is very high and leaves only a very small share of income for saving, and thus for investment. Nevertheless the proportion of GDP saved increased by about five percentage points between 1990 and 2000 (from about 9.6 percent to about 14.7 percent), while the proportion of GDP invested grew by about 3.4 percentage points (from about 20.8 percent to about 24.3 percent) over the same period (Table 5.1). The public sector consumption grew at a faster rate than the private consumption, causing the share of the former to increase from 10 to 12 percent in the decade (Table 3.5).

Table 5.1: Changes in consumption, savings and investment

	1990/91	**2000/01**	**Growth (percent)**
Nominal GDP (Rs billion) at producer prices	120.4	410.2	13.04
Real GDP (Rs billion) at producer prices	62	101.0	5.00
Consumption as percent GDP	90.43	85.34	NA
GDS as percent of GDP	9.57	14.66	
Investment as percent of GDP	20.83	24.25	

Source: *Economic Survey*, MOF, 2001/02.

Table 5.2 Effects and Impacts on Government Revenues and Expenditures

Table 5.2 presents figures on government expenditure and its sources of financing in real terms. Between 1990 and 2000 real government revenue grew by 9.5 percent annually, while real government expenditure grew at an annual rate of about 4.9 percent. Despite this, fiscal deficits during the period increased annually by about 0.8 percent, reflecting the low revenue base of the economy.

Table 5.2: Structure and growth of government revenue and expenditure (1984/85 prices)

	1990/91	2000/01	Growth rate
Revenue (Rs billion)	5.52	13.70	9.51
Expenditure (Rs billion)	12.12	19.65	4.95
Revenue as percent of expenditure	45.56	69.70	NA
Deficit amount (Rs billion)	5.49	5.95	0.82
Deficit financing (Rs billion)	5.56	4.69	-1.70
Domestic borrowing (percent)	42.09	36.76	
Foreign loan (percent)	57.91	63.24	NA

Source: *Economic Survey*, MOF, 2002.

5.3 Effects and Impacts on the External Sector

5.3.1 External trade

Nepal's foreign trade has grown over the years, and its pattern has improved slightly insofar as exports grew faster than imports in the 1990s. Thus the trade gap fell in relative terms, but it simultaneously increased in absolute terms (Table 5.3). The trade deficit with India, which accounted for about 36 percent of total deficit in 1990, decreased to 27 percent in 2000. Another important change in the foreign trade sector during the 1990s was that the ratio of agricultural imports to total imports declined from about 12.5 percent in 1990 to about 10.8 percent in 2000, indicating improved sectoral performance. Counterbalancing this, however, the ratio of agricultural exports to total exports also declined slightly over the same period (refer to Appendix Table 8 for details).

Table 5.3: Trends in the foreign trade situation

(Rs billion in 1984/85 prices)

	1990/91	2000/01	Growth (percent)
Import	11.96	28.47	9.07
Export	3.80	13.70	13.67
Trade Gap	-8.15	-14.78	6.13

Source: *Economic Survey*, MOF-2002.

5.3.2 The balance of payments

The trade deficit is huge, and during the period 1990-2000, it grew in both real and nominal terms. This has resulted in large current account deficits, despite the fact that foreign net private flows from services and transfers increased during the period (Table 5.4).

Table 5.4: Trends in the balance of payment situation

Rs in billion

	Nominal term			Real term (1984/85 prices)		
	1990/91	2000/01	Growth rate (%)	1990/91	2000/01	Growth rate (%)
Trade balance	-15.85	-60.12	14.26	-8.16	-14.80	6.13
Net of services	2.69	22.24	23.52	1.38	5.47	14.77
Net of transfers	3.66	26.93	22.09	1.88	6.63	13.43
Current account balance	-9.5	-10.96	1.44	-4.9	-2.70	-5.79
Net capital inflows	6.3	6.69	0.60	3.24	1.65	-6.54
Miscellaneous capital	7.33	9.48	2.61	3.77	2.33	-4.68
Foreign direct investment	0	0	0.00	0	0.00	0.00
Balance of payment	4.13	5.22	2.37	2.11	1.28	-4.84

Source: *Economic Survey*, MOF, 2001/02.

The fact that the growth rate of net inflows has been higher than that of trade deficits has meant that the annual rate of growth of the current account deficit, estimated at about 1.4 percent (-5.8 percent in real terms) has been lower than would otherwise have been the case. The current account deficit in nominal terms increased from about Rs 9.5 billion in 1990 to Rs 11.0 billion in 2000. In real terms, however, it declined from about Rs 4.9 billion to Rs 2.7 billion. Positive net official capital inflows and miscellaneous capital inflows in both years and positive foreign direct investment in 2000 remained high, offsetting current account deficits and thereby resulting in a positive balance of payments (BOP) situation. Comparing 1990 with 2000 and without considering intervening years, the BOP grew at the equivalent of an annual rate of about 2.4 percent in nominal terms, while and in real terms it declined by about 4.8 percent. In the intervening years, the BOP was negative to the extent of Rs 0.31 billion in 1994/95 and Rs 1.1 billion in 1995/96. The negative BOP in these two years was due to a sudden decline in net capital inflows (private and official foreign capital, miscellaneous capital), combined with the fast-growing trade deficit. With the enactment of the Foreign Investment and Technology Act in 1992, the external sector was further liberalised, allowing for direct foreign investment. Foreign capital inflow in this form was first recorded in 1995/96, when it amounted to Rs 0.39 billion, a figure, which grew to almost Rs 15 billion in 1998, an annual growth rate of over 200 percent (Appendix Table 9).

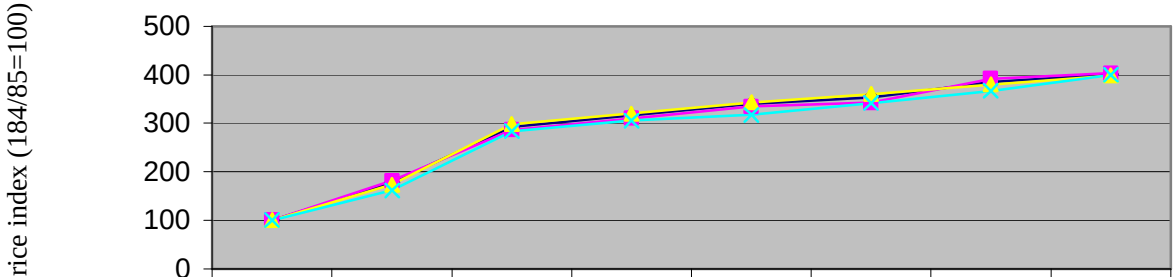
5.4 Impact on Prices and Economic Incentives

5.4.1 Changes in the general and consumer price indices

For a given level of demand, changes in the production and trade structure of an economy trigger changes in the price structure through their effects on supply. In order to evaluate the effect of macro policies on aggregate price levels, movement of a GDP deflator over time has been analysed separately for the agricultural and non-agricultural sectors; the results are depicted in Figure 5.1. Compared to 1985, the general price level had increased 293 percent by 1995/96, 353 percent by 1997/98 and 400 percent by 1999/2000. Price movements remained favourable to the agriculture sector compared to non-agriculture sectors from 1985/86 until 1992, implying that the price indices of the agricultural sector were relatively high. From 1993/94 onwards and till 1997/98, price indices were slightly higher in the non-agricultural sector implying declining incentives to agriculture compared to other sectors of the economy. Then for

1998/99 and 1999/2000, prices became favourable to agriculture sector compared to non-agriculture sector. Movement of the consumer price index was lower than that of the general price index throughout the 1990s,. Consumer price increased annually by about 9.5 percent during the 1990s (Refer to Appendix Table10 for the general price trend of agriculture and non-agriculture sectors).[2]

Figure 5.1: Movement of general price index

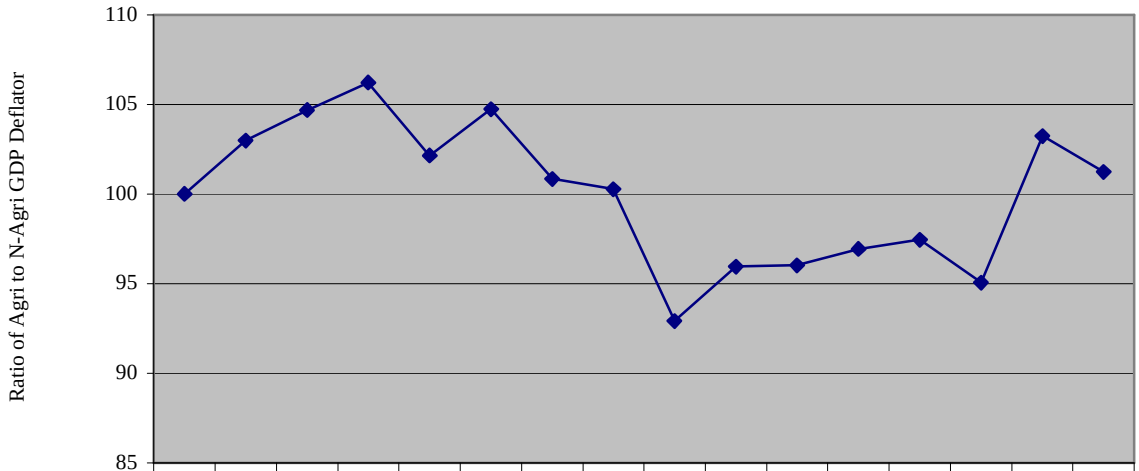


	1984/85	1990	1995	1996	1997	1998	1999	1999/00
General	100	178	293	316	340	353	385	400
Aggri	100	182	286	310	334	342	392	403
N-Agri	100	173	298	320	343	360	380	398
CPI	100	161	284	305	317	342	367	400

5.4.2 Terms of trade in agriculture

The price relationship between two groups of commodities is known as the terms of trade (TOT) between them. One way to analyse increases in prices of agricultural crops is to consider them in relation to prices of other commodities. Generally, it is difficult to obtain prices of individual inputs and outputs for the agricultural sector; similarly with aggregate price indices. The terms of trade for agriculture (TOTA) have thus been analysed by comparing the relative changes in prices in the agricultural and non-agricultural sectors using GDP deflators for the respective sectors[3]. A value of more than 100 indicates favourable TOT for agriculture vis-à-vis the non-agricultural sectors, and vice versa. Figure 5.2 depicts movements in the TOT between the agricultural and non-agricultural sectors for the period 1984/85 through 1998/99. With 1984/85 as the base period, the TOTA increased until 1990 and then started deteriorating, reaching its lowest point in 1994/95, fluctuating for some time thereafter, and then rising sharply in 1999. In general, deteriorating TOT in agriculture throughout most of the 1990s meant declining incentives for the sector.

Figure 5.2: Movement of terms of trade in agriculture

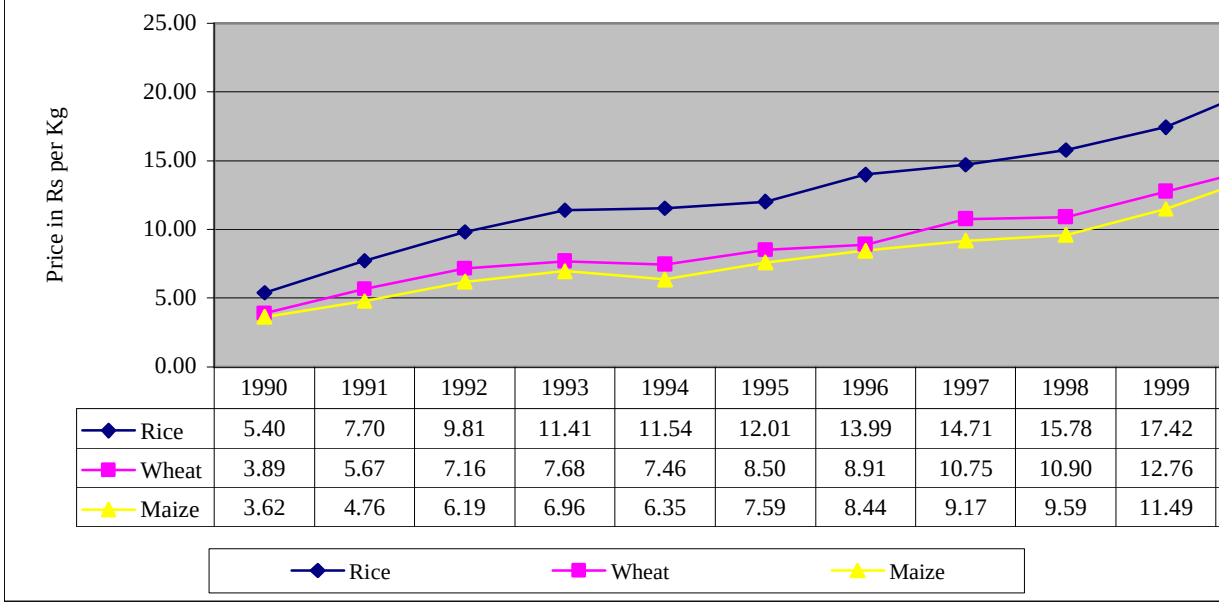


	1984/85	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	1999/00
TOT	100	103	105	106	102	105	101	100	93	96	96	97	97	95	103	101

Prices of cereals, fertilizer and pulses

Price trends have been analysed in order to evaluate the effect of macro policies on changes in the aggregate production of agricultural commodities targeted by the APP. Average national annual retail price trends of rice, wheat and maize are presented in Figure 5.3. Between 1991 and 2000, the average national retail prices of all three increased steadily. Over the same period prices increased annually by

Figure 5.3: Movement of national retail price of cereal



	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Rice	5.40	7.70	9.81	11.41	11.54	12.01	13.99	14.71	15.78	17.42
Wheat	3.89	5.67	7.16	7.68	7.46	8.50	8.91	10.75	10.90	12.76
Maize	3.62	4.76	6.19	6.96	6.35	7.59	8.44	9.17	9.59	11.49

about 14.3, 14.1 and 14.5 percent respectively for rice, wheat and maize. As noted earlier (Section 5.4.1) all three of these rates are above the contemporary rate of inflation (9.5 percent), so that the impact on the food security situation of the market-dependent poor will have been negative.

Table 5.5 shows the annual growth rate of the average national retail prices of rice, wheat and maize compared to those of major fertilizers in the pre- and post-APP periods. In the first three years of APP implementation, the price of urea increased by 18.6 percent and that of potash and DAP grew annually by about 21.9 and 2.5 percent, respectively, compared to the pre-APP period.[4] During the same period, the average national retail price of rice, wheat and maize increased respectively by 11.5 percent, 12.4 percent and 16.7 percent. In terms of production incentives, therefore, the price increases in general disfavoured producers. Despite this, fertilizer use increased in the post APP period. This was because fertilizers were freely available. .

Table 5.5: Changes in the prices of cereals and fertilizers

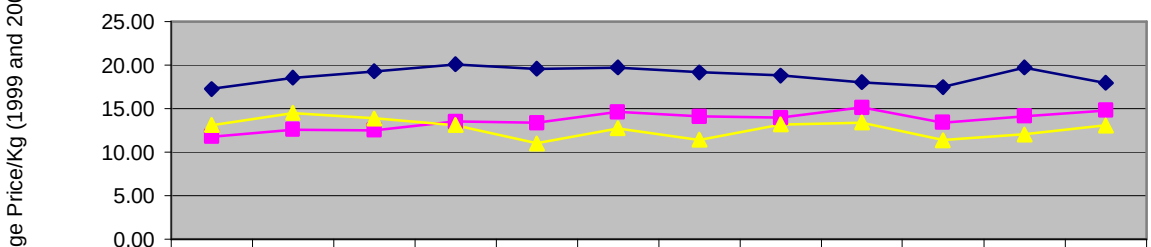
Year	Fertilizer price (Rs./Kg)			Cereal price (Rs./Kg)		
	Urea	Potash	DAP	Rice	Wheat	Maize
1995-96	6.16	8.50	16.88	13.00	8.71	8.02
1997-98	7.40	9.35	18.57	15.25	10.83	9.38
1999-00	10.4	13.9	19.5	18.96	13.68	12.77
Growth-1	9.60	4.88	4.89	8.29	11.51	8.18
Growth-2	18.55	21.93	2.47	11.50	12.39	16.68

Note: Growth 1 refers to 1995-96 and 1997-98 and Growth 2 refers to 1997-98 and 1999-2000
Source: Computed from AMIB-Special Issue, 1999 & 2002, MDD.

In 1997 HMG began a process of phased subsidy withdrawal and deregulation of the fertilizer trade, something that was not envisaged in the APP. The process was completed in October 1999 and has ushered in revolutionary changes in fertilizer supply, availability and use (Pokharel and Sharma 2000). It is too early at this point to comment authoritatively on how this will ultimately work out, but despite some setbacks on the quality front, early indications are encouraging, with rapid growth in both the number of dealers and aggregate supply.

Seasonal variation in prices of three main cereals is shown in Figure 5.4, which indicates that the prices of all the three show marked seasonal variation. As would be expected, prices decline after the harvest and climb to a maximum in the immediate pre-harvest period. In 1999-2000 the price of rice averaged Rs 18.8 per kg with a coefficient of variation (CoV) of about 5 percent. Over the same period the price of wheat averaged Rs 13.7 per kg (CoV 7.4 percent) and that of maize was Rs 12.7 per kg (CoV 8.4 percent). These figures may be seen in context by comparing them to those in neighbouring Bangladesh. This has traditionally been a chronically food-insecure country, yet it has made important progress in increasing off-season cereal production, to the extent that the CoV of rice prices fell from 5.2 percent in 1974-84 to 3.3 percent in 1984-94 (RURPOL 2000).

Figure 5.4: Seasonal variation in cereal prices



	April/M	May/J	J/J	J/A	A/S	S/O	O/N	N/D	D/J	J/F	F/M	M/April
Rice	17.26	18.57	19.31	20.09	19.60	19.74	19.20	18.80	18.03	17.51	19.75	17.99
Wheat	11.77	12.58	12.51	13.53	13.37	14.61	14.10	13.97	15.13	13.41	14.15	14.82
Maize	13.11	14.50	13.88	13.10	11.03	12.75	11.43	13.19	13.40	11.36	12.05	13.07

For the rural poor the inter-seasonal price spread (percentage difference between pre- and post-harvest prices) is a more important statistic than the CoV. These may be derived from the table in Figure 5.4, and are 16 percent for rice, 29 percent for wheat and 31 percent for maize.[5] These are large differences, and are an important negative factor for the food security situation of the poor, since the pre-harvest period is the hungry season, when food stores are exhausted, prices are high and food must be purchased.

Cereals are the main source of dietary energy for most people in Nepal.[6] The main source of protein is in a mixed diet of cereals and pulses – and the balance between the two is important because it determines protein efficiency. Table 5.6 shows movement in the prices of the main pulses over a recent ten-year period. Clearly there was a large jump in the price of almost all pulses in 1995/96 (the jump was in 1996/97 in the case of green gram). This is worrying, because pulses are considerably more expensive than cereals, and as the relative price of pulses increases the very poor may be forced to substitute cereals for them, with a disproportionately negative effect on the quality of diet. This is especially important for nutritionally vulnerable groups, particularly children and pregnant and lactating women, all of whom have above average protein requirements. Pulses are also a crucial source of iron for the poor, and women's need for iron is above average during pregnancy and lactation. Iron deficiency is an important cause of anaemia, and the situation of Nepalese women in this regard is highly unsatisfactory (see *Nutrition and Gender Dimensions of Food Security* under Subsection 5.7.3 below).

Table 5.6: Movement in national retail prices of pulses

Commodity	1990/91	91/92	92/93	93/94	94/95	95/96	96/97	97/98	98/99	99/00	Rate (%)
Blackgram	20.49	21.61	23.03	21.98	29.60	40.58	41.6	38.14	40.19	44.17	8.91
Arhar	22.28	27.05	28.52	26.48	30.87	40.63	44.21	40.61	52.33	53.88	10.31
Green gram	23.53	24.29	28.02	29.89	31.82	31.13	43.56	45.09	50.03	52.64	9.36
Lentil broken	16.71	20.95	22.28	21.40	24.67	32.71	37.76	34.27	38.3	39.75	10.11
Average pulse (unweighted)	20.75	23.48	25.46	24.94	29.24	36.26	41.78	39.53	45.21	47.61	9.67

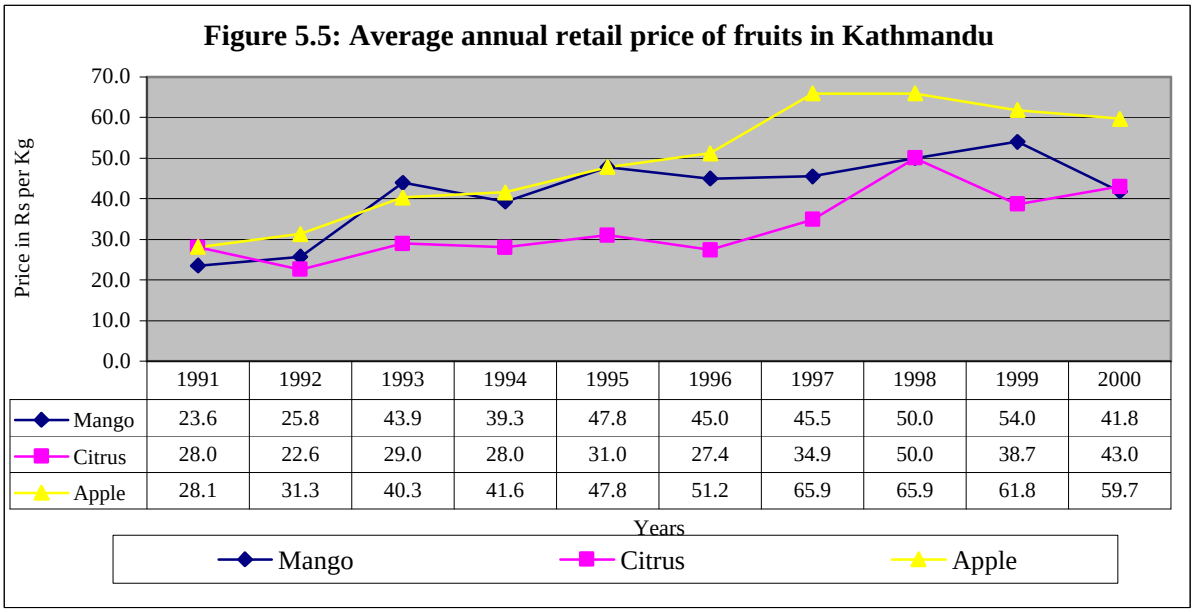
Source: Computed from AMIB-Special Issue, MDD, 2000.

The rapid increase in pulse prices relative to fertilizer should in theory provide incentives for farmers to increase pulse production, but there are technical issues here. In Nepal pulses are generally a risky crop, whereas their main competitor for land, cereals, is less risky, particularly under irrigation. The APP prioritises both the main cereal crops and irrigation, but not pulses, so that the pusles:cereals production ratio cannot be expected to increase – indeed it could even deteriorate – without corrective policy measures (such as research to produce less risky varieties). Relative decline in production of pulses vis-à-vis cereals has certainly been the experience of other developing countries in the course of the Green Revolution (which the APP seeks to promote in Nepal).

Prices of Fruit and Vegetables

Average national retail price trends of three important fruits in the central Tarai district of Parsa is presented in Figure 5.5. Over the period, prices increased annually by about 6.7 percent (mango), 4.9 percent (citrus) and 8.4 percent (apple).[7]

Figure 5.5: Average annual retail price of fruits in Kathmandu



	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Mango	23.6	25.8	43.9	39.3	47.8	45.0	45.5	50.0	54.0	41.8
Citrus	28.0	22.6	29.0	28.0	31.0	27.4	34.9	50.0	38.7	43.0
Apple	28.1	31.3	40.3	41.6	47.8	51.2	65.9	65.9	61.8	59.7

As Table 5.7 shows, in the post-APP period (1997-2000), the average retail prices of these fruits increased in nominal terms. For mangoes the overall increase was lower than for citrus and apple. However, the rate of increase in their prices was lower than the 9.5 percent rate of inflation, except for citrus.

Table 5.7: Changes in the prices of fruits in Parsa

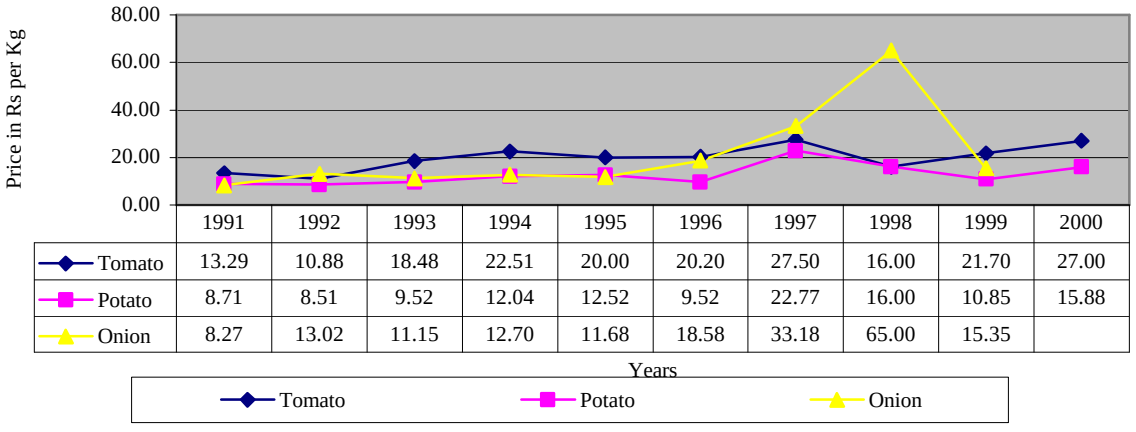
Fruit price (Rs/Kg)

Year	Mango	Citrus	Apple
1995-96	46.4	29.2	49.5
1997-2000	47.8	41.7	63.3

Source: Computed from AMIB-Special Issue, MDD, DOA, 2002

The average retail prices of three important vegetables in the same district are presented in Figure 5.6. Over the period 1991-2000, prices increased annually by about 8.2 percent, 6.9 percent and 8.0 percent respectively for tomato, potato and onion, all of which are lower than the growth in fertilizer prices and lower than the rate of inflation indicating declining real prices and incentives for vegetable producers.

Figure 5.6: Average annual retail price of vegetables in Kathmandu



	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Tomato	13.29	10.88	18.48	22.51	20.00	20.20	27.50	16.00	21.70	27.00
Potato	8.71	8.51	9.52	12.04	12.52	9.52	22.77	16.00	10.85	15.88
Onion	8.27	13.02	11.15	12.70	11.68	18.58	33.18	65.00	15.35	

Table 5.8 presents figures on the average national retail price of tomato, potato and onion in pre- and post-APP periods, (these periods being defined as in Table 5.7). In the post-APP period, the average retail prices of these three vegetables were higher than in the pre-APP period. The retail prices increased on average at higher rates than inflation and fertilizer prices, except for tomato, enhancing the producers' incentives.

Table 5.8: Changes in the prices of vegetables

Vegetable price (Rs./Kg)

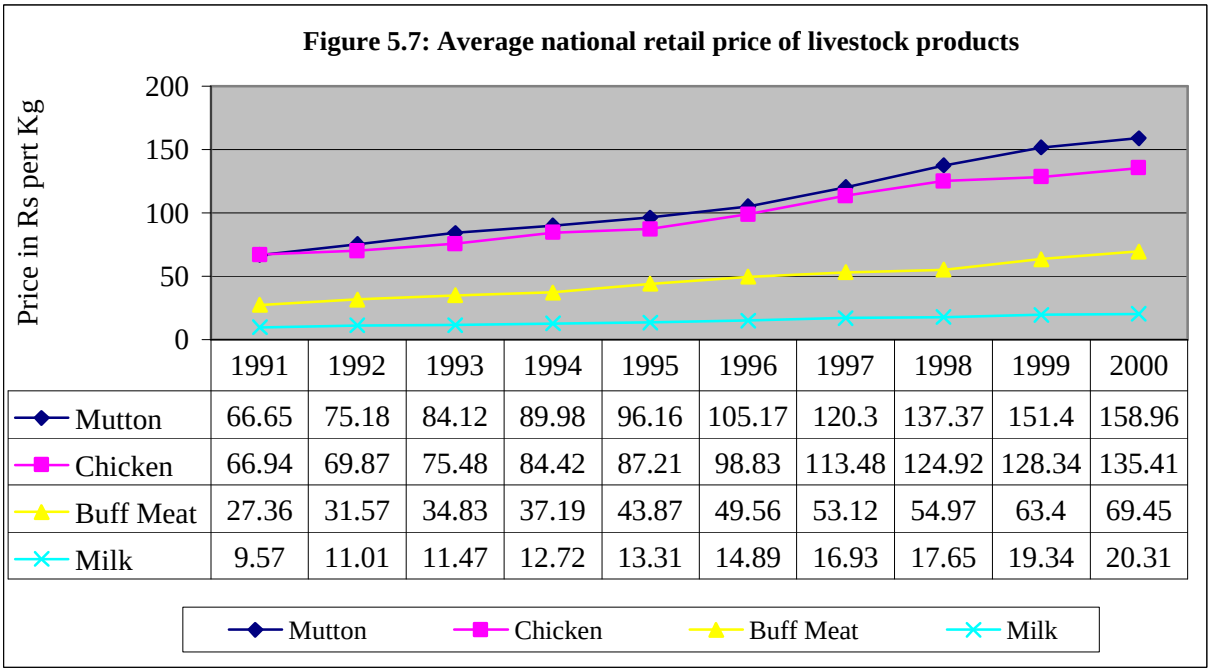
Year	Tomato	Potato	Onion
1995-96	20.1	11.0	15.1
1997-2000	23.1	16.4	37.8

Source: Computed from AMIB-Special Issue, MDD, DOA, 2002

Prices of Livestock Products

Average national annual retail price trend of livestock products (mutton, chicken and buffalo meat and milk) are presented in Figure 5.7. Between 1991 and2000, the price of mutton, chicken, buffalo meat and milk increased annually by about 10.8 percent, 8.2 percent and 8.8 percent and 8.1 percent respectively. Of these four products, only milk is likely to figure at all significantly in the diets of the poor, and here the rate of price increase was lower than the rate of inflation, indicating little but positive effect of food security situation of the poor.

Figure 5.7: Average national retail price of livestock products



	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Mutton	66.65	75.18	84.12	89.98	96.16	105.17	120.3	137.37	151.4	158.96
Chicken	66.94	69.87	75.48	84.42	87.21	98.83	113.48	124.92	128.34	135.41
Buff Meat	27.36	31.57	34.83	37.19	43.87	49.56	53.12	54.97	63.4	69.45
Milk	9.57	11.01	11.47	12.72	13.31	14.89	16.93	17.65	19.34	20.31

Table 5.9 presents the annual growth rates of average national retail prices of mutton, chicken, buffalo meat and milk in the pre- and post-APP periods. The issues raised by these figures are discussed in the next section.

Table 5.9: Changes in the prices of livestock products

Livestock products price (Rs./Kg)

Year	Mutton	Chicken	Buff meat	Milk
1995-96	100.7	93.0	46.7	14.1
1997-2000	142.0	125.5	60.2	18.6
Growth (percent)	10.88	8.19	8.80	8.07

Source: Computed from AMIB-Special Issue, MDD, 2002.

Except for mutton, annual rate of growth of prices of these commodities were lower than the inflation rate and therefore were in favour of the poor people.

5.4.3 Production response to price changes

In order to examine how production has changed in response to changes in prices, production indices of food crops, livestock products and vegetables were regressed against the relevant consumer price indices. Similarly, the food-manufacturing index was regressed against the non-agricultural price index. In order to see whether major policy decisions introduced in the current Ninth Plan (with poverty alleviation as the only goal and APP implementation its principal agricultural policy instrument) have had any effect on production, an intercept dummy was introduced into the regression model. The results are presented in Table 5.10.

Table 5.10: Results of regression analysis (1985-1998)

Statistics	Foodgrains.	Vegetables	Livestock products	Food manufacturing
Adjusted R^2	0.78*	0.94*	0.93*	0. 94*
Intercept	3.46*		3.83*	-2.48*
Lagged price index	0.246*	0.31*	0.17*	1.46*
Policy dummy	0.046 Ns	0.014 NS	0.07**	0.65*

Source: Computed from data presented in Economic surveys of MOF, SINA of MOAC and AMD publications.
* Significant at 99 percent confidence interval
** Significant at 95 percent confidence interval
NS = Non-significant

These indicate that lagged price and intercept dummy together explain about 78 percent of the variation in the cereal production index. The cereal price coefficient (which is the lagged short run price elasticity) is estimated at 0.246, and is highly significant. It shows that the food production index is highly responsive to the lagged price index. In quantitative terms, the estimated coefficient indicates that a 1 percent increase in the lagged price index would result in a 0.25 percent increase in the cereal production index. The regression coefficient associated with the policy dummy is not significant, so that the analysis does not support the hypothesis that APP implementation has had any significant effect on the production index of food crops. However, it must be added that the post-APP time period is too short (given the importance of weather in determining production, and therefore price, levels) to permit any very meaningful conclusions to be drawn from the pre-post comparison.

The regression coefficient associated with the lagged price index of vegetables, estimated at 0.31, is also highly significant, indicating that vegetable production is also price-responsive. As in the case of the cereal production index, the intercept dummy was not significant, so that the data do not support the view that APP implementation has had a significant effect on production of vegetables, despite the fact that this is one of the high value crops prioritized by the APP. However, again the above caveat must be borne in mind. In the livestock sector, regression coefficients associated both with the lagged price index (0.17) and intercept dummy (0.07) were significant. The significant intercept dummy in this case indicates that the supply/production function with respect to milk and milk products shifted upwards after APP implementation, implying that the APP policy to prioritize milk and milk products as one of the high value commodities made a net positive impact.

In a similar manner, the regression coefficients associated both with lagged price index (1.46) and intercept dummy (0.65) with respect to the food manufacturing production index were significant, indicating that the food manufacturing industry responded positively to both lagged price index and policy shift. The upward movement of the supply function after 1996/97 could be the combined effect of major policy shifts in the industrial sector brought about by several government policies and legal decisions made during the second half of the 1990s.[8]

5.5 Effects and Impacts on Social and Development Infrastructure

5.5.1 Social infrastructure

The impact on social development of macro policy reforms initiated since the middle of the 1980s has been analysed in terms of allocation of government expenditure to social services comprising education, health, drinking water, local development, and the 'other social services' category. Information on the period 1985 to 2000 is presented in Table 5.11

Table 5.11: Government development expenditure on social sector

(Rs. Million)

Sectors	Nominal terms			Real terms			Growth rate (percent)			
	1985	1995	2000	1985	1995	2000	Nominal		Real	
							P1	P2	P1	P2
Total development expenditure	6213.3	24980.5	31749.2	6213.3	8528.4	7932.9	14.93	4.91	3.22	-1.44
Social sector expenditure	1501.2	7612.7	12406.2	1501.2	2599.0	3099.8	17.63	10.26	5.64	3.59
percent share of social sector	24.16	30.47	39.08	24.16	30.47	39.08	NA			
Distribution of social expenditure on										
Education	644.2	1791	2573.7	644.2	611.5	643.1	10.77	7.52	-0.52	1.01
Heath	254.8	915.5	2126.7	254.8	312.6	531.4	13.64	18.36	2.06	11.20
Drinking water	201.6	1206.4	2423	201.6	411.9	605.4	19.59	14.97	7.41	8.01
Local development	339.3	3345.3	4136.7	339.3	1142.1	1033.6	25.71	4.34	12.90	-1.98
Other social services	61.3	354.5	1146.1	61.3	121.0	286.4	19.18	26.45	7.04	18.80

Note: P1 implies growth rate between 1985 and 1990 while P2 implies growth rate between 1990 and 1997.
Source: *Economic Survey*, MOF, 2001.

The decline in expenditure on education in real terms between 1985 and 1995 occurred because of a number of factors, one of which was simply redefinition (with teacher's salaries being transferred from the development budget to the regular budget in 1993). A more substantive reason was the policy of encouraging private schools at level of education. This is clear from the school statistics presented in Table 5.12, which shows that the private sector contributed almost 120 percent of all incremental schools between 1997/98 and 1999/2000, implying a 20 percent decline in the number of public schools during the period. At the same time the number of government primary schools and secondary schools declined. Since government schooling is much less expensive, these developments imply that for poorer families it is becoming more expensive to send their children to school.

Table 5.12: Incremental number of schools in 1999/2000 over 1997/98

Schools	Primary	Lower secondary	High school	Total	Percent of total
Total	1419	1333	1037	3789	100.00
Public	-643	174	-321	-790	-20.85
Private	2062	1159	1358	4579	120.85

Source: *Economic Survey*, MOF, 1999 and 2001.

Development expenditure on health increased in real terms by about 11 percent during the second part of the period, with the result that the number of health institutions grew rapidly (Table 5.13). All but 11 of the 75 districts now have at least one hospital (HDR, 1998). The number of government hospitals declined from 111 in 1990 to 83 in 2000, a fall which has been accompanied by an increased number of private hospitals in the Kathmandu Valley and other municipal areas. During the same period the number of public health posts also declined (from 816 in 1990 to 700 in 2000), but there was a sharp increase in the number of public sub-health posts, which grew from none in 1990 to 3,171 in 2000. This was the result of government policy to set up at least one sub-health post in each VDC. Increased public sector expenditure together with growing private sector initiatives have resulted into almost three-fold increase in the number of skilled personnel in the health sector. In theory this should have improved the access of the poorest, especially those in the more remote areas, to basic health services, but little information is presently available on the extent to which this improvement has actually materialised.

Table 5.13: Number of health institutions

Health institutions	1990/91	2000/01	Growth (percent)
Hospitals	111	83	-2.87
Others	987	4336	15.95
Total	1098	4419	14.94

Source: *Economic Survey*, MOF, 1999 and 2001.

Public sector expenditure on local development was shown in Table 5.11. This is normally categorized under six headings: area development, rural infrastructure development, rural/agricultural roads, rural water supply and 'others'. Over 95 percent of public sector development expenditure on local development is spent on the 'others' categories, proper accounting of which is difficult at present. However the relatively low proportionate increase in development expenditure on education after 1993

has occurred alongside a quantum jump in expenditure in the heath and local development sectors since that year.

The growth in expenditure on drinking water supply in real terms during both periods suggests that an increasing number of people have access to safer water, which must be seen as a positive development, in view of both the prevalence of water-borne disease and the amount of time women normally have to spend collecting household water supplies. Increased expenditure on agricultural or rural roads is also positive, as roads reduce the cost of bringing food from farm to market and inputs from market to farm, thus lowering unit production costs and encouraging farmers to produce more food. This in turn can be expected to translate into lower food prices, with obvious benefits in terms of reduced poverty and food insecurity. In addition, improved rural infrastructure makes it less costly and time-consuming to move food supplies around to meet local shortages.

5.5.2 Development infrastructure

The impact of macro policies on development infrastructure has been analysed in terms of allocation of government expenditure to economic services sector comprising agriculture (agriculture, irrigation and forestry combined), transport and communications, and 'others' (land reform, survey, industry and mining, electricity, etc.). Government development expenditure on economic sectors is presented in Table 5.14. Figures in the table show two distinct patterns. First, between 1985 and 1990 the rate of growth of development expenditure on economic services was greater than of total public sector development expenditure, indicating that these were the Government's priority sectors in the first five years of economic liberalisation. Second, it was lower than total public sector expenditure, indicating that the government's priority after the first five years of economic liberalisation shifted from economic sectors to other sectors, especially the social sectors. This is to be expected, because it can be assumed that the private sector, after monitoring government policy changes for the first few years, would begin to develop confidence in the government's programme and therefore start to take increasing responsibility for economic sectors, leaving the government to concentrate on social sectors, where private entrepreneurs have less incentive to participate.

The above-mentioned pattern has also been found in the agricultural sector, which has the most direct influence on poverty and food security. Table 5.14 shows that while development expenditure on agriculture in nominal terms decreased marginally in the first five years, it picked up momentum in the1990s. In real terms however, development expenditure on agriculture declined after 1985, although the rate of decline has fallen in the 1990s, compared to the second half of the 1980s. Agriculture's share in economic sector development expenditure decreased steadily throughout the period.[9] The economic services lumped together under the 'Others' category in Table 5.14 constitutes land reform, survey, industry & mining, electricity and 'miscellaneous items'. Land reform and industry and mining are sectors that have an obvious direct bearing on poverty and food security.

Table 5.14: Government development expenditure on economic sectors

(Rs million)

Sectors	Expenditures in Rs. billion						Annual growth rates (percent)			
	Nominal			Real			Nominal		Real	
	1985	1990	2000	1985	1990	2000	85-90	90-00	85-90	90-00
Total government expenditure	6.21	15.98	37.07	6.21	8.22	9.12	20.81	8.78	5.78	1.04
Economic services expenditure	3.62	11.89	21.14	3.62	6.12	5.20	26.85	5.92	11.07	-1.61
Percentage of economic sector	58.3	74.41	57.03	58.29	74.41	57.03	NA			
Economic sector expenditure on										
Agriculture	1.65	1.53	2.33	1.65	0.79	0.57	-1.50	4.30	-13.75	-3.12
Other economic services	1.97	10.36	18.81	1.97	5.33	4.63	39.37	6.15	22.03	-1.40
Proportion of economic sector expenditure on										
Agriculture	45.51	12.87	11.02	45.58	12.87	11.02	NA			
Other economic services	26.47	87.13	88.98	54.42	87.13	88.98				

Source: *Economic Survey*, 200/01 and 2001/02, MOF.

Table 5.15 shows that in the land reform sector, development expenditure in both nominal and real term increased during the period, indicating continued emphasis of the government in this sector. However, less than one percent annual growth in development expenditure allocated in this sector in the 1990s indicates the government's reluctance to implement an effective land reform programme. This in turn reflects lack of commitment to use land reform as an effective tool to contain poverty and ensure food security among the most vulnerable sections of the population. The negative growth rate in development expenditure on industry and mining is understandable because these are prime areas for private sector participation.

Table 5.15: Distribution of development expenditure on other economic sectors

Expenditure on	Nominal			Real			Nominal		Real	
	1985	1990	2000	1985	1990	2000	85-90	90-00	85-90	90-00
Economic sectors	3717.0	15979.5	37065	3717.0	8224.1	9122.6	33.87	8.78	17.21	1.04
Other economic services	1247.8	7203.6	9232.8	1247.8	3707.5	2272.4	42.00	2.51	24.33	-4.78
Proportion	33.57	45.08	24.91	33.57	45.08	24.91				
Other economic services expenditure on										
Land reform	17.9	40.4	90.0	17.9	20.8	22.2	17.68	8.34	3.04	0.63
Survey	40.7	68.9	251.8	40.7	35.5	62.0	11.10	13.84	-2.72	5.74
Industry and mining	347.0	1751.5	366.8	347.0	901.4	90.3	38.23	-14.47	21.04	-20.56
Electricity	504.9	1363.1	6813.7	504.9	701.5	1677.0	21.97	17.46	6.80	9.11
Others	337.3	3979.7	1710.5	337.3	2048.2	421.0	63.82	-8.10	43.44	-14.63
Distribution of expenditure on other economic services under										
Land reform	1.43	0.56	0.97	1.43	0.56	0.97	NA			
Survey	3.26	0.96	2.73	3.26	0.96	2.73				
Industry and mining	27.81	24.31	3.97	27.81	24.31	3.97				
Electricity	40.46	18.92	73.80	40.46	18.92	73.80				
Others	27.03	55.25	18.53	27.03	55.25	18.53				

Source: Source: *Economic Survey*, 2000/01 and 2001/02, MOF.

5.5.3 Investments on APP priorities

The basic APP strategy was explained in the previous chapter (Section 4.3.1). For this strategy to produce results, investments are to be concentrated on a few priority inputs and outputs which the Plan identifies as having the potential to boost agricultural growth significantly. The priority inputs of the APP are irrigation (groundwater development in the Tarai and small and medium surface schemes in the Hills and the Mountains), fertilizer, credit, agriculture technology, agricultural roads and rural electrification. The priority outputs are crop development through irrigated agriculture, livestock development, high value commodities, agribusiness and forestry. Implementation status of policies, programmes and envisaged institutional reform programmes of APP priority inputs and outputs have been analysed in detail and are presented in Annexe 2. Although the bulk of the investment requirements for realising the APP are to be privately-funded (primarily by farmers), public sector investment requirements are nonetheless large, with investment in priority inputs of Rs.4.2 billion in the first five years, an increase of 58 percent over pre-APP levels (APP Ch.16). The largest investment – 56 percent of the total – is earmarked for irrigation. Against this background, changes in investment patterns within the agriculture sector (irrigation, agriculture and forestry) in recent years are briefly discussed below[10].

Irrigation

New irrigation projects and development budget allocations to the irrigation sector in the pre- and post-APP periods are shown in Table 5.16. This reveals two patterns. First, the number of new projects decreased by about 8 percent in the post-APP period. Projects funded solely by government declined by 75 percent post-APP. However, over the same period projects funded through donor assistance increased sharply – by about 125 percent – reflecting the fact that donor assistance is increasingly geared towards meeting APP priorities. Second, the average annual development budget allocated to irrigation increased, but only by about 6.2 percent during the post-APP period compared to pre-APP period. This does not reflect the huge increases in irrigation investment required under the Plan.

Table 5.16: Changes in the number of new projects and allocated budget (Rs millions) in irrigation sector in pre and post APP period

Projects and allocated budget	Status during the period		Change in post-APP period
	Pre-APP	Post-APP	
No. of new projects	6	5.5	-8.33
HMG/N funded	4	1	-75.00
Donor assisted	2	4.5	125.0
Budget allocation (Rs billion)	3.22	3.42	6.21

Note: Pre-APP period here refers to average of 1995/96 and 1996/97 and post-APP period refers to average of 1997/98 and 1998/99.
Source: Appendix Table 11.

Analysis of development budget allocation to the irrigation sector in the pre- and post-APP years as presented in Appendix Table12 reveals that the share of irrigation sector in budget allocation increased from 26.6 percent in 1994/95 to 29.3 percent in 1999/2000. However, both the annual amount allocated and the percentage increase over the years varied widely, so that there is no discernible trend. For instance, there was an increase of over 30 percent in 1995/96 compared with the previous year. This also

corresponded with a significant increase in the irrigation sector's share, which grew from 26.6 percent to 28.7 percent. However the increase in budget in the following year was a mere 4.3 percent, while it actually decreased slightly in 1997/98. Thereafter, there has been a steady increase over the next two years. These latter two years correspond with the second and the third years of APP implementation.

Areas reported to have been brought under irrigation in the first two years of APP implementation exceeded targets by about 44 percent, but this was because most of the areas brought under irrigation in these years came from projects already completed. Instead of increasing in line with APP targets, investment in real term actually fell almost by 75 percent below target (Appendix Table 13). Clearly this does not augur well in terms of Nepal being able to achieve the APP's ambitious investment targets in this sector.

Fertilizer

Prior to APP adoption, the government was spending a huge amount on fertilizers in the form of price and transport subsidies. Table 5.17 presents the trend in price subsidies provided to different fertilizers, together with the annual subsidy allocation and the annual level of fertilizer imports before and after APP adoption. The level of government subsidy on all fertilizers has declined over time, reaching Rs 2 728 per MT in 1998 for urea and to zero in 1997/98 for DAP and MOP. As noted earlier, price subsidies on all fertilizers were scrapped towards the end of 1999.

As Table 5.17 indicates, with the decline in the subsidy rate the aggregate amount allocated for subsidies each year has also fallen by over 60 percent. The Table also shows that in the past there was generally a positive correlation between the level of fertilizer imports and the annual subsidy allocated. However, after deregulation and subsidy removal this link has been broken. The annual fertilizer subsidy declined sharply from 1997 to 1999, with the complete withdrawal of subsidy on DAP and MOP and 33 percent reduction on urea subsidy. Meanwhile fertilizer imports remained almost constant in 1997-98 and increased in 1998 despite further reduction of subsidy on urea by another 33 percent. If this trend continues in future, fertilizer imports are expected to surge to the level anticipated by APP for the first five years to the planned level under the Ninth Plan.

Table 5.17: Price subsidy, subsidy amount allocated and fertilizer imports

Fiscal Year	Price subsidy (Rs/Mt)			Allocated subsidy (Rs. million)	Fertilizer imports ('000 Mt)
	Urea	DAP	MOP		
1995-96	10719	5960	2977	122.9	133
1996-97	8924	335	3604	82.2	122
1997-98	8015	3472	4470	47.3	108
1998-99	2728	0	0	47.3	156.2

Source: Extracted from Dr. B. B. Basnyat 1999 and 2000.

Agricultural Credit[11]

Data on loans disbursed by the Agriculture Development Bank of Nepal (ADB/N) to APP priority sectors during the pre- and post-APP periods and other sectors are furnished in Table 5.18. This indicates

that in the first two years of APP implementation ADB/N credit disbursements to the agricultural sector increased by almost 30 percent. In the pre-APP period, APP priority sectors accounted for almost 81 percent of average annual credit disbursement; in the post-APP period this increased only marginally to just over 82 percent. However, the increment in credit disbursed to priority sectors was almost 50 percent higher than in the comparable figure for non-APP sectors. Average agricultural credits disbursed per annum in the post-APP period was almost 66 percent higher than the level planned in the first two years of APP implementation.

Table 5.18: Performance of credit disbursement by ADB/N

Sectors	Average annual credit disbursed/planned (Rs. million)			Percentage change	
	Pre-APP period	APP planned	Post-APP period	Pre- vs. post-APP period	Planned vs. post-APP period
APP sectors	3053	2432	4028	31.9	65.6
Input sector	1138	852	1420	24.8	66.7
Output sector	1915	1580	2608	36.2	65.1
Non-APP sector	732	-	883	20.6	-
Total	3785	-	4911	29.7	-

Note: Annual percentage changes between the pre- and post-APP period are calculated as compound growth rates between the average of 1995-96 and 1996-97 (pre-APP) and the last year of the APP period for which data was available, in most cases 2000-01. The same method has been applied in other tables as well.
Source: *Interim APP*, JMA/APROSC, 1997 and SINA, ASD, MOA, HMG/N.

Credit disbursement by ADB/N to the crops sector is mostly used for fertilizer purchases, and this increased by about 36 percent comparing the two periods. At the same time, credit disbursed to the irrigation sector – which goes mostly to finance shallow tubewell installation – declined by about 17 percent comparing the pre- and post-APP periods. This was due to a sharp drop in the credit advanced in the first year of APP implementation compared to the base year. Irrigation credit increased by about 4 percent in the second year compared to the first year of APP implementation (Appendix Table14).

Agricultural Research and Extension

Research and extension are defined in the APP as the major elements of its technology component. The strategy is to create 'a common set of priorities, adequate financial and material resources for fulfilling the priorities, and an appropriate institutional framework that motivates personnel to meet the priorities'. In order to achieve this, the Plan calls for devolution of responsibility to senior researchers within a central policy framework, competitive salaries, performance monitoring, and rewards for those who perform well. Lack of a clear set of priorities for achieving national objectives is identified as a key weakness of the research system and the Plan therefore sets out a set of such priorities derived from the need to deliver the priority outputs. Research teams are then to be organised round these themes.

In terms of financial targets, the APP identifies a need to double Nepal's research expenditure with priority first going to increasing expenditure per worker and then to rectifying major gaps in staffing while shedding surplus staff and increasing pay scales. On the first of these requirements, performance fell steadily behind target in the first three years of APP implementation. In 1997/98 expenditure on

research was 92 percent of the APP target, while in the next two years it was 57 and 64 percent respectively (Pokharel and Sharma 2000).

The government's failure to allocate the necessary resources meant that resources per worker could not be increased, nor could salary scales be made competitive. Nevertheless this would not rule out all of the above reforms demanded by the APP, since some of them require only reallocation of existing resources. The development budget allocation to agricultural research in the first two years of APP implementation is presented in Table 5.19.

Table 5.19: Research projects budgets in 1997 and 1998

Research area	Budget (Rs. '000)	
	1997	1998
Food crop sector	12874	14024
High value sector	4820	6949
Livestock sector	20773	22613
Research sector	9375	13960
Outreach research	5903	7871
APP priority projects	53745	65417
Other projects	19813	23992
Total projects	73558	89409
Percent on APP projects	73.06	73.16

Source: NARC, 2000.

Among the various sectors, livestock was the major consumer of the resources allocated for research, followed by food crops. The proportionate distribution among the various sectors, including APP priority outputs, remained more or less the same during FY 1998/99. The Table indicates that 73 percent of research budgets are devoted to APP projects, and this seems on the face of it to suggest that resources are indeed being reallocated in line with APP priorities. However it is difficult on the basis of such highly aggregated data to judge whether research priorities have actually been changed to reflect APP goals, or whether existing research has simply been reclassified. At the beginning of 2000 the Nepal Agricultural Research Council (NARC) issued new guidelines to assist staff in project preparation. The introduction of this document states that 'agricultural research needs to be sharply focussed and should inculcate some change in its traditional thinking in prioritising its agenda' (NARC 2000). However the document itself then goes on to list a large number of research priorities, far more then those of the APP itself. More recently NARC has issued a new "Vision" statement (NARC 2001). The latest initiatives include the launch of a competitive National Agricultural Research and Development Fund. These reforms are still in their formative stages, so it is too early to assess their impact.

On the agricultural extension front, the budgetary allocation picture is very different from that of research. In 1997/98 the allocation was 80 percent of the APP target, while in the next two years it was 90 and 154 percent respectively (Pokharel and Sharma 2000). Under the APP the reforms identified for extension parallel those for research, and the two components of the system are to be integrated. The relevance of the group approach to extension is stressed and the extension service is identified as the

agency responsible for developing farmers' organisations. Some attention is given to the gender dimension of research and extension, to the special needs of women in both areas, and to the need to recruit more women extension agents. In order to sharpen focus in line with APP norms, the Ministry of Agriculture in 1997 introduced the concept of the 'pocket package programme' (PPP) approach for agricultural extension as a means of triggering the level of growth envisaged in the APP. The 'pockets' are areas of high production potential for a number of crops, including cash crops and food crops. The 'packages' are bundles comprising infrastructure (agricultural roads, rural electrification, irrigation), APP priority commodities (particularly horticulture) priority inputs (fertiliser, seed) and services (research and extension). The District Agricultural Development Offices are required to allocate 60 percent of their budgets to these areas. Since these pockets are generally speaking already the most advantaged areas in the district, there may be a positive impact on food production, but any impact on poverty and food security will be indirect, as under the PPP poor farmers and those in remote areas have even less access than previously to extension services.

Extension policy has recently been sharply refocused, with the Government's decision to decentralize the agricultural and livestock extension services to the district level. This could provide a context within which public sector extension could, at least in some districts, be made less top-down, more accountable and more responsive to local needs, including those of the poor – who after all constitute the majority of voters in any district. However the modalities for this transfer of responsibility are still being worked out and it is clearly too early to say what will eventually transpire on this front.

Agricultural Roads

The Interim APP contains year-wise projections on investment in agricultural roads. During the first five years, the Plan projects an investment requirement of Rs 4.609 billion for the construction of 2 238 km of such roads (Table 5.20). Investment planned for the first three years amounted to Rs 2 224 million. Budget allocation to the programme has however been far short of these targets. In the first and second years only 8 to 9 percent of the planned budgetary allocations were provided, while around 13 percent was provided in the third year. In the first three years, only about 11 percent of the planned investments were provisioned. Although this closely corresponds to the physical achievements (7.3 percent), indications are that construction cost of agricultural roads has been much lower than those envisaged because a relatively large proportion of the roads currently under construction were expected to be completed within this fiscal year from the amount provisioned.

Table 5.20: Financial target of agricultural roads during the Ninth Plan

Fiscal Year	Investment targets (Rs. million)	Budget allocated (Rs million)	Allocated budget as percent of targets
1997/98	224	20	8.9
1998/99	811	70	8.6
1999/00	1189	150	12.6

Source: JMA/APROSC, 1997 and MOAC, May 2000.

The Livestock Sector

Government investment in the livestock sector increased from Rs 295 million per year in the pre-APP period to about Rs 537 million in the post-APP period implying an average annual growth rate of about 22.8 percent (refer to Appendix Table 15 for annual budget allocation to the livestock sector between 1995 and 1998). Public sector investment growth in the first four years of APP implementation was highest in veterinary services (31.7 percent) followed by input supply (28.2 percent), which mostly comprise of expenditure on animal nutrition and breed improvement and by extension and training (Table 5.21).

Table 5.21: Development expenditure in livestock sector

Programme area	Average (Rs. million)		Percent change per year
	1995-96	1997-2000	
Extension and training	154.51	191.99	12.95
Input supply	16.60	26.06	28.21
Veterinary services	23.32	39.83	31.65
Total livestock development	295.02	537.04	22.83
APP priority areas*	89.20	436.09	121.00

* CPRA estimate of APP proportions; NA = not applicable.
Source: CPRA, 1998 page 24.

Since the Ninth Plan does not provide annual- and programme-specific details of planned development in the agriculture sector, it is not possible to compare these annual allocations with targets. However, the Interim APP projected a total investment of Rs 2 600 million in the livestock sector. The Plan calls for an investment of about Rs 427 million in the first year and is projected to grow by about 10 percent annually to reach Rs 622 million in the fifth and final year of the Ninth Plan (Interim APP, 1997). Although the average level of annual expenditure in the priority livestock sector remained slightly lower than the planned level, no added emphasis seems to have been given to APP priority areas in terms of budgetary allocation. The proportion of livestock sector budget allocated to the livestock priorities of the APP in fact declined from about 82 percent in pre-APP period to about 81 percent in post-APP period.[12]

High Value Crops Sector

Although the Ninth Plan has not provided any separate investment estimate for sub-sectors within the agriculture sector, the Interim APP projected an investment requirement of about Rs 861.5 million over the five year period for prioritized high value crops (HVCs) and associated agribusiness (JMA/APROSC, 1997). This, if distributed equally across years, amounts to Rs 168 million per year over the five-year period. The Government's development budget allocation to high value crops – fruits, vegetables, vegetable seeds and sericulture including marketing and storage support – is presented in Table 5.22 with further details in Appendix Table 16.

Table 5.22: Investments in high value crops

Programme areas	Average annual budget allocation (Rs. million)			APP -target per annum (Rs. million)	Percentage of budget provisioned
	1995-97	1997-2000	% change		
Horticulture	81.9	60.6	(13.9)	48.7	124.4
Sericulture	42.0	30.6	(14.6)	62.0	49.4
Market support	36.7	45.7	11.6	51.2	89.3
Apiculture	4.2	0	NA	6.0	NA
Total	164.8	136.9	(8.9)	167.9	81.5

Source: Compiled from red books, MOF, HMG/N.

This indicates that budget provision for this sector declined by about 9 percent in the post-APP period. Except for market support, the average level of annual public sector investment in high value commodities declined in the first two years of APP implementation compared to the previous two years. However, the annual budget provisioned for the promotion of high value commodities increased from about Rs 131 million in the first year to Rs 143 million in the second and Rs 180 million in the third year. This indicates gradual progress in achieving investment targets in the high value crop sector and that targets will eventually be met provided this trend is maintained.

Forestry

The Interim APP projected public sector development expenditure of Rs. 2 015 million for the first five years in forestry, which is equivalent to an annual requirement of Rs 403 million. Government allocations from the development budget over a six year period are presented in Table 5.23. During the period the development budget allocated to the forestry sector increased annually by only 3.8 percent. Allocation pattern of development expenditure on forestry activities over the six year period indicates that the budget allocated to APP priorities increased by only 2.9 percent, which is less than the increase in development expenditure. This clearly indicates a failure of the government properly to recognize APP priorities in the forestry sector. Annual allocation in the first three years of APP implementation remained below the above estimates of the interim APP.

Table 5.23: Development expenditure in forestry

(Rs million)

Fiscal year	Development expenditure	
	Total	APP Sector
1994/95	491	300
1995/96	556	325
1996/97	489	275
1997/98	534	313
1998/99	589	345
1999/2000	592	347

Source: Red Book and CEPRA, 1998.

Table 5.24 presents a comparative analysis of development budget allocated to APP priority areas in forestry during pre- and post-APP adoption periods (first two years only). Although development budget allocated to two of the four APP priority areas increased slightly in the post-APP period compared

to pre-APP period, overall budget provision for APP priority forestry activities declined slightly. The decline was highest in research, extension and training. Budgetary analysis based on limited data supports the view that APP priorities are not well recognized within the forestry sector.

Table 5.24: Development budget before and after APP implementation

APP priority area	Average situation		Annual growth rate (%)
	Pre APP	Post APP	
Community and private forestry	85.2	87.4	1.71
Leasehold and commercial forestry	44.9	46.4	2.2
Soil cons. and watershed management	77.7	76.5	-1.0
Research, extension and training	191.4	187.9	-1.2
Total	399.2	398.2	-0.2

Source: Computed from CPRA report, 1998.

5.6 Effects of Recent APP Strategy on Agricultural Production and Productivity

The effects of macro policies on agriculture are realized through sustainable improvements in production and productivity, and this section attempts to trace these effects with special focus on the APP, at national and regional levels. To some extent such effects can be traced quantitatively, even when the programmes in question have been implemented over only a short period. Improvements are in turn expected to impact positively on the national food security and poverty position, but tracing these impacts would need a longer time frame than is presently available, so that assessment of impacts has not been attempted here.

In order to compare growth rates during the pre- and post-APP periods properly, it would be necessary to fit a trend line to the data in each of the two periods, compute the 'before' and 'after' growth rates from these, and mathematically compare the two rates in order to establish whether any observed differences were statistically significant. This has not been possible here, because post-APP data are available for only four years, which is insufficient for this approach. What has been done instead is to compare average areas, yields, etc in the two years before (pre-APP period) and four years after APP adoption (Post-APP period), calculate the percentage change between the two periods and then convert this to an annual basis. This is very much a second best approach, first because the two periods are very short, and second because the rates do not take into account intra-year changes within the two time periods. The figures presented here would therefore best be regarded as indicative orders of magnitude, and the conclusions as somewhat tentative. A particular problem with the present approach is that, because it deals with two very short time periods, it does not adequately take weather conditions into account. Weather conditions in much of the period since APP adoption have in fact been broadly favourable, and it is quite possible that many of the observed improvements have resulted from this, rather than from any policy changes that may have occurred at the same time. Nevertheless, these data are not the only source of information about what is happening on the ground, and in a number of cases it has been possible to find plausible explanations of apparent trends in terms of other developments in the conditions that underlie production and productivity change.

5.6.1 Changes in area, production and productivity of the crop sub-sector

Area, production and yields of major crops during the pre-APP and post-APP periods and their annual growth rates are shown in Table 5.25. Among annual food crops, paddy, maize and wheat are those prioritized by the APP. The analysis shows quite encouraging results for growth of cereals, particularly wheat and paddy, and for potato. The yield increases for paddy and wheat may be attributed, at least in part, to the combined effect of increased irrigated area and increased fertilizer supply[13]. This analysis suggests that achievements against the growth target set by the Ninth Plan have been good for food crop production, even though targeted growths in yield have not been achieved in full for paddy and wheat.

Table 5.25: Change in area, production and yields of APP crops

	Paddy	Maize	Wheat	Cereal	Potato
Average Area in (000 ha)					
Pre APP period	1504	793	660	2957	108
Post APP period (000 ha)	1525	811	645	2982	120
Annual Growth in Area (%)					
Pre APP period	0.96	0.26	2.08	1.02	4.58
Post APP period	0.30	0.96	-0.99	0.19	2.61
Average Production (000 Mt)					
Pre APP period	3645	1324	1042	6011	948
Post APP period	3899	1411	1115	6425	1140
Annual Growth in Production (%)					
Pre APP period	3.68	-1.07	5.83	2.98	11.03
Post APP period	3.25	3.03	1.95	2.98	7.14
Average Yield (Mt/ha)					
Pre APP period	2.42	1.67	1.58	2.03	8.74
Post APP period	2.56	1.74	1.73	2.15	9.50
Annual Growth in Yield (%)					
Pre APP period	2.69	-1.32	3.67	1.94	6.17
Post APP period	2.94	2.06	2.97	2.78	4.41

Note: Pre-APP implies growth in 1996/97 over 1995/96 and Post APP implies growth in 2000/01 over 1996/97.
Source: SINA, MOA (1994/95 to 2000/01).

Change in area, production and yield of non-APP crops are presented in Table 5.26. Generally speaking the growth rates for these crops are positive but lower than for APP crops. Positive growth of most of non-APP crops suggests that non-APP factors were at work, most likely favourable weather conditions. On the other hand, the fact that the APP priority cereals crops generally out-performed non-APP other cereal crops in terms of production and productivity increase can be regarded at least in part as a result of the APP prioritization exercise. What the Plan did was to adopt a strategy of targeting the three cereals that were the focus of the green revolution, so that the technology for rapidly improving yields was already available (not least from India, as will be shown in the next chapter). By comparison, little research has been done (e.g. at the CGIAR centres) on the cultivars of crops such as millet, barley, pulses and oilseeds that are grown in Nepal.

Table 5.26: Change in area, production and yields of non APP crops

	Millet	Barley	Pulses	Oilseed	Sugarcane
Average Area in (000 ha)					
Pre APP period	260	37	312	184	46
Post APP period	262	31	307	188	53
Annual Growth in Area (%)					
Pre APP period	-0.06	-10.46	0.20	-1.56	3.44
Post APP period	-0.01	-5.45	-0.65	0.86	2.12
Average Production (000 Mt)					
Pre APP period	286	39	219	118	1599
Post APP period	289	33	230	121	1902
Annual Growth in Production (%)					
Pre APP period	2.49	-11.25	3.79	2.81	3.86
Post APP period	-0.58	-4.52	2.11	2.57	2.09
Average Yield (Mt/ha)					
Pre APP period	1.10	1.04	0.70	0.64	35.07
Post APP period	1.10	1.05	0.75	0.64	36.02
Annual Growth in Yield (%)					
Pre APP period	2.55	-0.88	3.59	4.44	0.41
Post APP period	-0.57	0.98	2.78	1.69	-0.02

Source: SINA, MOA (1994/95 to 2000/01).

Changes in area, yield and production of crops at the regional and ecological belt levels are analysed and presented in the following sub-sections by commodity.

Figures on changes in **paddy** area, production and yield in the pre- and post-APP periods are presented in Table 5.27. At the regional and ecological belt levels, paddy area, production and yield all grew in the post-APP period except for the central region where paddy area declined. Among the five development regions, growth in area was higher than the national average in all the regions except CDR, largely because of a combination low base levels and high growth in irrigated areas in the post-APP period (Annexe 2). Among the ecological belts, while production growth was above the national average in the mountains, yield growth was above average in the Tarai. Higher yield growth in the Tarai is due mainly to higher volume of improved inputs used in this belt.

Table 5.27: Changes in area, production and yield of paddy by development regions and ecological belts

(Area in '000 ha; production in Mt; yield in Mt/ha)

Dev. region./ ecological belt	Pre-APP period			Post-APP period			Annual growth rate (%)		
	Area	Prodn.	Yield	Area	Prodn.	Yield	Area	Prodn.	Yield
EDR	477	1047	2.20	499	1292	2.59	0.75	3.84	3.07
CDR	427	984	2.30	438	1171	2.67	-1.34	3.62	5.02
WDR	277	617	2.23	298	710	2.38	1.00	2.49	1.47
MWDR	141	318	2.26	153	393	2.56	1.42	3.84	2.38
FWDR	131	286	2.19	136	333	2.44	1.06	0.62	-0.44
Nepal	1453	3253	2.30	1525	3899	2.56	0.30	3.25	2.94
Mountain	43	78	1.83	47	90	1.93	5.53	6.23	0.66
Hill	344	720	2.09	376	900	2.40	0.85	3.06	2.19
Tarai	1066	2455	2.30	1103	2909	2.64	-0.11	3.21	3.32

Source: Appendix Table 17

Production and yield of **maize** in the two periods are shown in Table 5.28. It is encouraging that for the hills and mountains, the least food secure areas in the country and where maize is the principal crop, both production and yield recorded positive growth. The mountains are generally even less foodsecure than the hills, and it is encouraging that production growth was highest in this zone. Despite positive growth in yield in the Tarai, both area and production declined in that belt. This suggests that perhaps a smaller area of better land is now cropped with maize. However this is not the principal staple crop of the area.

Table 5.29 gives the figures for **wheat**. Production and yield growth in all the regions is encouraging. The relatively high production and yield growth in the MWDR and the FWDR, is probably the effect of high growth rate in irrigation. Both production and yield growth were positive, and growth was higher than the national average in both the hills and the Tarai.

The figures for **potato** appear in Table 5.30. In the first five years of APP implementation, potato production was targeted to grow annually by about 6.2 percent, but actually grew by 7.2 percent. Yield was targeted to grow at about 1.3 percent, but actually grew by 4.4 percent. Both production and yield increased in all five regions. Growth in production was lower than the national average in the eastern and far-western regions. Potato yield were higher than the national rates in the eastern and central regions. .. Comparing ecological belts, both production and yield grew in all three, although the growth rate was lower than the national rate in the mountains for yield and in hills for both production and yield. Given both relatively high food insecurity in the mountains and the relatively high dependence of this zone on potato, this is another worrying development.

Table 5.28: Changes in area, production and yield of maize by development regions and ecological belts

(Area in '000 ha; production in Mt; yield in Mt/ha)

Dev. Region /ecological belt	Pre-APP			Post-APP			Growth Rate		
	Area	Prodn.	Yield	Area	Prodn.	Yield	Area	Prodn.	Yield
EDR	196	318	1.62	204	350	1.72	3.21	5.59	2.30
CDR	215	378	1.76	217	409	1.89	-1.18	1.40	2.62
WDR	197	312	1.59	198	330	1.67	0.22	3.56	3.33
MWDR	123	207	1.68	143	241	1.68	2.55	4.60	1.99
FWDR	51	88	1.71	50	82	1.64	-0.64	-5.75	-5.14
Nepal	782	1303	1.67	811	1411	1.74	0.96	3.03	2.06
Mountain	60	92	1.52	72	113	1.58	8.14	9.02	0.81
Hill	547	879	1.61	566	968	1.71	0.68	3.73	3.02
Tarai	175	332	1.90	173	330	1.90	-1.07	-0.92	0.15

Source: Appendix Table 18

Table 5.29: Changes in area, production and yield of wheat by development regions and ecological belts

(Area in '000 ha; production in Mt; yield in Mt/ha)

Dev. Region /ecological belt	Pre-APP			Post-APP			Growth Rate		
	Area	Prodn.	Yield	Area	Prodn.	Yield	Area	Prodn.	Yield
EDR	115	185	1.61	113	198	1.75	-2.88	0.01	2.97
CDR	199	323	1.62	198	361	1.83	-1.04	1.40	2.47
WDR	123	186	1.51	125	214	1.71	0.44	2.54	2.09
MWDR	120	160	1.33	120	194	1.61	0.00	2.82	2.82
FWDR	86	109	1.27	89	147	1.65	-1.72	4.18	6.01
Nepal	643	963	1.50	645	1115	1.73	-0.99	1.95	2.97
Mountain	42	51	1.21	47	63	1.35	2.05	5.07	2.96
Hill	235	319	1.36	240	377	1.57	0.38	2.13	1.74
Tarai	366	594	1.62	359	674	1.88	-2.25	1.56	3.90

Source: Appendix Table 19

Table 5.30: Changes in area, production and yield of potato by development regions and ecological belts

(Area in '000 ha, Production in Mt, Yield in Mt/ha)

Dev. Region /ecological belt	Pre-APP			Post-APP			Growth Rate		
	Area	Prodn.	Yield	Area	Prodn.	Yield	Area	Prodn.	Yield
EDR	38	302	8	43	394	9.14	1.28	6.45	5.11
CDR	33	320	9.66	40	435	10.97	2.52	8.86	6.19
WDR	13	97	7.69	16	134	8.30	5.62	8.30	2.55
MWDR	12	103	8.51	14	127	8.84	1.16	1.76	0.59
FWDR	6	48	7.73	7	50	7.46	7.88	10.17	2.12
Nepal	101	870	8.61	120	1140	9.50	2.61	7.14	4.41
Mountain	21	171	8.09	23	196	8.35	0.61	3.16	2.53
Hill	52	421	8.03	56	529	9.44	0.73	5.39	4.62
Tarai	28	278	9.84	40	415	10.26	4.34	11.03	6.42

Source: Appendix Table 20

5.6.2 Changes in area, production and productivity of horticultural crops

Targets set by the Ninth Plan (Interim APP for priority crops) and achievements in the first four years of APP implementation in respect of area and production expansion programme of **priority high value crops** are presented in Tables 5.31 and 5.32 respectively. In the first two years of APP implementation, targets were exceeded for citrus and apple, but there was a shortfall in the case of vegetables, caused by adverse weather conditions in some areas.

Table 5.31: Achivements in area expansion of high value crops

(000 ha)

	Average situation		Growth rate	
	1995-96	1997-2000	Achieved	Targeted
Citrus	9.2	15.1	6.13	5.72
Apple	1.87	3.23	2.91	1.72
Vegetables	145.0	149.0	1.77	2.1

Source: Computed from Nepal Agricultural Data Base, 2002, HMG/N and ASDB.

Table 5.32: Production achivements of high value crops

(000 Mt)

	Average situation		Growth rate	
	1994-96	1997-2000	Achieved	Targeted
Fruits and vegetables				
Citrus	90.8	153.8	6.58	7.10
Apple	18.32	31.03	2.69	1.96
Vegetables	1342.0	1484.0	5.10	5.4
Honey (Mt)	60.0	133.5.0	26.78	7.2
Silk (Mt)	24.5	23.85	6.80	51.4

Source: Computed from Nepal Agricultural Data Base, 2002, HMG/N and ASDB and SINA (different volumes), ASD, MOA, HMG/N.

Production of honey and cocoons targeted to grow annually by 7.2 percent and 51.4 percent during the Ninth Plan actually grew by 26.8 percent and 6.8 percent in the first four years of APP implementation.

Data on production of **tea, coffee and fruits other than citrus and apple** are presented in Table 5.33. In these cases, where figures are available the targets have been exceeded – in some cases very significantly. By far the most important commodity here, at least in terms of volume and value, is tea, and the very impressive achievement here owes much to the liberalisation policy of the government.

Table 5.33: Production achivements of other horticulture crops

(000 Mt)

Particulars	Average situation		Growth rate	
	1994-96	1997-2000	Achieved	Targeted
Other Fruits	278.76	310.07	2.70	2.35
Tea (Mt)	2814	6638	33.12	7.8
Coffee (Mt)	33	88.7	28.04	23.2
Cardamom (Mt)	47335	6080	-49.54	1.10
Spices (Mt)	104	118.4	4.42	0.59

Source: Computed from Nepal Agricultural Data Base, 2002, HMG/N and ASDB and SINA (different volumes), ASD, MOA, HMG/N.

Information on the three main high value commodity groups of the APP is disaggregated geographically in Tables 5.34 to 5.36. At the regional level, the fact that growth in production of citrus exceeded national rates in all development regions except the western region reflects HMG/N's targeted priority areas for citrus development. Yield growth was positive in all regions except the western region again and it was highest in the central region. In the case of apples, increasing area accompanied by falling yields suggests problems in selection of orchard areas. Judging by the high growth rates of production and yield in all five development regions, commercialization efforts in **vegetable production** appear to have made progress. Commercial production of vegetables, particularly off-season vegetables, is on the rise especially in the eastern, mid-western and far-western regions. Such a trend is also confirmed by high growth in area, production and yield of vegetables in the mountains.

Table 5.34: Changes in planted area, production and yield of citrus

Area in 000 ha; Production in 000 Mt; yield in Mt/ha

Dev. Region /ecological belt	Pre-APP			Post-APP			Growth Rate		
	Area	Prodn.	Yield	Area	Prodn.	Yield	Area	Prodn.	Yield
EDR	2.4	22.8	9.62	4.2	43.5	10.4	5.83	6.72	0.84
CDR	2.6	26.9	10.23	2.8	28.9	10.2	5.25	6.64	1.33
WDR	2.5	25.6	10.36	5.1	53.3	10.5	6.59	6.15	-0.41
MWDR	1.0	9.1	9.08	2.0	18.5	9.3	6.46	6.77	0.29
FWDR	0.7	6.4	9.46	1.0	9.7	7.3	6.89	7.74	0.79
Nepal	9.2	90.8	9.91	15.1	153.8	10.2	6.13	6.58	0.42
Mountain	0.7	5.8	8.41	1.4	12.3	7.2	8.05	10.20	1.99
Hill	8.4	84.8	10.06	13.7	140.7	10.3	5.89	6.24	0.33
Tarai	0.0	0.3	6.86	0.1	0.9	8.4	14.64	13.66	-0.85

Source: Appendix Table 21

Table 5.35: Changes in planted area, production and yield of apple

(Area in 000 ha; production in 000 Mt.; yield in Mt/ha)

Dev. Region /ecological belt	Pre-APP			Post-APP			Growth Rate		
	Area	Prodn.	Yield	Area	Prodn.	Yield	Area	Prodn.	Yield
EDR	0.52	4.60	8.77	0.53	4.72	8.94	0.96	1.03	0.08
CDR	0.57	5.27	9.10	0.58	5.71	9.85	0.83	0.82	-0.01
WDR	0.53	5.12	9.54	0.55	5.27	9.67	1.07	1.05	-0.02
MWDR	0.98	9.59	10.86	1.12	10.87	9.75	5.03	4.99	-0.04
FWDR	0.38	4.01	9.70	0.46	4.45	8.66	5.26	3.30	-1.87
Nepal	1.87	18.32	9.55	3.23	31.03	9.62	2.91	2.69	-0.21
Mountain	1.10	10.28	10.09	2.06	19.84	8.55	3.45	3.04	-0.39
Hill	2.98	28.60	9.74	1.17	11.19	9.60	1.98	2.06	0.08

Source: Appendix Table 22

Table 5.36: Changes in planted area, production and yield of vegetables

(Area in 000 ha; production in 000 Mt; yield in Mt/ha)

Dev. Region /ecological belt	Pre-APP			Post-APP			Growth Rate		
	Area	Prodn.	Yield	Area	Prodn.	Yield	Area	Prodn.	Yield
EDR	36	314	8.72	38	353	9.39	1.71	4.76	3.01
CDR	66	651	9.86	64	659	10.30	0.36	3.03	2.66
WDR	20	185	9.25	22	224	10.03	1.64	5.61	3.91
MWDR	17	146	8.59	19	186	9.97	4.34	10.32	5.74
FWDR	5	46	9.20	6	62	9.63	10.30	14.39	3.71
Nepal	145	1342	9.26	149	1484	9.96	1.77	5.10	3.27
Mountain	7	52	7.43	8	66	8.56	3.63	6.89	3.14
Hill	53	510	9.62	53	542	10.20	3.00	5.55	2.47
Tarai	85	780	9.18	88	877	9.93	0.81	4.67	3.83

Source: Appendix Table 23

5.6.3 Changes in the production of livestock products

Milk, meat and eggs are the livestock commodities prioritized for development by APP and the Ninth Plan. Table 5.37 provides information on the production and trends of these three commodities in the pre-and post-APP period, together with the growth rates envisaged by the Ninth Plan.

Table 5.37: Changes in milk, meat and egg production status in post-APP period

Livestock Producers	Pre-APP period	Post-APP period	Growth rate (%)	Envisaged change/annum
Milk (000 Mt)	987	1086	2.66	5.56
Meat (000 Mt)	168	187	2.75	6.22
Eggs (million)	410	472	5.04	7.22

Source: Appendix Table 24, 25 and 26

Information on the three main high value livestock commodity groups of the APP is disaggregated geographically in Tables 5.38 to 5.40. Failure to achieve national growth targets for milk and meat is related to a failure to achieve targets under breed improvement, grass seed distribution, vaccination programmes and annual investments (Appendix Table 17). This can also be inferred from the fact that growth in milk production in intensive livestock development areas was higher than in other areas. For example in the Third Livestock Development Project areas milk production has grown at 4.5 percent, compared to 3.6 percent in other areas, while the equivalent figures for meat are 4.6 and 4.4 percent (Appendix Tables18). Growth in production of eggs is highest in the Tarai and appears to be linked with urbanization.

Table 5.38: Changes in production of milk

(000 Liters)

Development regions / ecological belt	Average situation in		Annual growth rate during post-APP period (%)
	Pre-APP period	Post-APP period	
EDR	213	246	4.29
CDR	277	296	2.25
WDR	267	286	1.45
MWDR	112	128	4.13
FWDR	118	129	1.84
Nepal	987	1,086	2.66
Mountain	83	89	2.16
Hill	567	610	1.98
Tarai	337	387	3.87

Source: Appendix Table 24.

.

Table 5.39: Changes in production of meat

(000 Mt)

Development regions / ecological belt	Average situation in		Annual growth rate during post-APP period (%)
	Pre-APP period	Post-APP period	
EDR	38.5	43.70	2.79
CDR	52.9	59.68	3.58
WDR	34.5	37.34	1.42
MWDR	25.5	27.67	2.33
FWDR	16.5	18.86	3.36
Nepal	168	187.26	2.75
Mountain	15.2	16.04	1.60
Hill	90.2	100.02	2.28
Tarai	62.5	71.20	3.68

Source: Appendix Table 25.

Table 5.40: Changes in production of eggs

(in million)

Development regions / ecological belt	Average situation in		Annual growth rate during post-APP period (%)
	Pre-APP period	Post-APP period	
EDR	75.74	91.06	2.61
CDR	187.18	234.52	8.13
WDR	76.56	72.90	-0.15
MWDR	53.24	55.87	2.27
FWDR	17.71	18.06	2.09
Nepal	410.43	472.41	4.74
Mountain	30.08	2.67	5.04
Hill	219.90	4.31	2.22
Tarai	160.44	11.08	1.38

Source: Appendix Table 26.

Wool and fishery are two important livestock sector programmes not prioritized under the APP. Table 5.41 presents figures on the production of these two commodities during the first four years of Ninth Plan implementation. The shortfall in fisheries production is particularly disappointing, given the importance of this sector to the nutritional aspect of food security for the poor. The shortfall in wool production is also disheartening, as the important carpet industry requires a minimum proportion of native wool in order for the product to maintain its distinctive characteristics, and therefore attractiveness for foreign buyers.

Table 5.41: Growth in wool and fish production

Livestock products	Pre-APP period	Post-APP period	Annual growth (percent)	
			Achieved	Envisaged
Fish (000 Mt)	11.7	13.5	6.94	8.56
Wool (Mt)	636.6	617.0	-0.40	NA

Source: SINA, 2000/01, MOA, HMG/N.

5.6.4 Performance of the agribusiness sector

Growth trends in the establishment of agriculture- and forest-based small scale industries and associated capital investments are presented in Table 5.42. Given such large year-on-year fluctuations it is not possible to speak of a trend in any meaningful sense, but the huge drop in the number of new enterprises established the year after the APP was adopted is worrying, even though it is very unlikely to have been related in any way to the Plan itself. The Planning Division of the Ministry of Agriculture recently compiled information on the status of agricultural enterprises across the country as a means of providing support to the strategy of the APP and the programmes of the Ninth Plan in the agricultural sector. It was hoped that this would help consolidate the interrelationships among the agricultural entrepreneurs and the farmers and thereby enhance the industrialization process, which is at the core of the Ninth Plan strategy. An attempt is made here to analyse the trend in development of agro-industry between the pre-APP and post-APP periods using the information provided in this document.

Table 5.42: Growth in agriculture and forestry based industries

FY	Numbers	Investment (Rs Million)
1994/95	458	231.7
1995/96	600	428.6
1996/97	81	108
1997/98	164	214

Note: Here post APP period refers to average of 1997/98 and 1998/99
Source: FNCCI, 1999.

The industries have been grouped into two broad categories viz. production-based and service-oriented, and relevant information is presented in Table 5.43.

Table 5.43: Growth in agro-industry by sectors

Industry type	Base period	Pre APP		Post APP	
		Number	Growth rate (%)	Number	Growth rate (%)
Production	136	182	16.9	239	15.6
Service	43	47	4.6	53	6.4
Total	179	229	13.9	292	13.7

Note: Here post APP period refers to average of 1997/98 and 1998/99
Source: MOA, 2000

There appears to have been a slight change in the composition of such industries, with the proportion shifting in favour of more service-oriented types (although the numbers involved are not particularly large). Changes that have taken place in the number of agro industries in the pre- and post-APP periods are differentiated geographically in Table 5.44. This shows that the national picture masks some very important regional dissimilarities. The growth rates in the EDR and CDR appear quite reasonable, particularly in production-oriented enterprises. In the WDR there has been a quite significant decline in growth rates of both types of enterprise. In the MWDR exceptionally high growth was observed in production-oriented enterprises, but from an extremely low base in the pre-APP era, and the growth appears to have levelled off quickly. The FWDR seems to be relatively disadvantaged in terms of agro-industries, as there was no such enterprise at all in the earlier periods, and just two were established during the latter period. Overall, no significant thrust seems to have emerged in promoting agro-enterprises in post-APP period, at least in the districts for which information is available.

Table5.44: Growth in agro-industry

Region	Base Period	Pre APP		Post APP	
		Number	Growth rate (%)	Number	Growth rate (%)
Production-oriented enterprises					
Eastern Dev. Reg.	8	10	12.5	16	30.0
Central	101	121	9.9	152	13.0
Western	25	39	28.0	47	10.0
Mid-western	1	11	500.0	21	45.0
Far-western	0	0		2	
Total	136	182	16.9	239	15.6
Service-oriented enterprises					
Eastern Dev. Reg.	13	13	0.0	13	0
Central	9	13	22.2	17	15.0
Western	4	4	0.0	4	0
Mid-western	15	15	0.0	17	7.0
Far-western	0	0		0	0
Total	43	47	4.6	53	6.4
Grand total	179	229	13.9	292	13.7

Note: Here post APP period refers to average of 1997/98 and 1998/99.
Source: MOA, 2000.

5.7 Impact of the APP on Food Security

The APP aims to increase food security through a combination of measures which will lead to increased efficiency in agricultural production, and hence lower production costs (which can simultaneously provide production incentives and accommodate lower food prices), and increased demand for agricultural produce through employment creation in the agricultural sector and stimulation of the rural non-farm economy. In this section, these impacts are assessed quantitatively based on data available at national, regional and micro levels. Where quantitative data are not available only likely impacts are discussed.

5.7.1 Food availability and food security

Information on average per capita food production at the national level during pre- and post-APP periods are presented in Table 5.45. The finding that the annual rate of cereal production, and hence food availability, exceeded annual growth of population is clearly important, because if per capita food production is considered a proxy of food availability, then the overall food security position of Nepal improved slightly in the post-APP period. Although not all of the incremental food production can be attributed to APP implementation, at least some part of it seems to reflect the contribution of government's ongoing efforts to improve policy formulation and implementation.

Table 5.45: Per Capita Annual Food Production

Commodity	Pre-APP	Post-APP	Growth rate
Cereal (Kg)	195.65	194.36	0.50
Potato	48.21	51.95	4.75
Fruits (Kg)	19.32	20.17	2.18
Vegetables (Kg)	65.61	67.75	2.76
Milk (Kg)	48.92	49.58	0.38
Meat (Kg)	8.42	8.55	0.47
Eggs (Number)	20.37	21.56	2.42

Source: Computed from Nepal Agricultural Data Base, 2002, HMG/N and AsDB.

Table 5.46 shows that the improved production of staple foods in the post-APP period was spread across all the development regions except CDR and FWDR, and all ecological belts except the Tarai, although actual improvements varied among them. Comparing regions, improvement was highest in EDR and MWDR and lowest in the FWDR. Comparing ecological belts, it was highest in the mountains followed by the hills.. The improvement in the hills and the mountains is especially encouraging, for reasons stated earlier. On the other hand, the fact that per capita cereal production declined in the Tarai reflects the high population growth in that area. In the case of potato, all development regions except MWDR and ecological belts achieved positive growth in per capita production. Positive growth in per capita production of potato in hills and mountains, although modest, has direct positive implications for food security.

Table 5.46: Per capita annual food production by regions

(Production in kg. per annum)

Dev. region/ ecological belt	Pre-APP		Post-APP		Growth rate	
	Cereals	Potato	Cereals	Potato	Cereals	Potato
EDR	231.7	70.8	236.6	77.1	1.68	4.51
CDR	173.7	51.3	169.1	57.6	-0.04	6.06
WDR	202.3	26.9	198.1	30.7	0.58	6.24
MWDR	186.5	50.3	191.3	44.6	1.17	-0.49
FWDR	183.4	22.4	178.4	24.0	-2.21	7.27
Nepal	195.7	48.2	194.4	52.0	0.50	4.75
Mountains	118.2	116.3	129.6	120.4	5.18	1.56
Hills	157.5	49.5	161.0	54.2	0.63	3.34
Tarai	244.1	36.2	235.4	39.3	-0.11	8.16

Source: Computed based on Appendix Table 17 through 20 and Table 27.

On the horticultural front, per capita production of fruits and vegetables increased in all development regions and ecological belts, although again the rate of growth varied significantly among them (Table 5.47). Among the development regions, growth in per capita production of fruits was highest in the MWDR and lowest in the FWDR and among the ecological belts, it was highest in the mountains and lowest in the hills. However, in the case of vegetables, production growth was highest in FWDR and

lowest in CDR. The high growth rate in per capita production of vegetables in FWDR, MWDR and EDR show the positive impact of vegetable development projects implemented in these regions. Among the ecological belts, growth was positive in all the belts. The low growth in per capita production of vegetables in the central region and in the Tarai was because of exceptionally high growth of population in these areas and therefore conversion of agricultural land to alternative uses. The improvement in the Midwestern region and the mountain belt is encouraging, because these are areas in which nutritional security has traditionally been precarious.

Table 5.47: Per capita annual horticultural products by regions

(Kg)

Dev. region/ ecological belt	Pre-APP		Post-APP		Annual growth Rate (%)	
	Fruits	Vegetables	Fruits	Vegetables	Fruits	Vegetables
EDR	20.0	64.3	21	69.1	2.70	2.85
CDR	19.0	92.9	20	87.6	2.12	0.38
WDR	22.0	47.5	22	51.4	1.86	3.59
MWDR	19.0	54.2	20	65.1	2.77	7.89
FWDR	16.0	24.1	16	30	0.77	11.39
Nepal	21.3	65.6	22.3	67.7	2.40	2.76
Mountains	26.0	33.9	28	40.4	2.99	5.23
Hills	22.0	55.8	22	55.4	1.92	3.49
Tarai	16.0	79.9	17	83.4	2.41	1.96

Source: Computed based on Appendix Tables 21 through 23 and Table 27.

In the case of livestock products, per capita production of milk grew eastern and mid western region while it declined in other regions and among ecological belts, it was positive in all the belts except the hills. Excepting western development region, per capita meat production grew in all the development regions and ecological belts (Table 5.48), although again there was significant geographical variation.

Table 5.48: Per capita annual production of livestock products by regions

Dev. region/ ecological belt	Pre-APP			Post-APP			Growth rate		
	Milk	Meat	Eggs	Milk	Meat	Eggs	Milk	Meat	Eggs
EDR	44.8	8.3	16.9	48.1	8.6	17.8	2.39	0.92	0.74
CDR	40.0	7.7	27.4	39.4	7.9	31.1	-0.39	0.90	5.34
WDR	66.4	8.7	18.0	65.7	8.6	16.7	-0.48	-0.51	-2.05
MWDR	42.7	9.8	19.8	44.9	9.7	19.6	1.83	0.08	0.02
FWDR	63.3	8.9	9.3	63.1	9.2	8.8	-0.83	0.65	-0.59
Nepal	48.9	8.4	20.4	49.6	8.6	21.6	0.38	0.47	2.42
Mountains	53.8	9.9	19.2	54.6	9.9	17.6	0.57	0.02	-2.61
Hills	62.3	10.1	23.9	62.5	10.2	25.1	-0.01	0.29	1.85
Tarai	35.6	6.6	17.2	36.8	6.8	18.9	1.18	1.00	4.00

Source: Computed based on Appendix Tables 24 through 27.

Post-APP changes in the food security situation at the micro level in terms of per capita food consumption cannot be directly assessed because the PRA exercise (see Chapter 6) generated data for

1998/99 only. The food security situation assessed in villages surveyed during the PRA exercise between April-May 2000 in four villages studied is presented in the Table 5.49. The information presented in the Table provides a clear indication of the acute food insecurity situation that exists in the villages studied, with very low production in relation to household requirements. Low household food production would not in itself matter very much if alternative livelihood opportunities were available to provide for adequate food purchases, but this is clearly not the case, as subsistence food production continues to play a vital role in household food security in most of the rural areas. The PRA findings indicate that in all study sites, regardless of development region or ecological belt, more than 75 percent of households do not produce sufficient food to meet year-round family needs. Among the villages surveyed, the situation was worst in the mountains in MWDR followed by hills in the same region and then the Tarai in the FWDR and EDR. However because of lack of baseline information, pre-APP and post-APP comparison is not possible.

Table 5.49: Level of food self-sufficiency in study villages

	Murma	**Sokat**	**Kharaula**	**Amhaibelha**
Total households (Number)	55	193	125	121
Food-sufficient households (%)	5.45	17.62	17.60	24.79
Food-deficit households (%)	94.55	82.38	82.40	75.21
Distribution of deficit households	100.00	100.00	100.00	100.00
9 months and above (%)	53.85	69.81	38.83	49.41
6-9 months (%)	15.38	23.27	15.53	31.76
Less than 6 months (%)	30.77	6.92	45.63	25.88

Source: PRA study of villages, 2000.

Note: Self-sufficiency based on household productions of food.

The information in Table 5.49 presents only an indication of the situation in a small number of villages based on rapid assessment tools. However these findings are in line with those of much larger and more representative surveys. Table 5.50 draws on two such studies, the first covering about 3 388 households distributed across 275 wards of 73 districts (NLSS, 1996) and the second 157 187 households distributed across 2 025 wards of 225 VDCs in 15 districts and representing all five development regions and all three ecological belts (APROSC, 1998). The latter study indicates that some 70 percent of the sample households suffer from food insecurity. The problem seems to be more pronounced in the Mountains and the Hills compared to Tarai, and among the five development regions, the EDR, CDR and MWDR greater food insecurity than other two regions. The APROSC study shows a larger proportion of households to be food-insecure than did the NLSS study, which put the proportion at 51 percent. Whichever figure is correct, if the true proportion of households, which are food insecure lies anywhere within this range it is quite unacceptably high.

Table 5.50: Proportion of households reporting as not producing sufficient food

	Households not producing enough food (%)	
	NLSS 1996	APROSC 1998
Development region		
Eastern	49.13	75.70
Central	49.83	72.55
Western	54.82	62.11
Mid-western	46.86	72.68
Far-western	55.84	67.80
Nepal	50.86	70.40
Ecological belt		
Mountain	63.16	71.72
Hill	54.67	75.75
Tarai	44.86	66.90

Source: NLSS, 1996 and APROSC, 1998.

5.7.2 Changes in food self-sufficiency situation

The Table 5.51 indicates the food balance situation prevailing during the 1990s. Clearly the great variability in food production is the cause of the large swings in the size of the deficit, but in every year except 1999 and 2000 production failed to meet requirements. Increasing food deficits in the first two years of APP implementation compared to the year before APP occurred because the Tarai was affected by failed monsoon and then unseasonal floods in 1997, with obviously detrimental effects on production (Shakya and Singh, 2000). Weather conditions cannot be ruled out as a cause, perhaps the main cause, of the slightly improved food situation of 1998/99 and 1999/2000, because as noted earlier, weather conditions in recent years have been generally favourable.

Table 5.51: Trends in food deficit situation ('000 MT)

Year	**1991**	**1992**	**1993**	**1994**	**1995**	**1996**	**1997**	**1998**	**1999**	**2000**
Production	3 373	3 292	3 585	3 398	3 917	3 973	4 027	4 097	4 452	4 513
Requirement	3 562	3 634	3 724	3 883	3 948	4 079	4 178	4 279	4 383	4 430
Deficit	189	342	139	485	31	106	151	182	– 69	+83
Deficit (%)	5.31	9.41	3.73	12.49	0.79	2.6	3.61	4.36	+1.57	1.87

Source: AMB, MDD-Special Issue, 2000 and SINA, 2001.

Analysis of the geographical dimension of the food deficit situation as presented in Table 5.52 reflects the fact that the Mountains and the Hills have always been food deficit areas. In all the years covered, food production in the Mountains remained 38 percent short of requirements in 1995/96, 37 percent in 1997/98 and 24 percent in 2000/01, while in the Hills the deficit was around 15 percent in 1995, 17 percent in 1997 and 16 percent in 2000/01. The Tarai, on the other hand, has always been a surplus food producer, this surplus amounting to around 20 percent in 1995, slightly over 16 percent in 1997 and almost 25 percent in 2000/01. Among the five development regions, only the EDR is not vulnerable to food shortages.

Table 5.52: Geographical dimensions of the food deficit situation

Ecological	Number of deficit districts			Percentage deficit		
Belt	1995/96	1997/98	2000/01	1995/96	1997/98	2000/01
EDR	9	6	2	15.88	12.96	24.20
CDR	14	13	11	-9.59	-10.05	-10.03
WDR	12	11	7	1.05	-9.62	5.47
MWDR	13	9	9	-4.56	-2.82	1.38
FWDR	7	7	7	-10.38	-10.21	-16.75
Nepal	55	46	36	-0.87	-3.61	1.90
Mountains	16	16	14	-38.87	-37.3	-24.39
Hills	33	26	21	-14.88	-17.33	-16.13
Tarai	6	4	2	19.66	16.44	24.64

Note: Positive sign in the last two columns indicated food surplus.
Source: AMIB-Special Issue, MDD, 2001.

5.7.3 Other dimensions of food security

The Physical Dimension

Food availability is a critical factor in food security. However, availability alone does not ensure that the available food reaches every household and every member within households. Unless food availability is accompanied by access, food security cannot be assured. Access to food can be viewed in two ways. First, it can be considered in geographical terms, implying that even if a country produces enough to feed its entire population, people in production deficit areas may lack access to this food due to the distance between the production and consumption points. This type of access issue is crucial for Nepal where the around 60 percent of the food is produced in the Tarai, where less than 50 percent of the population live. Difficult terrain, poorly developed transport and marketing infrastructure and low levels of competition in food supply make food supply difficult and costly, contributing to the food insecurity situation of non-Tarai areas.

Organizing a public food distribution system to ensure food security in food deficit areas has been one of the major policies of successive governments. This system began after the drought and crop failure of 1972/73. Since then public food distribution has continued and is aimed at:

- Ensuring adequate and continuous supply of cereals to deficit areas – including the Kathmandu Valley;
- Providing relief supplies in times of emergency caused by natural disasters;
- Maintaining support prices for farmers; and
- Maintaining affordable prices for consumers.

The Nepal Food Corporation (NFC) was established to perform these functions in 1974, and has since been distributing subsidized food in the 56 Mountain and Hill districts. Twenty-six of these districts are considered remote and inaccessible, and are therefore eligible for additional support.

Ensuring timely and adequate supplies of cereals calls for maintenance of adequate stocks at strategic locations. The NFC maintains an operational stock of around 20 000 MT of cereals and an

additional 23 000 MT of cereals as an emergency stock. It engages in annual procurement in surplus districts for this purpose. In addition to regular annual procurement, the Corporation is also engaged in the relief supply operations from time to time. It maintains cereal buffer stock of 40 000 MT and is mandated to assist people or families affected by natural calamities. Table 5.53 shows NFC's procurement and sales of subsidized cereals since 1990, together with figures on subsidy cost (including the cost of interest and transport). Between 1990 and 2000/01, the Corporation's annual procurement and sales have fluctuated, but on an annual basis have declined by 8.2 percent and 6.0 percent respectively. These drops were the effect of redefined role of NFC in public food grain distribution. Subsidies to cover interest and transport costs, which the government has provided to NFC for its cereal procurement and distribution during the period, have on the other hand grown by about 12 percent annually.

Table 5.53: Summary of NFC operations

Fiscal year	Procurement (Mt)	Sales (Mt)	Subsidy (Rs million)
1990/91	18 000	35 000	120.0
1991/92	92 000	58 000	142.4
1992/93	32 000	74 000	162.6
1993/94	74 000	94 000	140.0
1994/95	20 000	66 000	192.0
1995/96	82 000	60 000	221.7
1996/97	50 000	54 000	224.0
1997/98	12 000	35 000	336.9
1998/99	37 000	56 000	300.0
1999/2000	33 339	25 168	NA
2000/01	7 616	18,914	NA
Growth rate (% pa)	-8.24	-5.97	12.14

Source: Nepal Food Corporation, 2001.

The volume of cereals distributed by NFC to remote food-deficit areas has always been very small, meeting only a very modest part of their deficits. For example, in 1996/97 when the aggregate food deficit was 106 000 MT and NFC sales were 54 000 MT, only 15 520 MT were distributed in the seven most remote districts. Moreover it is widely held that the bulk of the food NFC distributes to remote areas goes to government employees, the police and the military, with very limited distribution among needy people. The fact that (a) the government's capacity to finance subsidized operations is so limited as to be incapable of significantly improving food security, in combination with the fact that (b) poor and food-insecure people lack access to whatever food is supplied by NFC, has raised questions about the legitimacy of continued subsidised cereal distribution. As a result, and as part of a larger economic reform package as required under the Second Agriculture Programme Loan of the Asian Development Bank, the Government is in the process of reforming the NFC and curtailing subsidized cereal distribution.

The Economic Dimension of Food Security

Another dimension of access to food is economic, and income levels largely determine this. Food availability at the national and local levels will not protect people from food insecurity if they lack purchasing power. Nepal is one of the poorest countries of the world, with very low per capita income and acute inequality in income distribution.

Table 5.54 presents some data on average household income and sources of income geographically disaggregated. The gap between urban and rural incomes is large. On the other hand the differences between the three ecological belts – particularly that between the hills and Tarai – is surprisingly small. The proportion of incomes derived from farming is high – and this is typical of a 'least developed' country. In terms of employment status, self employment accounts for half or more of household income, followed by wage income and 'other' sources.

Table 5.54: Level and sources of household income

	Income (Rs. '000)	Income by source (%)		
		Farm	Non-farm	Others
Development Region				
Mountains	32.3	62.0	18.0	20.0
Hills	45.0	58.0	24.0	18.0
Tarai	44.5	64.0	22.0	14.0
Nepal	**43.7**	**61.0**	**22.0**	**16.0**
Ecological Belt				
Rural	40.4	65.0	20.0	15.0
Urban	86.8	16.0	54.0	31.0

Source: NLSSR, CBS, 1997.

Trends in household income distribution are presented in the Table 5.55, which shows a highly skewed set of statistics. Judging by the figures on the income share of the poorest 40 percent of households, there seems to have been a dramatic improvement between 1977 and 1985, yet all of this ground and more was lost again by 1996. Given the magnitude of the changes shown, it is difficult to believe that this finding does not reflect some problem with the statistics. Similar doubts have to be expressed about the changes in the Gini coefficient for urban areas over the same period. The gradually falling value of the Gini coefficient for rural areas is more credible, at least insofar as the changes are relatively small and the direction of change consistent. However, even if this apparent improvement in rural areas is genuine, it is still only relative and income distribution in the rural areas remains highly skewed.

Table 5.55: Changes in income distribution, 1977-96

Reference Year	Household income share of			Gini coefficient		
	Lowest 40%	Next 50%	Last 10%	Rural	Urban	Nepal
1977	12.6	28.2	59.2	0.60	0.50	NA
1985	23.0	54.0	23.0	0.55	0.85	0.57
1996	11.0	37.1	52.0	0.51	0.55	NA

Note: last 10 percent shows last 20 percent for this year.
Source: NPC 1977, NRB, 1988 and CBS 1996.

Nutrition and Gender Dimensions of Food Security

A comparative assessment of requirement and availability situation in terms of dietary energy in Nepal over the period 1986 to 2000/01 has been made in order to examine the nutritional dimension of food security at the macro level (Table 5.56). In terms of availability of dietary energy, Nepal, at the macro level, remained deficit only during 1986-88 and surplus in other years analysed. However, source-specific composition of available dietary energy is far from what is normally regarded as ideal from nutritional perspective. In 1995, almost 94 percent of available dietary energy was from vegetable sources, which is 14 percent higher that the 'normal' requirement. Even within vegetable sources, the bulk of available energy was from cereals and root crops, against a norm of 45 percent for a nutritionally balanced diet.

Table 5.56: Situation of dietary energy availability and requirements

	Availability	Requirement	Surplus/ deficit
Total dietary energy (Kcal/day)			
1986-88	2 083	2 250	-167
1989-91	2 285		35
1994-96	2 267		17
1997	2 366		116
2000/01	2 577		327
Percentage composition (1995)			
Animal origin	6	20	-14
Vegetable origin	94	80	+14
Cereal and root crops	79	45	+34
Other	15	35	-20

Source: SIFAD-Asia Pacific Region, FAO Regional Office 1999 and MDD, 2002.

Household food security implies that all the members of the household have adequate nutritional intake and good nutritional status. Many studies of nutrition in Nepal and other parts of South Asia indicate pro-male bias in the distribution of food within households, so that the nutritional status of women provides a good indicator of intra-household food security. Citing old data, a UNICEF report states that nutritional status of most rural women of Nepal is extremely low (UNICEF, 1996) particularly in terms of widespread lack of protein, vitamin A, iron and iodine in their diets. Maternal mortality is estimated at 540 per 100 000 live births, one of the highest such figures in the world. Nutritional anaemia is a major contributory factor here, and it is believed to be very high among mothers with children aged six to 36 months. It has been measured at 71 percent in Sindhupalchowk District in the Hills, and at no less than 95 percent in Nawalparasi District in the Tarai. Based on WHO Body Mass Index (BMI) standards, about 24.7 percent of women in Nepal (36.9 percent in the Tarai, 13.6 percent in the Hills and 14 percent in the Mountains) suffer from undernutrition[14.]

Available information suggests that children under five years of age suffer from various degrees of protein-energy malnutrition. In 1996 about 53 percent of children suffered from chronic malnutrition (stunting) and 16 percent from acute malnutrition (wasting). Among the ecological belts, chronic malnutrition was highest in the Mountains (63 percent), and acute malnutrition was highest in the Tarai (24 percent). Prevalence of a high degree of maternal under-nutrition and child malnutrition in the Tarai,

despite its food surplus status, illustrates the fact that food availability at the regional level is no guarantee of food security at the household and intra-household levels.

5.7.4 Vulnerability assessment

Various environmental and economic risk factors make the country in general, and certain of its geographical areas and population groups in particular, vulnerable to food insecurity. Environmental factors affect food security through their effects on food production, distribution and utilization. Factors that affect production and distribution include frequency and intensity of natural calamities such as drought, floods, landslides and earthquakes. Factors that affect utilization are related to health issues such as frequency of illness, access to safe drinking water and sanitation practices. Economic risk factors include price increases, economic policies and pressure on economic resources.

According to the 1997 *World Disaster Report*, about 251 815 people in Nepal suffer from natural disasters. Table 5.57 shows the number of families exposed to natural calamities between 1996 and 1999. All five types of calamities included in the Table can affect any part of the country, although there is obviously year-to-year variation in the type of calamity and the number of families affected. Although the Table suggests that the number of families affected by different natural calamities seems to have decreased over the years (from about 58 540 families in 1996 to about 16 492 in 1999), no discernible trend can be derived from data covering such a short period of time.

Table 5.57: Families affected by different natural calamities/disasters

	Year of occurrence			
Type of calamity	**1996**	**1997**	**1998**	**1999**
Flood and landslides	37 096	5 648	33 541	8 925
Epidemics	1 411	1 897	2 300	6 119
Windstorm and hailstorm	13 371	34 531	172	293
Earthquakes	2	269	3	90
Fires	6 630	3 380	876	1 065
Total number of families affected	58 540	45 725	36 892	16 492

Source: Reproduced from Shakya and Singh, 2000.

In general, the environmental factors that affect food security often remain isolated and localized. The effects of some events, such as hailstorms, may be short-term in that they affect only a single season (although certain areas are susceptible to such events in every year); the effects of other weather-related disasters, such as rain-induced landslides, are longer term, insofar as they destroy terraced fields and thus reduce food production capacity. The three ecological belts are susceptible to different types of calamity. For example the Hills and Mountains are particularly vulnerable to loss of terraces to landslides, while flooding in the Tarai tends to affect wide areas as a result of flat terrain and correspondingly poor runoff. In Table 5.58 the vulnerability of the three ecological belts to food insecurity is presented in terms of the number of districts within each belt that faced food deficits and the number of years in which they faced this problem over a given four-year period. This clearly shows that vulnerability to prolonged district-level food deficits is highest in the Mountains and lowest in the Tarai.

Table 5.58: Number of food-deficit districts during 1994/95 to 1997/98

Ecological belt	Total number of districts	Number of districts reporting food deficits for:				
		0 years	1 year	2 years	3 years	all 4 years
Mountain	16	0	0	0	1	15
Hill	39	5	7	0	5	22
Tarai	20	11	4	2	3	0
Nepal	**75**	**16**	**11**	**2**	**9**	**37**

Source: Compiled from MDD data file, 2000.

Vulnerability of areas to the problem of food insecurity can also be assessed in terms of size of the food deficit, and the situation during 1994/95 is presented in Table 5.59. This again leads to the conclusion that at the district level the Mountain belt is the most food-insecure, while the Tarai is the least food-insecure.

Table 5.59: Distribution food deficit districts based on deficit levels

Ecological belt	Food deficit districts		Total deficit		
	Numbers	Proportion	< 20%	21 to 40%	> 41%
Mountains	16	100.0	12.50	18.75	68.75
Hills	27	69.9	48.15	25.93	25.93
Tarai	5	25.0	80.00	20.00	0.00
Nepal	47	62.7	38.30	23.40	38.30

Source: Computed from MDD data files.

5.8 Impact on Poverty

There have been four comprehensive surveys of poverty levels in Nepal. The first was made in 1977 by the NPC, the second by the NRB in 1985, the third by WB/UNDP in 1989 and the latest by CBS in 1996. The impact of macro policies on poverty can thus be evaluated based on the findings of this body of research, although differences in methodology between the different studies mean that little can be inferred from relatively small differences. The figures from the four surveys are shown in Table 5.60. In the case of urban poverty, there is great variation between studies and no evidence of a clear trend. With rural poverty, there seems to be an upward trend, and the dominance of the rural areas in terms of population distribution means that the trend at national level is also upwards. The fact that the 1989 study goes against the trend of the other three suggests that such differences may be particularly pronounced in this case and that there was in fact an upward trend in poverty over this period of almost two decades, during which there was considerable macroeconomic policy liberalization. What is more serious is the fact that while these studies indicate that over the period while the proportion of people below the poverty line increased by close to 10 percent, the number of poor people almost doubled, from about 4.9 million in 1977 to about 9.5 million in 1996. Moreover all four studies show that poverty is more rampant in rural, than in urban, areas.[15]

Table 5.60: Trends in the incidence of poverty

Source	Year	Percent of population below poverty line		
		Urban	Rural	Nepal
NPC	1977	17.0	37.2	36.2
MPHBS	1985	19.2	43.2	42.5
WB/UNDP	1989	15.0	42.0	40.0
CBS	1996	18.0	47.0	45.0

Source: NHDR, 1998.

In terms of ecological belts, poverty, like food insecurity, is most pronounced in the Mountains and least pronounced in the Tarai (Table 5.61). In terms of development regions, the two westernmost regions are particularly disadvantaged. The fact that no less than 80 percent of the population of the Far-Western Mountains live in poverty is quite appalling

Table 5.61: Poverty among development regions and ecological belts (%)

Development region	Ecological belt			Nepal
	Mountain	Hills	Tarai	
Eastern	57	68	27	43
Central	48	31	34	34
Western	52	46	44	45
Mid-western	72	66	47	59
Far-western	80	73	49	65
Total	63	50	37	45

Source: NHDR, 1998.

Poverty distribution by caste/ethnic groups is presented in Table 5.62. Socially, poverty is more pronounced among the Dalits (formerly known as 'untouchables', comprising the Damai, Kami and Sarki castes), and a number of tribal groups, such as Limbu, Tamang and Magar. The Table suggests a fairly close association between poverty and socially disadvantaged status, but there are some surprises too, in particular the fact that poverty among the Chhetri (a relatively high caste group) is rather higher than that among the Tharu, a traditionally highly-disadvantaged group.

Table 5.62: Poverty among caste/ethnic groups

Caste/ethnicity	Proportion below the poverty line	Caste /ethnicity	Proportion below the poverty line
Brahman	34	Rai	56
Chhetri	50	Gurung	45
Newar	25	Tamang	59
Kami	68	Limbu	71
Sarki	65	Magar	58
Damai	67	Tharu	48
Muslim	38	Others*	40

* Represents Tarai caste groups.
Source: NHDR, 1998.

According to the Nepal Human Development Report (NHDR 1998), poverty is higher among male-headed households than among female-headed households, although the difference is not large (45 and 42 percent respectively). This is contrary to expectation, given that the figures for several poverty-relevant variables are higher among females and female-headed households than among their male counterparts. For example, compared to their male-headed households, more female-headed households are landless[16] and they tend to cultivate less land. Also there is no doubt that females, irrespective of whether they belong to poor or non-poor households, lag behind males according to several socioeconomic indicators, such as education, health and access to productive resources. The NHDR considers that this could be due to defective reporting and data collection procedures. This may well be true, but it could also, at least partly, be a consequence of the fact that female-headed households tend to have smaller families, and hence a lower dependency ratio.

5.9 Programme Management, Monitoring and Evaluation

Institutional arrangements for policy making, planning and implementation of development programmes related to poverty alleviation and food security were discussed in Chapter 4. In the present section arrangements for monitoring and evaluation of poverty and food security concerns are discussed. All sectoral programmes aimed at ensuring food security and reducing poverty through growth are the responsibility of the respective line ministries, but in the case of targeted programmes implementation responsibility lies with the Ministry of Local Development. However, there is no very clear demarcation of responsibility, so that conflicts between ministries and programme duplication are common. This is particularly so for programmes with several components, such as rural development. Implementation of rural development programmes which are basically aimed at ensuring food security and poverty reduction is the responsibility of MOLD. But these areas are also the responsibility of sectoral ministries, and this has created co-ordination problems from the central level right down to the district and sub-district levels.

Another example of poor co-ordination can be seen in the programme implementation arrangements for the APP. Implementation has been by far the greatest challenge with the Plan. One of the components was to have been be ‘an implementation mechanism that operates at the district and national levels, and is complemented with an analytical body to facilitate reinforcement and adjustment of the Plan over time’. Regarding the second part of this component, an Independent Analytical Unit (IAU) was formed under the NPC, and operated from mid-1997 until mid-1999, when external funding came to an end. This more-or-less coincided with the Unit’s transfer to the Ministry of Agriculture and its re-naming as the APP-Monitoring and Analytical Unit (APP-MAU). Lack of resources has prevented the APP-MAU even continuing IAU activities, far less expanding them to cover the full co-ordination, monitoring and analytical role it was meant to play.

In addition to Government, several NGOs and INGOs implement targeted programmes for poverty alleviation. The Social Welfare Council, an autonomous body under the Ministry of Women, Children and Social Welfare, co-ordinates activities of NGOs. Recently, a Poverty Alleviation Fund has been established as an autonomous body to implement poverty alleviation programmes through the NGOs, but it has not yet started operating.

The diversity of institutions involved in the implementation of development programmes that have direct and indirect impact on food security and poverty alleviation calls for strong monitoring and evaluation arrangements. For this purpose a detailed three-tier institutional arrangement for monitoring and evaluation of poverty alleviation programmes was framed in the Eighth Plan. The highest tier is the National Development Action Committee (NDAC), chaired by the Prime Minister; all ministers and the Vice Chairperson of the NPC are members. The second tier consists of a Central Monitoring and Evaluation Division (CMED) within the NPC and a Ministerial Development Action Committee (MDAC) within each ministry. The third level is located within ministries: a division or section was established in each ministry to monitor and evaluate its programmes. These divisions/sections are required to send regular progress reports to MDAC and CMED. In addition to the line ministries, the five regional directorates of the NPC are required to conduct periodic inspection of development projects and send their periodic reports to CMED. Based on these, the CMED has to submit its reports every four months to NDAC. Despite this elaborate mechanism, monitoring and evaluation of development programmes in food security and poverty alleviation cannot be said to have been effective.

The Ninth Plan also placed strong emphasis on the need for an elaborate and effective mechanism for monitoring and evaluation of poverty alleviation programmes. As a result, a National Poverty Alleviation Advisory Committee has recently been formed to advise the Prime Minister. Within the NPC a Poverty Alleviation Division has been set up to monitor programmes in this area and to evaluate development programmes from the perspective of poverty alleviation. This division has yet to begin its work.

5.10 Key Findings

Table 5.63 summarises the major findings of the study as reported in the present chapter. In terms of macroeconomic policy, the negative factors listed simply reflect the fact that Nepal is economically a 'least developed' country and one of the poorest in the world. On the positive side, some major reforms of recent years are beginning to bear at least some fruit, and could in future free up the resources needed to make important contributions to enhanced food security and poverty reduction. The analysis found no significant negative factors in policy on social and development infrastructure, at least in terms of the direction of change, although of course what can actually be done in this area is severely restricted by pervasive resource constraints.

On the food and agriculture side the picture that emerges from Table 5.63 is very mixed. Various policy reforms have had some positive effect. The major change has been the adoption of the APP, but its implementation has fallen far short of requirements, co-ordination has been poor (a situation that has recently worsened), investment has been far short of targets, and many of the important institutional reforms demanded by the APP are still – at best – in the pipeline. In fact, in terms of impact on food production, the most significant policy development since APP adoption was fertilizer deregulation and liberalisation, and this was not even envisaged in the Plan. The progress that has been made since APP adoption in terms of increasing per capita food production seems to owe at least as much to broadly favourable weather conditions as to the APP itself, so the caution is needed in interpreting the apparently favourable trends reported here. Some recent developments have been discouraging, particularly the fact

that the poorest and least food-secure part of the country, the mountain ecological belt, is the one where least progress has been made in terms of increasing – or more accurately, reducing the decline in – most forms of per capita agricultural production and productivity. The remoteness of this area, its rugged terrain and its correspondingly poorly-developed transportation and marketing infrastructure means that any gains made in agricultural production and productivity in the Tarai are likely to have only marginal impact on the local food security situation. Meanwhile the poverty and food security situation across the country as a whole remains very unsatisfactory in terms of a broad range of indicators.

Table 5.63. Impact of policy on poverty and food security: A summary of key findings

Positive factors	Negative factors
I. Macroeconomic policy	
• Reduction in government borrowing means future tax revenue can potentially be diverted from debt servicing to poverty alleviation • Reduced government borrowing frees up domestic resources for private borrowing and investment • An improving balance of payments situation in real terms improves the country's ability to pay for food imports • Reinforcing the above point, econometric analysis shows that food production is highly price-responsive • Poverty alleviation was adopted as the cornerstone of the Ninth Plan, with the APP as the main agricultural policy instrument. The Tenth Plan will incorporate the country's Poverty Reduction Strategy Paper • Liberalisation policy in the tea sector was followed by large increases in production and sales	• The low level of domestic savings hampers the economy's investment capacity • The fact that rural poverty is greater than urban poverty implies that agricultural investment is likely to be lower than investment in urban-based sectors • A large and growing trade deficit is constraining improvement in the balance of payments • Falling agricultural exports in combination with increasing agricultural imports indicates that the sector is becoming less capable of supplying even the domestic market • The deterioration in the ratio of cereal prices to fertilizer prices has decreased the profitability of producing basic foods and discouraged production • Deteriorating TOT in agriculture throughout most of the 1990s has had a negative effect on farmers' incentive to increase food output • Above-inflation price increases for the main cereals has negative impact on the poorest, who spend a high proportion of income on food • Seasonal price spreads for staple foodstuffs are higher than in neighbouring countries, harming the food-insecure, who must buy food when prices are at their seasonal peak • Price inflation for vegetables in general is very high, and this is very detrimental to dietary quality for the poor; much lower price inflation for fruits does not compensate, because the poor cannot afford them • There appears to be no political will to implement an effective land reform programme

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Positive factors	Negative factors
II. Policy on social and development infrastructure	
• Increased government expenditure on social sectors in both real and proportionate terms has made these services more available to the poor • The shift of emphasis to primary education is of potential benefit to the poor • The parallel shift in health policy from hospitals to sub health posts is also potentially beneficial for the poor; growth in expenditure on drinking water supply is also likely to benefit the poor • Improved rural transport and marketing infrastructure will reduce transaction costs and should both incentivize increased food production and make it less costly to move food around to meet local shortages	
III. Policy on food and agriculture	
• Acceptance of APP across the political spectrum suggests that changes in government do not imply disruptive shifts in agricultural policy • Donor assistance is increasingly being geared towards meeting APP priorities • Liberalization of the fertilizer market has eased chronic supply constraints in this subsector • Elimination of fertilizer subsidies has reduced the budgetary demands of the agricultural sector • Policy changes in the livestock sector have had significant impact in increasing milk production, and source of animal protein that is relatively affordable for the poor	• Development expenditure on agriculture remained constant in real terms up to 1990 and then declined; agriculture's share in economic sector development expenditure decreased steadily throughout the period • Government investment in APP implementation has been substantially below target in all subsectors • The greatest problems with the APP are low investment, poor co-ordination and weak implementation mechanisms • Withdrawal of subsidies on STWs has greatly reduced sinkings and has reportedly distorted investment patterns towards other (subsidised) forms of irrigation • Improved fertilizer availability has been accompanied by problems of adulteration of smuggled fertilizer

Table continued...

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Positive factors	Negative factors
• Reforms currently in the pipeline for the agricultural research and extension systems have the potential to make them more priority-focussed and more responsive to farmers' needs • Planning documents in research and extension indicate a growing awareness of the gender dimension of food production • Per capita production of most food groups has increased in recent years • Per capita production of three major staples – rice, wheat and potato – have grown impressively in recent years • Increases in rice, wheat and potato yields have been especially high in the hills, where many districts are food-deficit • Per capita maize yields have grown substantially in the Tarai, the country's 'food basket' • Per capita yields of many fruits and other horticultural crops have grown in recent years • The fact that productivity of APP priority cereals is growing faster than that of other staple foods vindicates the APP approach of prioritising green revolution technology in the cereals subsector • The Tarai produces around 18 per cent surplus food in recent years	• The key reforms which the APP calls for in research and extension have yet not been made, particularly those concerning prioritization, problem orientation and rewarding good performance • Investment in agricultural research has fallen steadily and radically behind APP targets • The 'pocket package programme' approach has been narrowly interpreted, with the result that extension resources are even more concentrated than before on areas and farmers who are already relatively advantaged • Investment in agricultural roads, a key component of the APP, has been only around 11 percent of APP financial targets, and physical achievements have been only around 7 percent of targets • Increases in rice and wheat production have been below average in the mountains, the most food-insecure belt in the country • Maize yields have fallen in both mountains and hills, particularly the former • Both yield and per capita production of potato have been falling in the mountains, where it is a particularly important staple • Increases in vegetable and fish production have fallen far below APP targets and below population growth; vegetables are especially important for the nutritional security of the poor • Much of the net increase in per capita production of staples is attributable to favourable weather conditions in the post-APP period; this clearly cannot be expected to last indefinitely • Despite recent improvements, the best available estimate is that around 70% of Nepal's rural households are food-insecure.

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Positive factors	Negative factors
	III. Policy on food and agriculture (continued)
• There was some improvement in the production of high value crops (fruit and vegetables) in the mountain belt, lending support to the APP strategy of capitalising on mutual regional comparative advantage by promoting high value market-oriented produce in the hills and mountains, thus increasing the ability of people in these belts to import Tarai cereals	• By the end of the 1990s, the Mountain and Hill belts were producing respectively 62% and 84% of their food requirements • Among the five development regions, only the EDR is not vulnerable to food shortages • In the food-insecure parts of the country difficult terrain, poorly developed transport and marketing infrastructure and low levels of competition in food supply makes food supply difficult and costly, contributing to the food insecurity situation of food deficit areas • The volume of food distributed by NFC to remote food deficit areas has always been only a very small part of the deficit; there is evidence that the bulk of NFC's supply that does reach such areas reaches only civil servants, the police and the army. • Inequality in income distribution within the rural areas, although apparently gradually falling, is still very marked • From a nutritional standpoint, the composition of most diets is very unsatisfactory • The nutritional status of most rural women is extremely low, with widespread lack of protein and deficiency in Vitamin A, iron and iodine; the incidence of maternal mortality and anaemia are exceptionally high • All three anthropometric indicators (stunting, wasting and underweight) show that the nutritional condition of children is very unsatisfactory • Acute maternal and child malnutrition are very high in the Tarai • The female under-nutrition rate in the Tarai is more than 2½ times that of the hills and mountains, illustrating the fact that regional food availability is no guarantee of food security at the household and intra-household levels • The food security of rural households in all three ecological belts remains very vulnerable to adverse weather events and other natural disasters • A number of indicators show that district level food insecurity is highest in the mountains and lowest in the Tarai, so the fact that the performance of the mountain belt in increasing per capita food production is the poorest of the three belts should be a matter of urgent policy concern • The poverty position mirrors that of food insecurity: it is estimated that over the past two decades the proportion of people below the poverty line increased by 10%, while the absolute number of poor people almost doubled. • Poverty is primarily a rural phenomenon and is most pronounced among lower castes and 'ethnic' groups

Notes on Chapter 5

[1] Only salient features have been presented here; details will be found in Chapter 3.

[2] General price indices are GDP deflator calculated on the basis of production of agricultural and non-agricultural goods. Consumer price index, on the other hand weigh the prices of goods with their respective shares in the consumer budget.

[3] TOTA= (AGDPD/NAGDPD)*100. Where: TOTA= Terms of trade of agricultural sector with the non-agricultural sector, AGDPD= Index of agricultural GDP deflator, NGDPD = Index of non-agricultural GDP deflator

[4] Throughout this chapter growth rates have been calculated as: $P_t=P_o(1+r)^t$ where r is the growth rate. This is a compound growth rate and it does not take into account values P_1 and P_{t-1} periods.

[5] This figure may be seen in perspective by comparing it with the USA, where the inter-seasonal price spread of the most important cereal, wheat, tends to be around the 7 percent level.

[6] At higher altitudes, non-cereal foods are the starchy staple for many people, particularly potato, but also the pseudo cereal, buckwheat.

[7] The word 'citrus' is used here for the sake of consistency with the APP. However what is usually meant is tangerine.

[8] These were brought about by Industrial Policy of 1992, Industrial Enterprise Act, 1992, Foreign Investment Policy, 1992, Foreign Investment and Technology Transfer Act, 1992 and Company Act, 1996.

[9] In towards the end of the 1990s at least part of this decline could be attributed to the phasing out of fertilizer subsidies.

[10] Pre-APP period refers to average situation of 1995/96 and 1996/97 and post-APP period refers to average situation of 1997/98 and 1998/99 except when otherwise mentioned.

[11] Discussion here is confined to credit operation of ADB/N only. Between 1990 and 2000, the number of formal credit institutions financing in rural areas increased from about 4,007 in 1990 to about 12,774 in 2000. In 2000, apart from ADB/N, Rastriya Banijya Bank and five regional rural development banks, 12,466 financial institutions were involved in rural finance and their share in total lending was 22 percent as against 10 percent in 1990 (NASPR, 2002).

[12] The proportions reported here are only for first two years of APP implementation.

[13] Average fertilizer supply in 1997 and 1998 was three percent higher than the average of 1995 and 1996 (Table 4.3)

[14] The BMI (defined as the ratio of body weight divided by the square of height in meters) below 18.5 is considered a symptom of under nutrition.

[15] A study conducted by APROSC using food sufficiency criteria in 1998 and covering 225 VDCs in the fifteen districts of Nepal has estimated rural poverty to be around 70 percent nationally, with 72 percent, 76 percent and 67 percent respectively in the Mountains, Hills and the Tarai. The proportion of population in the ultra poverty (food self-sufficiency for six months or below) groups was estimated at about 42 percent (39 percent in the Mountains, 43 percent in the Hills and 42 percent in the Tarai).

[16] Some 8.4 percent, 16.0 percent and 42.2 percent of female-headed households in the Mountains, Hills and Tarai respectively have no land compared to less than one percent, 10.5 percent and 21.8 percent of male-headed households in the respective belts. Likewise, female-headed households operate less land (0.6 ha, 0.4 ha and 0.5 ha in the Mountains, Hills and Tarai respectively) compared to male-headed households (1.3 ha, 0.9 ha and 1.0 ha in the respective belts).