CHAPTER-IV
FOOD SECURITY IN ANDHRA PRADESH

4.1 Introduction

Among the States in India, Andhra Pradesh has created its unique identity on many fronts. It is one of the few States that have been on the forefront in accepting the new phase of economic reforms. The State also has a strong history of introducing a few ambitious programmes, like distributing of rice through PDS at Rs.2/- per Kg. It is also a prominent state that provoked land reforms. But at the same time, it continues to be a region carrying large share of India's poor as food security continues to be on the top of the agenda in economic development of the state. It also presents a typical picture of extreme geographical variations in economic development due to the history of its emergence. Andhra Pradesh was formed on 1st November 1956, by merging nine Telangana districts with the erstwhile Andhra state. It is one of the largest states with a land area of 2.74-lakh sq. Kms and a population of 75.7 million (2001 census). It accounts for 8.4 percent of the country's geographical area. The State comprises of three geographical regions, namely, the Coastal Andhra (9 districts), Rayalaseema (4 districts) and Telangana (10 districts) (Appendix-4.1). Growth in population exerts pressure on food security. Andhra Pradesh is one of the densely populated states (it increased from 66.5 million to 75.7 million in absolute numbers) but recorded a decline in the population growth during the last decade. The growth rate of population in the 1990's (1.3 percent per annum) is lower than the earlier decade's growth rate (2.17 percent per annum). There is no significant change in the proportion of population among the regions. The share of population in Telangana region has gone up while that of other regions registered a marginal decline. The decline was faster in South Coastal region than other regions (Table-4.1).

Table-4.1: Distribution of population across regions in Andhra Pradesh

Region	1971	1981	1991	2001
North Coastal Andhra	12.4	11.8	11.6	11.3
South Coastal Andhra	32.9	32.5	31.6	30.4
South Telangana	18.4	19.4	20.9	21.9
North Telangana	17.9	18.3	18.3	18.6
Rayalaseema	18.3	18.0	17.6	17.8
Total population	43.50	53.55	66.50	75.72
Coefficient of variation (%)	38.3	38.0	36.6	34.8

Source: Hand book of statistics, Directorate of Economics and Statistics, Government of Andhra Pradesh.

The coefficient of variation shows a declining trend indicating narrowing regional differentials in population share over decades.

4.1.1 Physical features

Andhra Pradesh has three major river basins Krishna, Godavari and Penna and five minor ones in the state draining into the Bay of Bengal. Based on various agro-climatic conditions, the state has been divided into seven agro-climatic zones:

(i). Krishna-Godavari zone consisting of the districts of West Godavari, Krishna and Guntur and parts of East Godavari, Khammam, Nalgonda and Prakasam. Paddy and cotton are the important crops produced in this region.

(ii). North-coastal zone – comprising most parts of Srikakulam, Vizianagaram, Visakhapatnam and a smaller portion of East Godavari. Paddy is the important crop in this region

(iii). Southern zone – including the districts of Nellore, Chittoor, Southern parts of Prakasam and Cuddapah and Eastern part of Ananthapur. Paddy-pulses and cotton are the important crops produced in this region.

(iv). Northern Telangana zone – which includes the districts of Adilabad, Karimnagar, Nizamabad, Medak (except southern borders), Warangal (except North-Western portion), Eastern tip of Nalgonda and most parts of Khammam. Paddy and pulses are the major crops in this region.

(v). Southern Telangana zone – which includes the districts of Hyderabad, Ranga Reddy, Mahaboobnagar (except southern border), Nalgonda (except south-eastern border) and North-western and Southern parts of Warangal. Paddy and sorghum are the important crops in this region

(vi). Scarce rainfall zone of Rayalaseema – comprising the districts of Kurnool, Ananthapur, Western parts of Prakasam and Northern parts of Cuddapah. Groundnut and sorghum are the important crops in this region

(vii). High altitude and tribal areas – lying along the northern borders of the state in the districts of Srikakulam, Vizianagaram, Visakhapatnam, East Godavari and Khammam. Paddy is the important crop in this region.

Each of these zones has a particular set of agro-climatic condition, which influences the cropping patterns and crop production.

The rainfall in Andhra Pradesh is influenced by South-west and North-east monsoons. The average rainfall of the state is 925 mm, varying from about 520 mm in Ananthapur to 1160 mm in Vizianagaram and East Godavari districts. The distribution of annual rainfall in the State as a whole is about 69 percent during South-west monsoon, 22 percent during North-east monsoon and 9 percent during winter and hot weather months. The mean annual rainfall in coastal region varies from 750 to 1160 mm of which 350 to 700 mm (approximately 59 percent) is received in the South-west monsoon except Nellore district, which receives only 30 percent of its rain from the South-west monsoon. Most part of the Rayalaseema region gets 300 to 400 mm of rain during the South-west monsoon season, accounting for 40 to 70 percent of its annual rainfall. More than 80 percent of the rain in Telangana region is received during the South-west monsoon season. This typically presents a picture of rainfed, climate dependent fragile agricultural region facing instability in crop production.

The initiatives taken to introduce economic reforms have earned a name for Andhra Pradesh as one in the forefront states in the process of economic reforms. Andhra Pradesh is also one of the States pursuing a vigorous public distribution policy. Since the early 1980's Public Distribution System (PDS) has been almost universal in the State, although the scale of supply, commodities supplied and issue prices have varied across different sections of the population.

Andhra Pradesh is considered as foodgrain surplus and food secure state at the macro level (in terms of availability). However, there is food insecurity at the household level. It is paradoxical that at an aggregate level it is a surplus state while individuals are not having access to food (Rao, 2003). A few important issues emerge in this present context:

(i) Is Andhra Pradesh a Surplus State with respect to foodgrain at aggregate level?

(ii) With the implementation of new economic policy, what would be the change in cropping pattern, which in turn affects supply of foodgrains?

(iii) What will be the implications on nutrition due to changing food consumption pattern?

We will be looking into these issues in terms of food availability and access to food with the help of available data on production of foodgrains, food consumption and evidence about malnourishment.

4.1.2 Land utilisation and Crop production

The gross cropped area in the State is about 47.4 percent of the total geographical area in 1999-2000 and the net area sown is 39 percent (Table-4.2). Over the years the net area sown has declined in absolute coverage.

Table-4.2: Land utilisation in Andhra Pradesh

(In lakh hectares)

Category	1975-76	1980-81	1985-86	1990-91	1995-96	1999-2000
Total geographical area	274.4	274.4	274.4	274.4	274.4	274.4
Land put to non-agricultural uses	20.7 (7.5)	21.6 (7.9)	22.4 (8.2)	23.0 (8.4)	24.5 (8.9)	25.1 (9.1)
Net area sown	111.7 (40.7)	107.3 (39.2)	104.2 (38.0)	110.2 (40.2)	106.3 (39.0)	107.1 (39.0)
Area sown more than once	17.8 (6.8)	15.4 (5.6)	16.7 (6.1)	21.7 (7.9)	24.0 (8.8)	24.1 (8.8)
Total cropped area	129.5 (47.2)	122.8 (44.8)	121.0 (44.1)	131.9 (48.1)	130.4 (47.3)	130.2 (47.4)

Source: Season and Crop Report, Bureau of Economics and Statistics, Government of Andhra Pradesh.
Note: Figures in the brackets indicate the percentage of area in total geographical area.

The continuous decline in net area sown since the beginning of seventies is as high as 6.6 lakh hectares. This decline is the result of increase in the current fallow land by 11.5 lakh hectares, only in the nineties the extent of fallow land started declining along with increase in the net area sown. It is argued that green revolution reduced the pressure on land due to increased productivity (Rao, 1994). Under this hypothesis, one could have expected higher share of fallow lands in the high growth regions. But regional distribution of fallow land does not lend support to this hypothesis, as fallow lands are largely concentrated in agriculturally backward areas. Fallow lands are mainly

98

located in South Telangana followed by North Telangana regions, where 44 and 36 percent of cultivable land is under fallow. Area sown more than once increased during 90's. It indicates increased cropping intensity as well as higher pressure on land resources.

Aggregate trends in output of crops are indicative of the robustness of growth in the agricultural economy. Though indirectly, that also determines access to food, and availability of work. Agricultural development in Andhra Pradesh during 1955-56 to 1968-69 was mostly area-led, and during 1968-69 to 1980-81, growth was largely yield-led. This high acceleration during this period is mostly due to rice, the main beneficiary of green revolution in the initial phase, and also due to the good performance of all foodgrains.

4.2 Foodgrain availability

Aggregate foodgrain availability can be understood with the help of crop production trends considering that the data on food imports and exports out of the state are not available. The crop output growth during the last four decades (from 1970 to 2000) shows that Andhra Pradesh has achieved a significant growth in agricultural production in general and rice production in particular.

Table-4.3: Growth rates in output of crops

Crop	1970-71 to 1979-80	1980-81 to 1989-90	1990-91 to 1999-2000
Rice	3.58	3.31	1.57
Bajra	2.62	-5.66	-7.45
Jowar	1.81	-3.05	-5.77
Maize	7.14	0.36	8.02
Ragi	2.67	-5.34	-3.47
Total cereals	3.64	2.17	1.40
Total pulses	2.97	6.72	1.49
Total foodgrains	3.61	2.47	1.50
Total non-foodgrains	2.82	4.96	3.20
All crops	3.46	3.41	2.30

Source: Computed from Season & Crop Report. Directorate of Economics and Statistics, Government of Andhra Pradesh, Hyderabad.

During nineties the State experienced a decline in growth rates. The growth rate of aggregate output was down from 3.4 to 2.3 percent. The growth rate of rice output declined from 3.58 to 1.57 percent per annum (Table-4.3). The growth rate in

foodgrains production in the State has come down during the 1990's. The growth rate of cereals also showed lower growth rates during 1990s compared to earlier sub-periods. This decline is mainly caused by lower incremental growth in yield of the crop. Rice experienced increased growth rate of yield during 1980's from 2.5 percent in 1970's to 3.05 percent but it declined to 1.3 percent during 1990-2000 (Table-4.4). Although growth rate in yield is high, the slowdown in growth of area under rice led to decline in output growth from 3.58 percent in 1970's to 3.31 percent per annum in the 1980's. Traditionally rice growing regions and the regions that have shifted from coarse cereals to groundnut or cotton attained higher growth rate in aggregate output than other regions (Subrahmanyam, 2003).

Table-4.4: Growth rates of area and yield of crops in different periods

Crop	1970-71 to 1979-80		1980-81 to 1989-90		1990-91 to 1999-2000	
	Area	Yield	Area	Yield	Area	Yield
Rice	1.04	2.5	0.27	3.05	0.27	1.3
Jowar	-0.64	2.45	-1.69	1.36	-4.28	1.49
Bajra	0.21	2.42	-5.99	0.33	-11.31	3.86
Maize	3.48	3.65	-0.77	1.12	1.71	6.29
Ragi	-0.52	3.19	-4.64	-0.69	-5.32	1.86
Black gram	-1.17	7.09	0.09	1.73	-0.91	0.47
Bengal gram	-1.49	2.26	-3.09	2.72	11.07	6.18
Groundnut	-0.3	1.89	4.88	0.36	1.19	0.71
Cotton	1.33	10.57	4.58	3.43	6.04	1.39

Source: Computed from Season and Crop Report. Directorate of Economics and Statistics, Government of Andhra Pradesh, Hyderabad.

In order to get a clear picture of the growth rates and to locate if there has been any deceleration or acceleration in growth of foodgrains production in different time periods we have used a quadratic equation to test the deceleration hypothesis (Sawant, 1983). The crop productivity data regressed on time (t) and (t^2) for three time periods (1960-80, 1970-2000 and 1980-2000).

$$\log Y = a + b_1 t + b_2 t^2 + u$$

100

Table-4.5: Growth rates in foodgrains production

Crop	1960-80			1970-2000			1980-2000		
	b_1	b_2	R^2	b_1	b_2	R^2	b_1	b_2	R^2
Rice	-0.324	1.152	0.708	1.536*	-.660*	.827	0.551	0.136**	0.467
Wheat	0.899	0.214	0.480	-.872	.220	.436	-1.860**	1.424*	0.340
Total cereals	-0.797	1.57***	0.680	1.535*	-.723**	.725	-0.363	0.946	0.359
Total pulses	0.489	0.121	0.369	1.107**	-.246	.757	1.850**	-1.204	0.543
Total foodgrains	-0.743	1.55***	0.677	1.528*	-.700**	.749	-0.213	0.818	0.376

Source: Computed from Season and Crop Report. Directorate of Economics and Statistics, Government of Andhra Pradesh, Hyderabad.

Note: * significant at 1 percent level, ** significant at 5 percent level, and *** significant at 10 percent level.

The coefficients of b_2 indicate the rate of change in the slope coefficient. A positive coefficient of b_2 indicates acceleration whereas, the negative coefficient confirms deceleration in growth. Non-significance of the coefficients of b_1 and b_2 imply absence of continuously positive or negative trend. We find no evidence of deceleration during the two sub-periods (1960-80 and 1980-2000). Only total pulses showed a negative coefficient for b_2 but that is not statistically, significant even at 10 per cent probability. Whereas, a clear acceleration is noted in the trends of rice and wheat during 1980-2000 and for total cereals during 1960-80. During 1970-2000 rice, total-cereals and total foodgrains showed a negative coefficient for b_2 which is statistically, significant at one and five percent level, indicating deceleration in growth, total pulses also showed a negative coefficient for b_2 but that is not statistically significant.

Why has the decade of 1990's turned to be a period of lower growth rates in aggregate output? In this context, it is necessary to examine as to what extent area under cultivation is responsible for the slowdown in foodgrains growth in Andhra Pradesh. Changes in the share of area under cultivation are shown in Table-4.6. The percentage of gross cropped area increased marginally from 48.2 percent to 49.7 percent during 1970-71 to 1999-2000. But there is a consistent decline in area under total food crops and foodgrains beginning from 1975-76, whereas area under non-foodgrains increased over the years.

Table-4.6: Changes in area under cultivation

(Percentage to total cropped area)

Year	All food crops	Food grains	Non foodgrains
1970-71	76.8	70.9	23.2
1975-76	81.1	75.8	18.9
1980-81	77.3	70.7	22.7
1985-86	72.1	64.7	27.9
1990-91	67.1	58.9	32.9
1999-2000	67.3	54.1	33.7

Source: Season and Crop report. Directorate of Economics and Statistics, Government of Andhra Pradesh, Hyderabad.

Decline in area under cultivation along with slower increments in yield per hectare seem to be responsible for the slow growth in foodgrains output in the state during 1990s. The other major problem with food production is the prevalence of wide regional disparities in the State. Between the three geo-political regions of the state, the differences in gross cropped area and irrigated are quite sharp.

4.2.1 Inter regional differences in food availability

In the Telangana region, the gross cropped area was virtually stagnant while gross irrigated area sharply increased by 68.2 percent (Appendix-4.2). In coastal Andhra region, gross cropped area showed a relatively higher increase of 24.9 percent. Rayalaseema region registered a slower growth both in the gross cropped area as well as in the gross irrigated area than the Coastal Andhra region. Within the regions, different districts showed wide differences. East Godavari, Vizianagaram, West Godavari, Guntur showed an increase in the gross cropped area. The districts, which showed a decrease in the gross cropped area, were Nalgonda, Nellore, Chittoor, Mahaboobnagar, Prakasam and Adilabad. Srikakulam showed a decline in the gross irrigated as well as in the gross cropped area.

To have clear picture of regional variations in cropping pattern we computed Crop Concentration Ratios across three regions. Districts are classified into two groups based on their per capita production. Surplus districts – whose per capita production exceeds that of the State by more than 5 percent. Deficit districts– whose per capita production is less than that of the State by more than 5 percent, these two groups are again reclassified into four groups, from each group one district is selected (Apendex-4.3).

$$\text{Crop Concentration Ratio} = \frac{AD_{ij} / GAD_i}{AS_{ij} / GAS_i}$$

Where,

AD_{ij} = Area under the crop 'j' in the district during the ith year.
GAD_i = Gross cropped area in the district during the ith year.
AS_{ij} = Area under the crop 'j' in the State during the ith year.
GAS_{ij} = Gross cropped area in the State during the ith year.

Figure-4.1
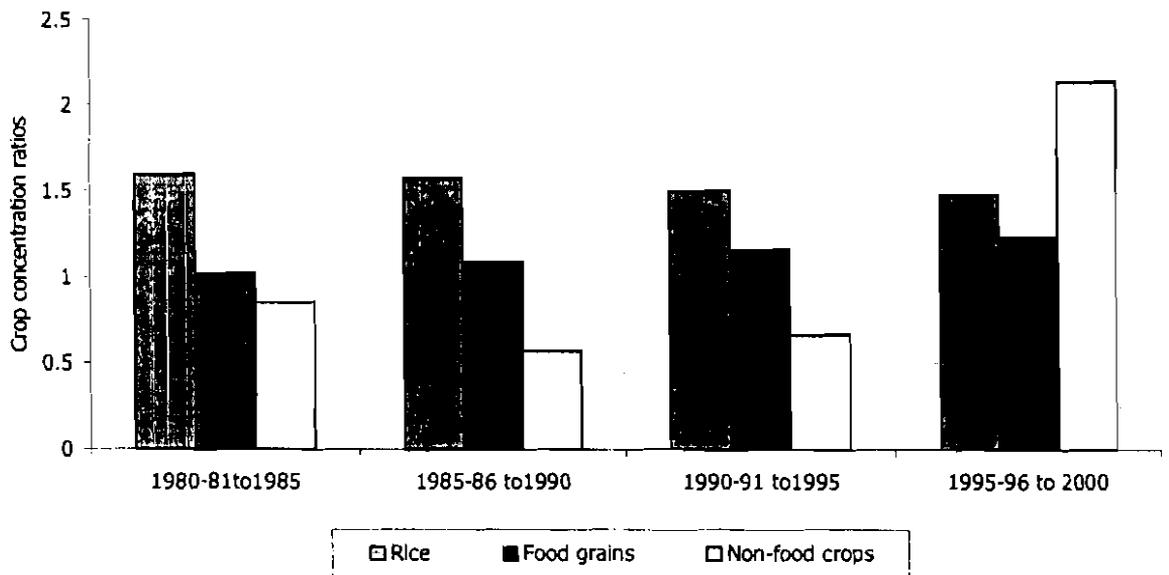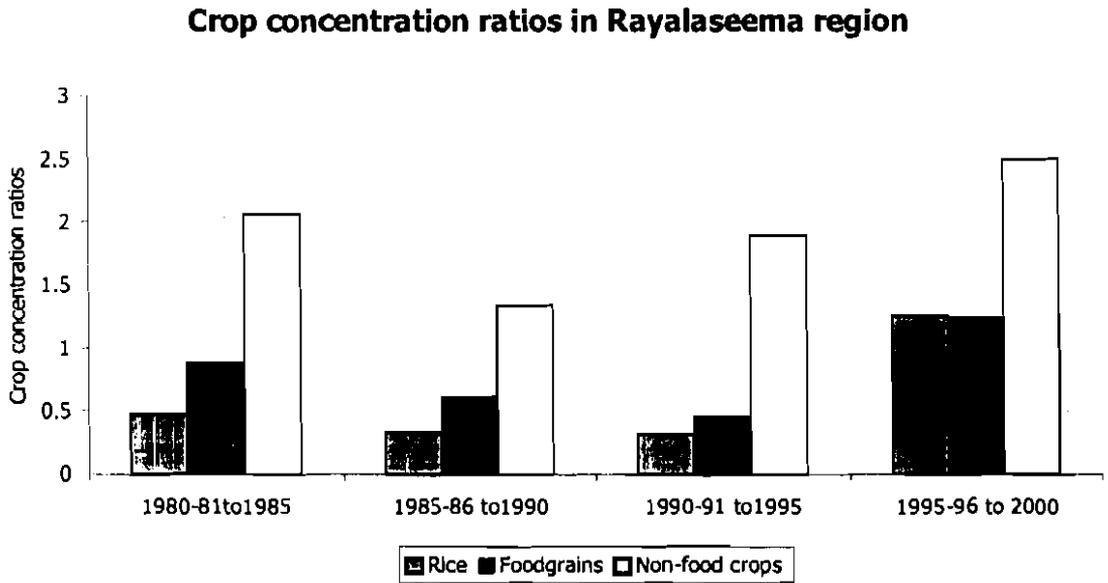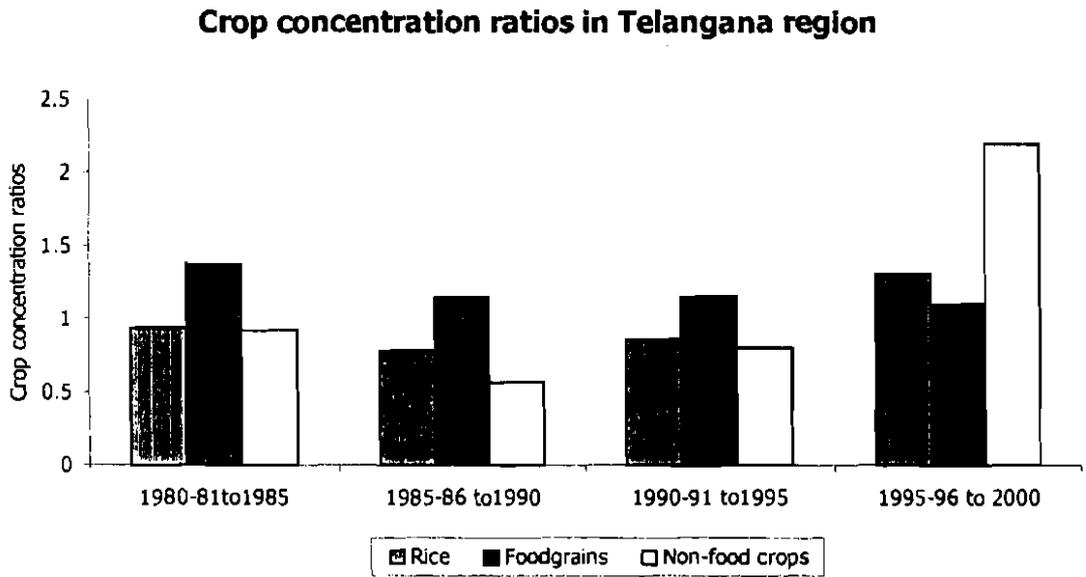
Crop concentration ratios in Coastal Andhra region

103

Figure-4.2

Crop concentration ratios in Rayalaseema region

Figure-4.3

Crop concentration ratios in Telangana region

Figure-4.4

Crop concentration ratios of foodgrains in Andhra Pradesh

1980-81to1985 1985-86 to1990 1990-91 to1995 1995-96 to 2000
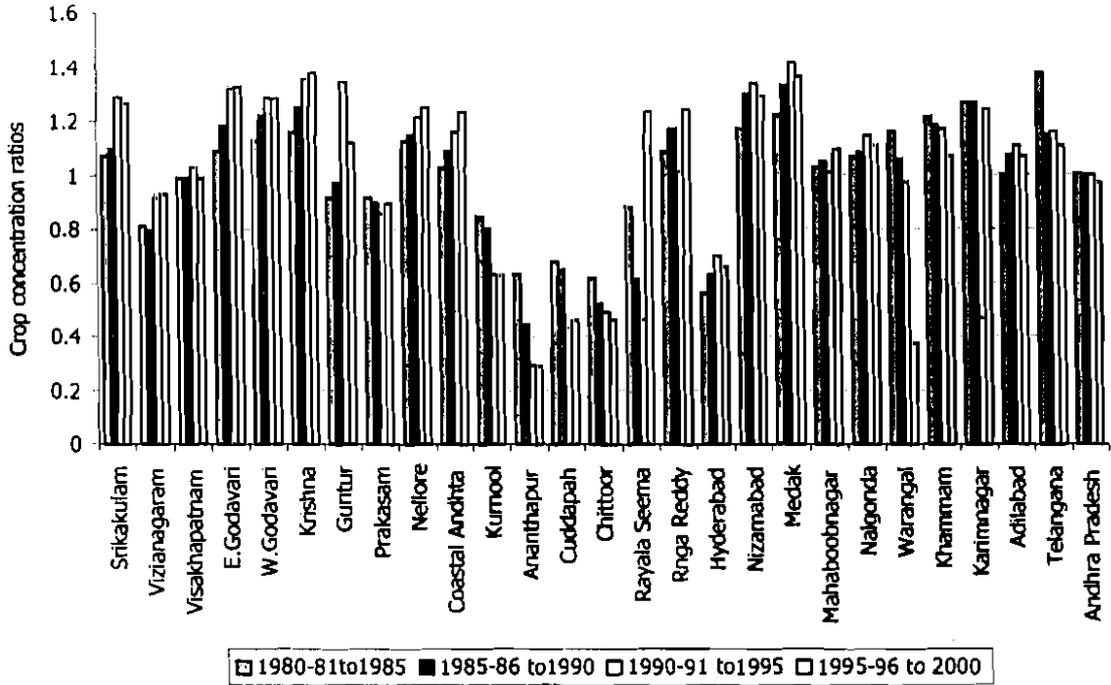
Figure-4.5

Crop concentration ratios of non-food crops in Andhra Pradesh

1980-81to1985 1985-86 to1990 1990-91 to1995 1995-96 to 2000

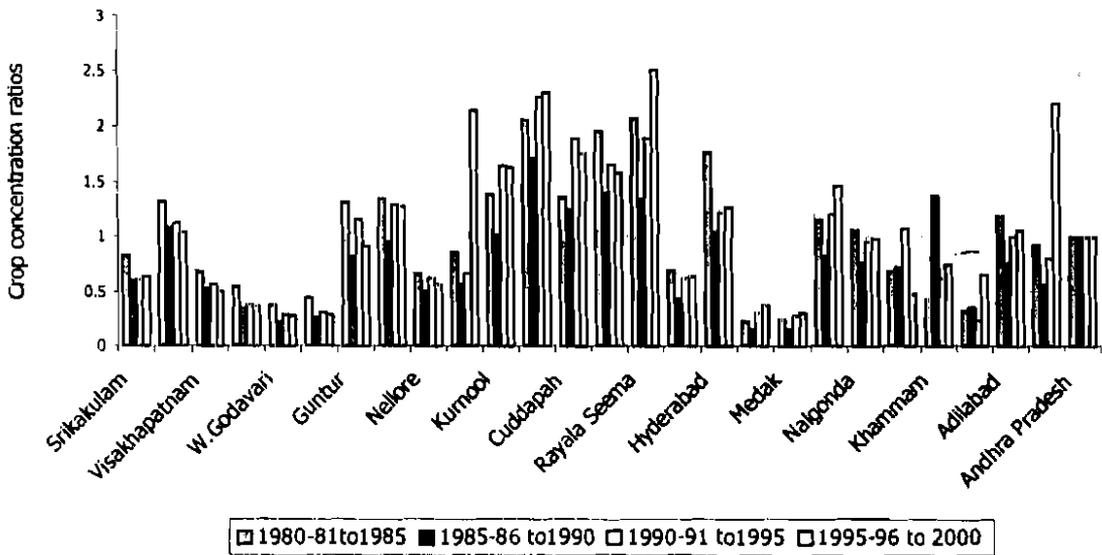Crop concentration ratios, gives the relative importance of the crop. Crop specialisation is more common in Coastal Andhra region, which is a rice producing surplus region. Crop concentration ratios show that area under non-food crops is increasing in all the regions when compared to food crops. It is observed from the figure-3.5 that during 1995-2000 share of non-food crops increased in coastal Andhra region. In Rayala Seema region diversification took place from coarse cereals to rice but Kurnool, Ananthapur, Cuddapah, Chittoor showed crop diversification from foodgrains to non-food crops such. In Telangana region diversification took place mainly favoring commercial crops.

Sustainable food availability depends on various factors of production. An index of production is worked out by using the indicators such as: (i). Percentage of gross irrigated area to gross cropped area (ii). Percentage of area sown more than once to gross sown area (iii). Productivity of foodgrains (Kgs/hec) (iv). Percentage of Area under foodgrains (v) Fertilizer use per hectare (Kgs/hec) and (vi) Percentage of area under HYV. Only foodgrains are considered for the production indices calculations.

Production Indices:

$$I_p = [\{\sum_{i=1}^{n} (X_{ij} - X_{imn}) / (X_{imx} - X_{imn})\} / n] * 100$$

Where,

I_p: Index of production
X_{ij}: i^{th} production in the jth district
X_{imx}: i^{th} production in the district with highest value
X_{imn}: i^{th} production in the district with lowest value

This is helpful in understanding the regional variations across districts. The average of three years is taken for computing the indices to iron out year to year variation. Conceptually, the production indices measure the distance covered by a given region from the minimum as a proportion of the distance between the best performing region and the region with least performance. When the highest value in the series represents good situation, the lowest value represents the worst situation. The four southern coastal Andhra districts (East Godavari, West Godavari, Krishna and Guntur) remain to be more sustainable in production over the years (Table-4.7). Although there is a

decline of production indices value in most of the districts during 1997-2000 compared to 1980-83 it improved during 1997-2000 in some districts especially in Telangana region.

Table-4.7: Production indices

District	1980-83	1990-93	1997-2000
Srikakulam	37	41	37
Vizianagaram	23	35	32
Visakhapatnam	25	25	21
East Godavari	75	68	72
West Godavari	91	83	80
Krishna	71	77	80
Guntur	74	78	70
Prakasam	33	39	30
Nellore	46	53	50
Kurnool	29	35	20
Ananthapur	19	20	20
Cuddapah	28	38	30
Chittoor	29	28	29
Ranga Reddy	17	25	20
Hyderabad	60	66	70
Nizamabad	60	50	50
Medak	24	22	22
Mahaboobnagar	19	23	50
Nalgonda	36	50	53
Warangal	42	48	32
Khammam	24	27	20
Karimnagar	48	58	60
Adilabad	7	2	20

Source: Computed from Hand Book of Statistics. Directorate of Economics & Statistics, Government of Andhra Pradesh, Hyderabad.

In Rayala Seema region all the districts showed a decline in production indices value except Chittoor district during 1997-2000. Per capita foodgrain production increased by 38 percent between 1978-82, and 1998-2001 in the State. But the performance of three regions in per capita foodgrain production is quite contrasting. Coastal Andhra region registered a 55 percent increase in the foodgrain production per capita, followed by the Telangana region with a 32 percent increase. But the Rayalaseema region recorded a 16 percent fall.

Figure-4.6

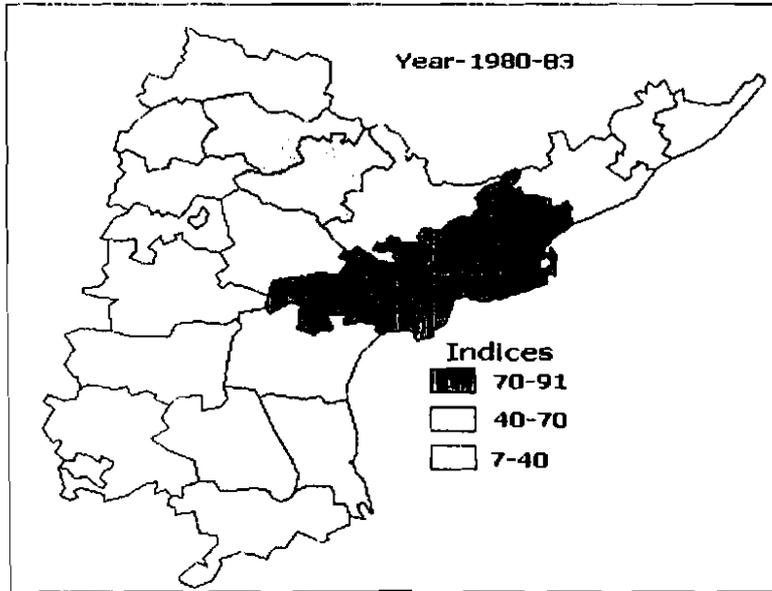### Production Indices in Andhra Pradesh

Year-1980-83

Indices
- 70-91
- 40-70
- 7-40

Figure-4.7

Production Indices-Andhra Pradesh

Year:1990-93

Indices
- 70-83
- 40-70
- 2-40
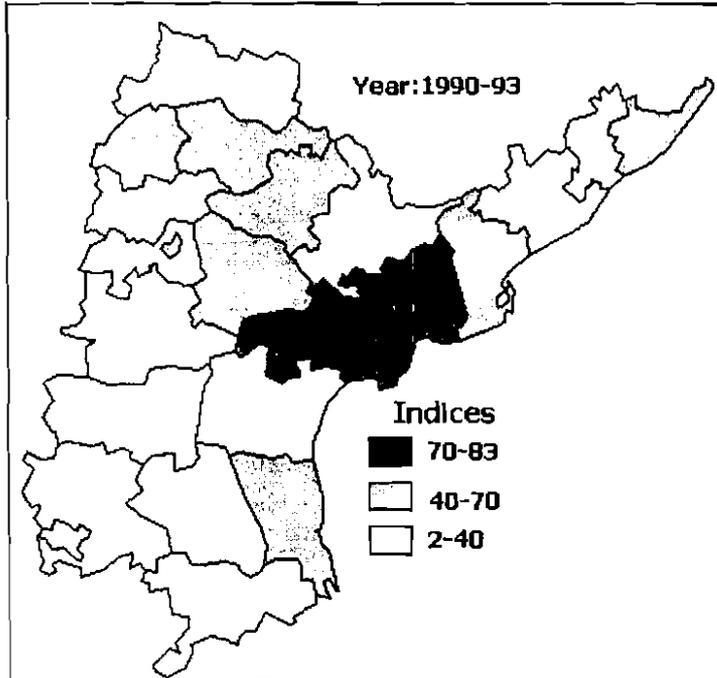
Figure-4.8

Production Indices-Andhra Pradesh

Year:1997-2000

Indices
■ 70-80
☐ 40-70
☐ 20-40
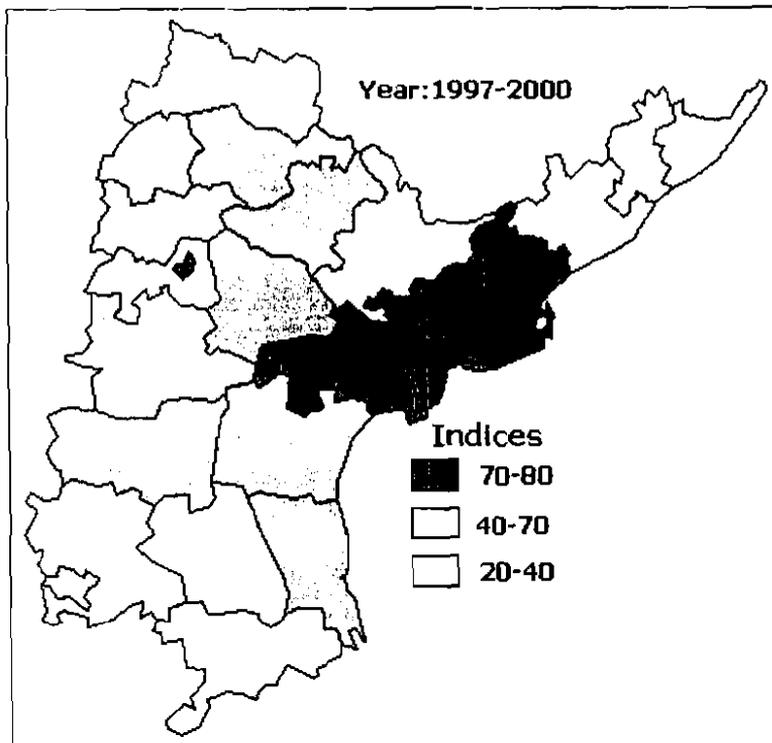
Among the districts Chittoor, Mahaboobnagar, Ananthapur, Ranga Reddy and Cuddapah, recorded a decline in per capita foodgrains production. But Karimnagar, Guntur, Krishna, Visakhapatnam, Warangal, Khammam, Medak, East Godavari, Prakasam and West Godavari districts recorded higher percentage increase than the State average. Low per capita production in irrigated districts might be due to lower yield of foodgrains and diversification towards commercial crops.

Rice production in Coastal Andhra increased by 58 percent over the two decades (Appendix-4.4) and that is due to an increase in productivity by 45 per cent rather than area expansion. In case of Jowar, both the area and production fell by 96 per cent due to stagnant productivity. Area under Bajra came down by 70 per cent but the decline in the production was only 60 percent due to productivity growth of 32 percent.

In Rayalaseema, maize is the only crop among cereals, which gained in terms of area. Rice lost 10 percent of area but its production went up by 30 percent due to 45 percent increase in productivity. Total area under cereals and millets decreased by one

109

half. Although their productivity increased by 75 percent, production decreased by 13 percent. In Telangana three important millet crops namely jowar, bajra and ragi lost area by 61, 77 and 61 percent, respectively. Output of these crops also declined by 56, 75 and 44 percent, respectively, in spite of small increases in their productivity levels. Total area under cereals and millets decreased by 19 percent. But their production increased by 54 percent due to significant productivity levels (89 percent). These observations point towards differential performance across crops.

Differences in the growth performance across regions are due to variations in the growth of irrigated area. Another reason for decline in the output growth is attributable to decline in total investment in agriculture. Gross total investment in agriculture increased by 6.0 percent per annum during 1980s in Andhra Pradesh, but during 1990s the State experienced a very low rate of growth 1.5 per cent per annum (Rao, 2003). This decline in the growth rate of investment can be attributed to the steep decline in public investment. As a result, area under surface irrigation declined by 2 lakh hectares during the 1990s. The growth rate of total factor productivity declined from 1.58 percent in 1980s to 1.05 percent during 1990s. As a result, the cost of production per unit output in Andhra Pradesh is higher than in major rice growing states of Punjab and Uttar Pradesh.

In order to understand availability of foodgrains among the districts net availability indices are calculated. At the district level, we have taken the data on production as a proxy for availability. One need not reiterate that availability depends not only on local production but also on inflows and outflows from the State. Inherently this leads to a bold assumption of equal imports and exports from a district, which is too strong an assumption but has to be resorted to without any estimates on inflows/outflows for a district. There are outflows of food from the districts both due to state procurement operations and private trade. There are also inflows of foodgrains due to the existence of the public distribution system and private trade. The net availability at the district level/state level is a result of all these movements. It is also well recognized that district level assessment of availability is hampered by the lack of data on private trade in foodgrains. Therefore, there is no other alternative but to take production as a proxy for availability. Net production (Production net of seed, feed and wastage) is considered as a proxy for net availability at the district level. The average production of three years is

considered instead of one year, to compute the per capita production of various food items. To obtain the net production, 13 percent of the total output of cereals, is deducted for seed, feed and wastage. The per capita net availability index is computed for all the districts, with ICMR recommended daily allowance as the base (420 grams of cereals per day per person). Wherever the production per capita is more than the ICMR recommended quantity, the index is above one (above 100 percent), whereas it is less than one (less than 100 percent) if the district is deficit in availability. This indicates whether a district is surplus or a deficit one. Compared to the dietary requirements of per capita per day given by the ICMR, all the districts are deficit in Andhra Pradesh (table-4.8 & figure-4.9).

Net Availability Indices:

$$INP_{ij} = (X_{ij} / X_{iICMR}) *100$$

Where,

INP_{ij}: Index of foodgrain availability of the jth district for i^{th} food item

X_{ij}: Per capita availability of ith foodgrain item per day in the jth district

X_{iICMR}: Per capita per day recommended intake of the ith foodgrain item
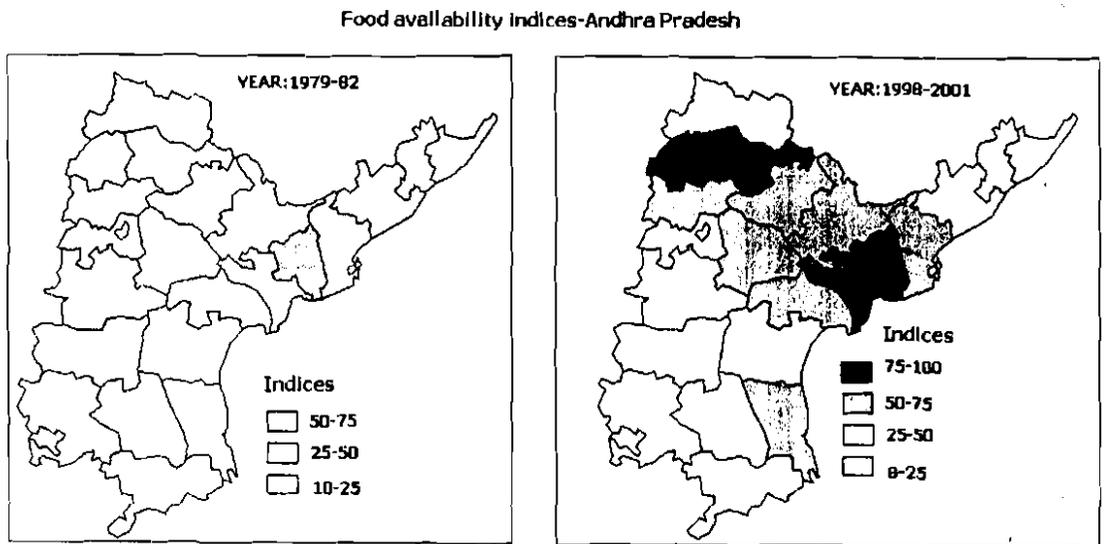
Figure-4.9

Food availability indices-Andhra Pradesh

Table-4.8: Net availability indices

District	1979-82	1998-2001
Srikakulam	29	36
Vizianagaram	29	37
Visakhapatnam	14	23
East Godavari	41	60
West Godavari	60	90
Krishna	49	81
Guntur	37	67
Prakasam	34	48
Nellore	45	56
Kurnool	34	34
Ananthapur	20	17
Cuddapah	24	22
Chittoor	25	14
Ranga Reddy	10	8
Hyderabad	10	8
Nizamabad	40	75
Medak	38	57
Mahaboobnagar	38	27
Nalgonda	44	63
Warangal	36	53
Khammam	34	53
Karimnagar	46	87
Adilabad	31	40

Source: Computed from Hand Book of Statistics. Directorate of Economics and Statistics, Government of Andhra Pradesh, Hyderabad.

As can be seen from Table-4.8 that there is a wide regional disparity in foodgrains availability within the state this could be due to variations in the production of food grains and population growth among the regions. All the districts of the Coastal Andhra region moved from low availability to high availability, the highest increase in net availability is seen in West Godavari district. Interestingly Rayala Seema region showed a different picture, all the districts moved from higher availability to low net availability, only in Kurnool district net availability remains to be same over the years. In Telangana region district showed a mixed trend, Ranga Reddy, Hyderabad, and Mahaboobnagar moved from high net availability to low net availability, rest all the districts showed an improvement in net availability. From the analysis it is clear that Coastal Andhra region which is a food surplus region (in terms of physical availability) remains to be surplus, over the years. Ralya Seema region, which is a deficit region, remains to be deficit over the years. Telangana region showed a mixed trend.

If cropping pattern varies across regions, the impact of price and productivity changes will be different across regions and they in turn influence the wages and purchasing power of the people which in turn influences the consumption and nutrition intake of the food at household level. Access to food at household level can be examined by looking at food consumption and expenditure data through changes in food prices, wages and it's impact on consumption of food.

4.3 Access to food:

Access to food depends on the purchasing power of the people, and it in turn depends on wages. The growth in real wages is not uniform in different decades in different regions (Table-4.9).
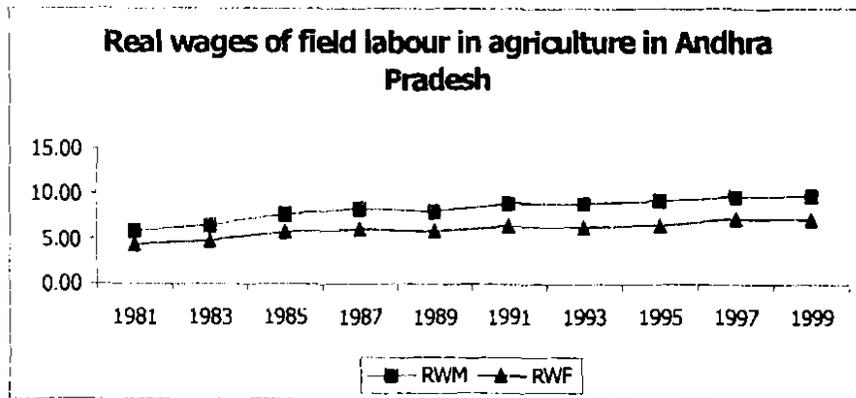
Table-4.9: Growth rates of real wages

(Percent per annum)

Region	1970-80		1980-90		1990-2000	
	Male	Female	Male	Female	Male	Female
Coastal Andhra	2.94	3.13	3.96	2.86	1.36	2.57
Telangana	3.99	4.69	4.23	4.01	3.12	2.8
Rayalaseema	2.30	2.72	6.3	4.36	0.04	1.23
Andhra Pradesh	3.23	3.68	4.61	3.88	1.67	2.23

Source: Subrahmanyam (2002)

Wage rates of male labour have increased by 3.23 percent in seventies and by 4.6 percent during eighties. In the same period female wages have increased by 3.6 and 3.8 percent, correspondingly. But in the nineties, the male wage growth rate declined to 1.6 percent and that of female to 2.2 percent. This slow growth in real wages indicates low income of labourers during 1990s. The growth rate of female wages is higher than that of male wages in the nineties, which indicates that the demand for female labour is increasing at a higher rate than for male labour. During nineties, the growth rate of agricultural wages in Telangana region is higher when compared with the other two regions of Andhra Pradesh. Decline in real wages will affect the poor and other vulnerable sections. Real wages act as rough indicators of poverty. The slow growth in real wages indicate that the decline in poverty is also slow in the nineties, which in turn would affect the food security at the household level.

113

Figure-4.10

Real wages of field labour in agriculture in Andhra Pradesh

Note- RWM- Real wages of male, RWF- Real wages of female.

Table-4.10: Growth rates of cereal prices

Item	Rural			Urban		
	1970	1980	1990	1970	1980	1990
Cereal index	3.20	6.27	8.95	3.83	6.34	9.16
Relative price index of cereals	-2.51	-0.79	-0.27	-3.81	-1.92	0.27

Source: Ravi (2003)

Figure-4.11

Price of rice in Andhra pradesh
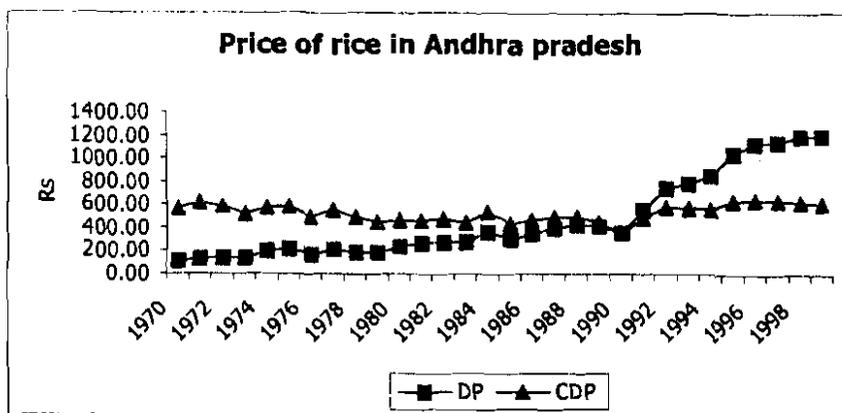
Note- DP-Domestic price of rice in Nellore, CDP-Constant domestic price of rice at 1990 as base.

114

The relative price indices in rural sector show a declining trend over the years. In urban sector it declined during the seventies and eighties but it started rising at 0.3 percent per annum during nineties (Table-4.10). These trends do not indicate anything adverse on consumption at present but if the trend continues to raise it would affect the purchasing power of the poor.

4.3.1 Consumption of foodgrains

To know the changes in economic access to food and its implications on nutritional intake of the household we have to look into the consumption pattern of the households. The National Sample Survey (NSS) data is used to analyse the trends in the pattern of consumption of foodgrains in the rural and urban districts of Andhra Pradesh. Cereals are the main source of calories, particularly for consumers in rural areas. Average annual rate of change in per capita monthly consumption of cereals during 1972-73 to 1999-2000 is calculated for various income groups at constant prices (Table-4.11). There is an increase in cereal consumption among the lowest income groups in rural and urban areas of Andhra Pradesh. The rate of decline is sharp for higher income groups in both the areas.

Table-4.11: Average annual rate of change in per capita monthly consumption of cereals by income groups during 1999-00 over 1972-73.

(Percent per annum)

Sector	Income group			
	I	II	III	All Groups
Rural	0.26	-0.58	-1.94	-0.86
Urban	0.37	-0.31	-1.30	-0.54

Note: I – Bottom 30 percent; II – Middle 40 percent; III – Top 30 percent

In general, the decline in cereal consumption is more conspicuous in the rural areas, which shows that over the last two decades there has been a clear change in the pattern of consumption. The decline in total cereal consumption is mainly on account of a decline in the consumption of coarse cereals. Changes in tastes or preferences may be one of the reasons influencing the consumption pattern. However, the changes may be forced in response to larger changes in the economy (Suryanarayana, 1995).

115

Table-4.12: Monthly per capita consumption in Andhra Pradesh.

Rural (Kg /person/month)

Income groups	1972-73	1977-78	1983-84	1987-88	1993-94	1999-2000
cereals						
I	11.25	12.73	10.53	12.51	11.25	10.89
II	15.2	15.85	15.39	14.25	13.24	12.81
III	19.31	18.97	20.19	16.32	15.33	14.21
All	15.25	15.85	15.37	14.35	13.27	12.66
coarse cereals						
I	5.96	5.91	2.10	3.93	2.13	1.06
II	6.12	4.82	3.53	2.61	1.39	0.60
III	6.44	3.92	4.74	1.98	1.05	0.49
All	6.17	4.88	3.46	2.82	1.51	0.70
rice						
I	5.23	6.79	8.41	8.54	9.07	9.75
II	8.98	10.96	11.79	11.55	11.71	12.04
III	12.66	14.80	15.17	14.03	13.88	13.30
All	8.96	10.86	11.79	11.39	11.57	11.73

Urban

Class	1972-73	1977-78	1983	1987-88	1993-94	1999-2000
cereals						
I	10.88	11.0	10.66	10.54	10.43	10.41
II	12.99	13.62	11.92	11.63	11.56	11.14
III	14.05	14.0	13.48	13.32	11.94	11.21
All	12.67	12.95	11.95	11.81	11.34	10.94
coarse cereals						
I	2.20	1.77	1.33	1.11	0.63	0.37
II	1.50	1.33	0.58	0.51	0.38	0.28
III	0.94	0.78	0.53	0.37	0.33	0.05
All	1.54	1.28	0.73	0.65	0.44	0.24
rice						
I	8.30	8.89	8.95	9.15	9.51	9.74
II	10.71	11.51	10.66	10.45	10.52	10.18
III	11.83	11.71	11.60	11.45	10.26	9.72
All	10.32	10.80	10.43	10.36	10.14	9.91

Note: I – Bottom 30 percent; II – Middle 40 percent; III – Top 30 percent

116

Cereals consumption in Andhra Pradesh-Rural
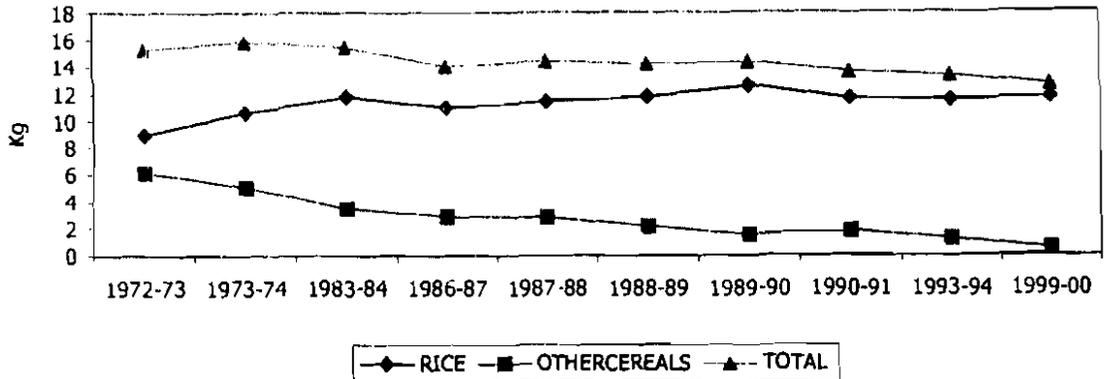
Figure-4.13

Cereals consumption in Andhra Pradesh-Urban
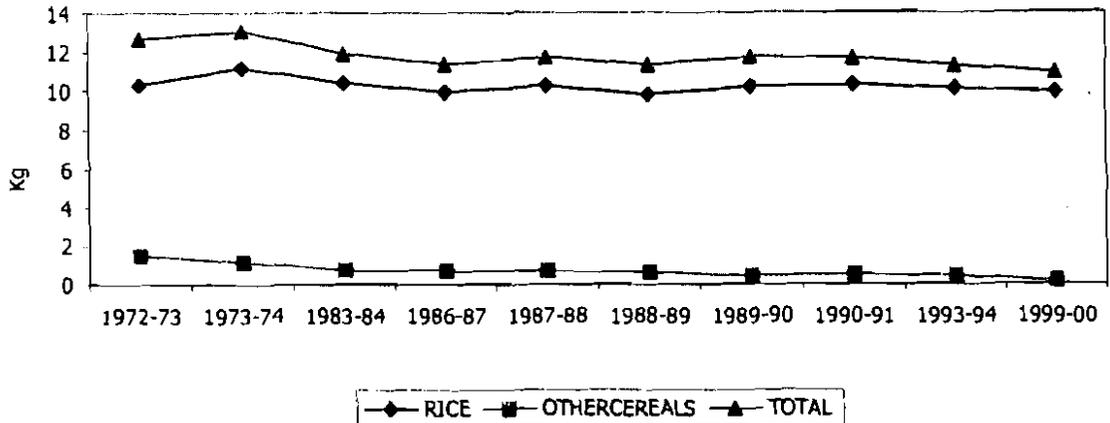
The consumption of cereals is declining in all the income groups. In aggregate it declined from 15.25 kgs to 12.66 kgs in rural areas and from 12.67 kgs to 10.94 kgs in urban areas during 1972-73 to 1999-2000(Table-4.12). The per capita expenditure on food in rural Andhra Pradesh declined from 73.4 percent in 1972-73 to 60.5 percent during 1999 (Table-4.13). That implies there is a shift food to non-food expenditure. The decline in the cereals share is not commensurate with the increase in the share of non-cereal food.

Table-4.13: Budget shares of different broad group of items of consumption

Rural (Rs/-)

Items	1972-73	1986-87	1993-94	1999
Cereals	18.36 (46.14)	35.38 (25.10)	68.87 (24.10)	111.70 (23.62)
Pulses & Products	1.18 (2.96)	5.36 (3.8)	10.66 (3.73)	17.70 (3.90)
Milk& Milk Products	1.63 (4.09)	8.61 (6.10)	18.17 (6.36)	27.40 (6.0)
Food Total	29.22 (73.43)	86.80 (61.5)	176.22 (61.60)	274.45 (60.50)
Non-Food Total	10.57 (26.56)	54.13 (38.40)	109.54 (39.74)	179.16 (39.4)
Total Expenditure	39.79 (100.00)	140.93 (100.00)	285.79 (100.00)	453.61 (100.00)
Urban				
Cereals	18.06 (32.06)	35.26 (17.18)	73.26 (18.04)	120.50 (15.5)
Pulses & Products	3.88 (6.9)	6.64 (3.23)	12.86 (3.17)	23.56 (3.0)
Milk& Milk Products	2.48 (4.4)	15.36 (7.48)	29.58 (7.29)	53.15 (6.87)
Food Total	38.12 (67.68)	112.79 (54.9)	223.26 (54.96)	366.95 (47.43)
Non-Food Total	18.2 (32.31)	92.41 (45.0)	182.97 (45.04)	406.57 (52.56)
Total Expenditure	56.32 (100.00)	205.21 (100.00)	406.23 (100.00)	773.52 (100.00)

Note: Figures in brackets indicate the percentage of each item to total expenditure.

In urban Andhra Pradesh much of the increase in total household expenditure has been allocated to non-food items, with the share of food expenditure falling from 54.9 percent to 47.4 percent. The decline in cereals consumption by lower income groups is more concerned as it will have impact on their calorie intake, which intern influence the food security within the household.

Expenditure elasticities are calculated to see the proportionate change in consumption among different commodities with an increase in income. The double log functional form was used to estimate expenditure elasticities.

$$\log X_i = \alpha + \beta \log Y_i + \mu_i$$

118

Where X_i is the per capita expenditure on commodity **i**, Y_i is per capita total expenditure on i^{th} commodity, α and β are the parameters and μ is the Stochastic disturbance term. Expenditure elasticities are estimated for cereals, pulses, edible oil, meat, egg & fish, milk, food total and non-food total in 1986-87,1993-94 and 1999-2000 for both rural and urban areas. Only for cereals, expenditure elasticities are estimated for three different income groups. The estimates presented in the table-4.14 show, in rural areas about 40 paise will be spent on cereals as against less than 30 paise by urban consumers from the additional income of one rupee (1993-94). The expenditure elasticities for pulses, meat, egg & fish, and non-food are higher for rural sector during 1986-87. During 1993-94, expenditure elasticities declining for cereals and for total food, whereas in urban sector, elasticities were increasing for food.

Table-4.14: Expenditure elasticities for major commodities

Item	Rural			Urban		
	1986-87	1993-94	1999-2000	1986-87	1993-94	1999-2000
Cereals	0.61	0.40	0.29	0.27	0.28	0.21
Pulses	0.73	0.72	0.73	0.64	0.64	0.50
Edible Oil	0.93	0.65	0.71	0.67	0.58	0.60
Meat, Egg & fish	1.03	0.93	0.90	0.62	0.60	0.61
Sugar	0.81	0.53	0.51	0.83	0.78	0.77
Total food	0.88	0.69	0.62	0.56	0.66	0.71
Total non food	1.22	1.42	3.52	1.29	1.40	1.62

Source: Computed from NSSO consumer expenditure data.

The decline in cereal consumption and calorie consumption at the average level is due to the increase in per capita income and diversification of food basket away from cereals, which is partly an indication of relative affluence. However, the same logic does not apply to the lower expenditure groups. Deficient calorie consumption among the poor would be due to mismatch of incomes and prices. The seasonal variation in prices may lead to transitory food insecurity.

The consumption pattern however, changes across districts in the state. These changes occur due to differential food habits, changes in income, economic growth and food availability itself. To look into the changes in consumption across the districts we

119

have used consumption indices. Consumption indices are estimated among the districts with a view to look into the adequate consumption of foodgrains (cereals & pulses). The Indian Council of Medical Research (ICMR) has recommended 420 grams of cereals and 40 grams of pulses per day per person. We have taken cereals and pulses together to estimate the consumption index.

Consumption Index:

$$IFC_{ij} = (X_{ij}/M_i) *100$$

Where,

IFC_{ij}: Index of food consumption in the jth district for i^{th} food item
X_{ij}: Per consumer unit per day consumption of ith food item in the jth district in grams obtained from NSS data
M_i: Per consumer unit per day recommended intake by ICMR of the ith food item

Table: 4.15: Consumption index

District	1977-78		1993-94		1999-2000	
	Rural	Urban	Rural	Urban	Rural	Urban
Srikakulam	100	100	100	90	90	80
Vizianagaram	-	-	80	80	70	70
Visakhapatnam	95	90	80	70	80	70
East Godavari	100	90	80	90	70	80
West Godavari	100	90	100	80	100	80
Krishna	120	100	100	80	90	70
Guntur	110	100	90	80	80	70
Prakasam	100	100	110	100	100	100
Nellore	90	90	90	70	90	60
Kurnool	110	100	90	80	80	70
Ananthapur	110	90	70	80	60	70
Cuddapah	110	90	120	100	90	90
Chittoor	110	100	110	80	100	70
Ranga Reddy	-	-	90	90	80	80
Hyderabad	90	90	-	70	-	70
Nizamabad	90	80	110	90	100	90
Medak	100	90	80	70	80	60
Mahaboobnagar	110	90	80	80	70	70
Nalgonda	120	90	90	110	80	100
Warangal	110	90	90	80	80	70
Khammam	120	100	80	90	70	80
Karimnagar	90	90	100	90	100	80
Adilabad	80	80	70	70	60	60

From the table-4.15 we find that most of the districts moved from high consumption to lower consumption of cereals and pulses, below we have given the movement of the districts in the consumption.

Districts, which are having lower consumption (less than 90 percent) during 1977-78

Rural-Except Adilabad all the districts showed more than 90 percent consumption levels.

Urban- Except Nizamabad and Adilabad all the districts showed more than 90 percent consumption levels.

Districts, which are having high consumption (more than 90 percent) during 1977-78 and moved to lower consumption level in 1993-94.

Rural-Vizianagaram, Visakhapatnam, East Godavari, Ananthapur, Medak, and Mahaboobnagar. Adilabad remains to be same.

Urban- Vizianagaram, Visakhapatnam, West Godavari, Krishna, Guntur, Ananthapur, Chittoor, Hyderabad, Mahaboobnagar, and Khammam. Adilabad remains to be same.

Districts, which moved to further low consumption, during 1999-2000 compared to 1993-94.

Rural- Visakhapatnam, West Godavari, Guntur, Nellore, Medak, and Karimnagar remains to be same in the consumption level, where as all the other districts moved from high consumption to lower consumption level.

Urban-Visakhapatnam, West Godavari, Prakasam (this district remains to be same in the consumption of cereals and pulses from1977-78 to 1999-2000), Hyderabad, and Nizamabad, remains to be same in the consumption level, where as all the other districts moved from high consumption to lower consumption level.

121

Figure-4.14

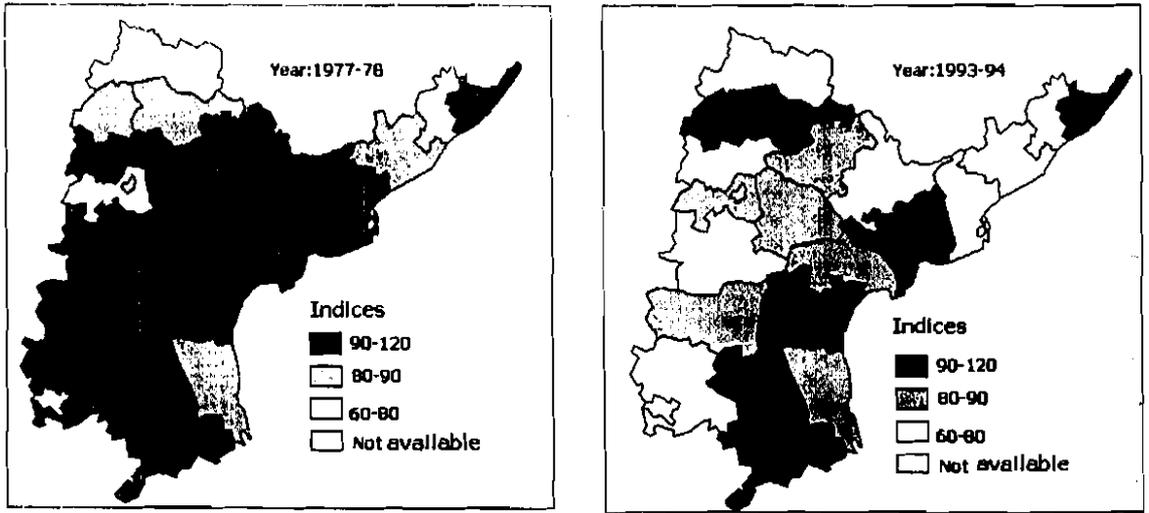Food consumption Indices-Andhra Pradesh (Rural)

Figure-4.15

Food consumption Indices-Andhra Pradesh (Rural)
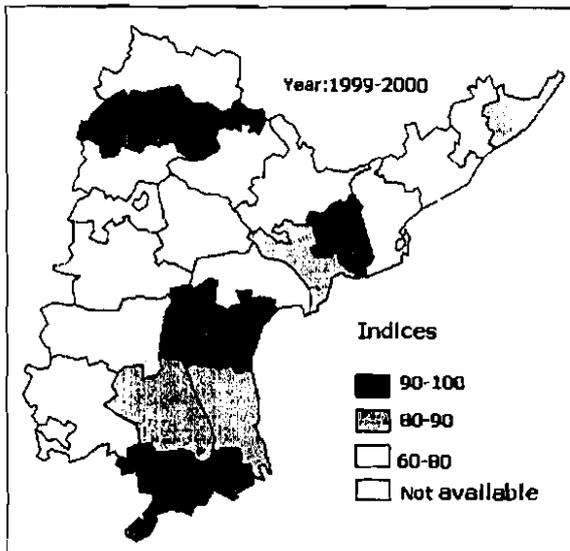

122

Figure-4.16

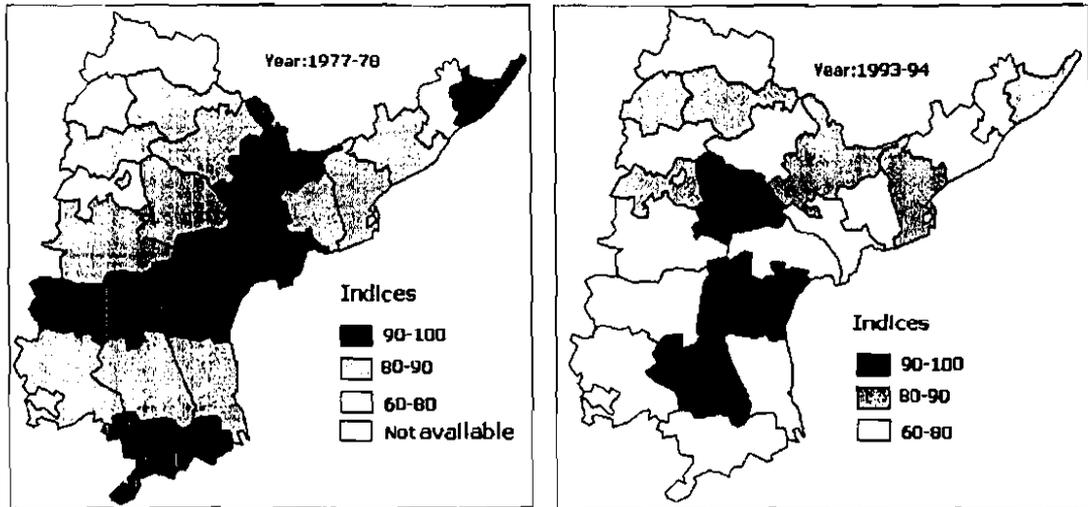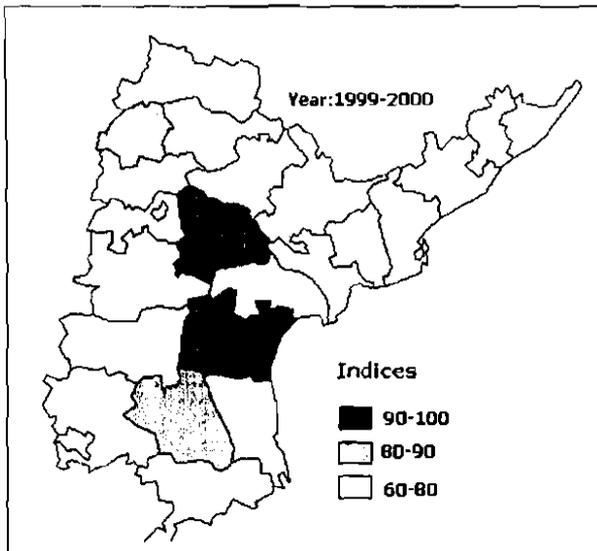Food consumption indices-Andhra Pradesh -Urban

Figure-4.17

Food consumption indices-Andhra Pradesh (Urban)

Per capita consumption of cereals was 13.61 Kgs per month at the State level in 1977-78. Among the five regions, North Coastal Andhra had the lowest intake of 12.72 Kgs per month. North Telangana also had a lower intake than the State average of 13.47 Kgs per month. The highest intake is found in Rayalaseema with 15.0 Kg followed by South Telangana with 14.5 Kgs. South Coastal Andhra, the agriculturally developed region, occupied median position in cereal consumption with an intake of 14.1 Kgs per month. By 1993-94, the average per capita cereal intake declined to 12.66 Kgs per month, indicating a decline of 6.9 per cent. North Coastal Andhra did not experience a decline, the region experienced 2 percent increase in consumption. All the remaining regions experienced decline in consumption - South Coastal Andhra (12.57 Kgs), Rayalaseema (12.36 Kgs), South Telangana (12.68 Kgs) and North Telangana (13.47 Kgs). Rayalaseema, the region with highest initial intake, experienced highest decline of 17.4 per cent (NSSO 50th round).

In terms of production and availability, coastal Andhra districts are better off but in terms of consumption of required amount of cereals and pulses Rayalaseema districts are better off during 1977-78. During 1993-94 and 1999-2000 the Indices for Rayalaseema districts is declining. Changes in the consumption of food will have implications on nutritional intake of the people, as the nutritional levels vary across the food groups.

4.3.2 Implications for Nutrition

Given the differences in nutritional composition across different food types, we examine the implications of the increasing diversification of food consumption patterns in Andhra Pradesh upon three main dimensions of nutrition. These are calories (kcals), protein (grams), and fat (grams).

The level of calorie consumption associated with expenditure deciles is analysed here. This helps us in checking nutritional inadequacy. The Food and Agricultural Organization (FAO) has estimated that India has 207 million people consuming diets inadequate in calories. The Government of India has set its own norms at 2400 Kcal per consumer unit per day for rural India and 2100 Kcal per consumer unit per day for urban India. Despite their cut-off points, it is a well known fact that the actual requirement of calories depends upon multiple factors such as age, sex, body weight,

nature of work, environment etc. Any norm used may either over-estimate or under-estimate the actual need. Further, the norm can be defined either in terms of per capita or in terms of per consumer unit. The consumer unit is adjusted for sex and age composition of the population as the calorie requirements differ across these groups. Cereals constitute the major share of calorie intake compared to other foods. Higher-level cereal consumption is associated with higher levels of calorie intake.

Cereals were the most important source of calorie supply accounting for 71.6 percent of the total calorie intake in rural and 62.6 percent in the urban areas. More significantly, the very poor group derived almost its entire calorie intake from cereals i.e. 80 percent in rural and 83 percent in urban areas in 1993-94 (Table-4.16). It implies that with the decline of cereal intake nutritional intake also declines.

Table-4.16: Percentage of total intake of calories and proteins from different groups of food items in Andhra Pradesh -- 1993-94 and 1999-2000.

Rural										
MPCE Class (Rs)	Percent of total intake of calories from cereals		Percentage of total intake of protein from (grams)							
	1993-94	1999-00	Cereals		Pulses		Milk		Meat, Fish & Egg	
			93-94	99-00	93-94	99-00	93-94	99-00	93-94	99-00
I	80.0	78.0	78.2	72.5	6.45	9.5	1.5	3.99	3.4	6.6
II	79.9	73.4	74.7	67.9	7.42	9.9	3.38	7.48	5.5	6.1
III	70.0	63.7	63.15	57.1	10.33	13.46	9.2	12.4	7.2	7.1
All Classes	71.67	71.01	64.71	63.0	9.95	10.9	8.32	8.0	7.18	6.8
Urban										
I	83.8	73.1	78.6	68.0	5.1	6.8	2.9	6.8	4.8	5.4
II	73.2	63.3	67.4	58.5	10.0	12.74	6.8	11.9	6.6	6.8
III	56.0	48.3	51.9	44.2	12.8	16.6	13.3	16.6	7.2	6.5
All Classes	62.64	61.4	57.62	56.4	11.92	13.04	10.93	11.7	7.17	6.5

Source: computed from NSSO consumer data
Note: Income groups are:(I) bottom 30 percent, (II) middle 40 percent, (III) top 30percent.

Percent of calorie and protein intake from the cereals declined among all the income groups, both in rural and urban areas, this could be due to lower consumption of coarse cereals. Whereas protein intake from pulses, milk, and meat, fish, and egg

increased in all the income groups. But it gave an interesting result when we looked the protein intake from milk, and meat, fish, and egg showed a declining trend at aggregate level from 1993-93 to 1999-2000.

The level of calorie consumption of the lowest expenditure deciles represents the depth of hunger or calorie deficiency. The depth of hunger is defined as the deficiency of a diet from the norm in terms of calories. The smaller the gap in terms of calories from the norm, the lesser the sting of hunger.

Table-4.17: Average per capita intake of calories, proteins and fat per diem over NSS rounds

Calorie (Kcal)	Rural	Urban
1972 – 73	2103	2143
1983	2204	2009
1993 – 94	2052	1992
1999 – 2000	2021	2052
Protein (grams)	**Rural**	**Urban**
1972 – 73	53.0	51.0
1983	56.0	50.0
1993 – 94	50.8	49.6
1999 – 2000	49.4	50.8
Fat (grams)	**Rural**	**Urban**
1972 – 73	21.0	31.0
1983	24.0	32.0
1993 – 94	27.2	34.9
1999 – 2000	29.5	41.5

Source: NSSO-Nutritional Intake in India (1999-20000

Table-4.17 shows the changes in calorie intake over the various NSS rounds. Calorie intake of protein intake increased between 27th round (1972-73) and 38th round (1983), but since then it shows a declining trend till the 55th round. It has been directly linked to the decline in the cereal consumption. Calorie and protein intakes are declining over the years whereas fat intake is increasing, this is due to increased consumption of milk and milk products.

Table-4.18: Average per capita intake of calories per diem over NSS rounds in Andhra Pradesh. (Kcal /day)

Class	1972-73	1977-78	1983	1987-88	1993-94	1999-2000
Rural						
I	1892	1764	1690	1499	1443	1400
II	2550	2536	2306	2030	1965	1841
III	3657	3555	3118	2776	2692	2610
All	2103	2611	2204	2095	2052	2000
URBAN						
I	1790	1680	1513	1342	1406	1423
II	2420	2315	2091	1836	1938	1860
III	3112	2980	2738	2742	2695	2530
All	2143	2331	2009	1961	1992	1942

Source: Computed from NSSO consumer data

Calorie intake among the bottom 30 percent declined over the years in rural areas and in urban areas it increased during 1999-2000. The consumption shifts among the poor is adverse in terms of their implications on energy intake levels. With increasing market dependence and changing consumption patterns in favour of superior cereals, the purchasing decision is dictated largely by availability than by choice. The economic entitlement of the poor with respect to the cereal basket has declined and hence average cereal consumption and average calorie intake have also declined.
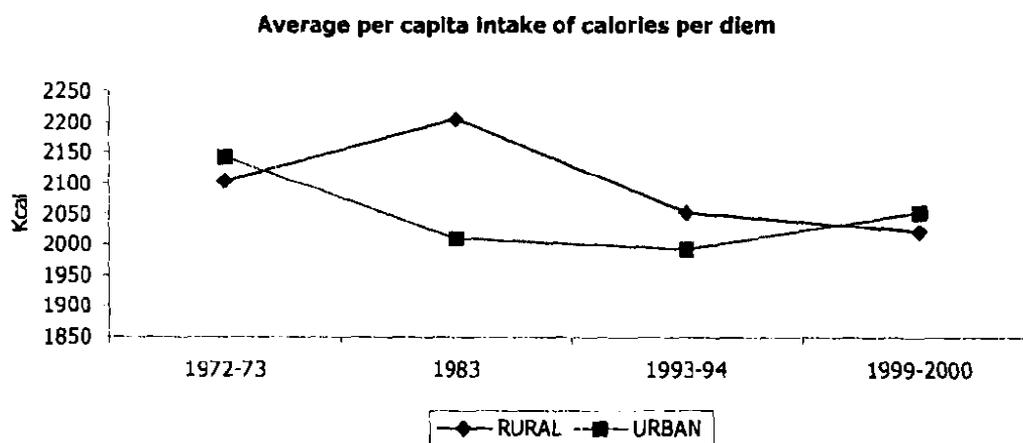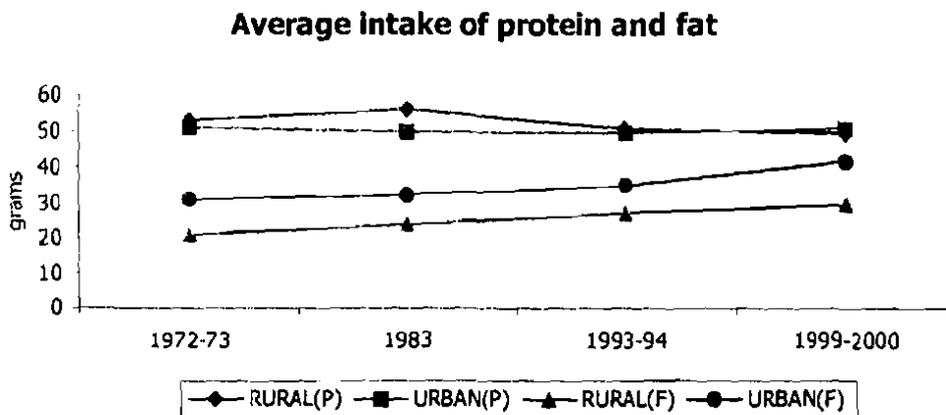
Figure-4.18

Average per capita intake of calories per diem

Figure-4.19

Average intake of protein and fat

With the decline in calorie intake number of people below poverty line should increase as nutritional adequacy, primarily in terms of daily calorie availability, formed the primary criterion to measure the poverty. Despite its being based on nutritional availability, there is no systematic relationship between poverty ratios and calorie availability in the State.

4.3.3. Paradox of Poverty

The official poverty ratios, based on the expert group methodology, show relatively low level of rural poverty and high level of urban poverty for Andhra Pradesh in 1999-2000. Thus, the official estimates of poverty ratios in urban areas of Andhra Pradesh are more than double of rural areas during 1990s on the other side calorie intake is declining at faster rate in rural areas compared to urban areas in lower income groups. This is quite contrary with the given rural urban differences in per capita income and wages. There exists a difference among various estimates regarding the levels of poverty all the estimates show a significant decline in the incidence of poverty in Andhra Pradesh between the 1980s and the 1990s.The studies on poverty in India were based on nutritional adequacy, but then what exactly the nutritional adequacy really means is a debatable issue. There is a range of dietary intake that may be considered adequate among adults depending on activity levels, climate, etc, Sukhatme (1980).

The poverty line is computed based on a fixed consumption basket of 1973-74, which will meet the minimum requirement of calories (2,400 calories in rural areas and 2,100 in urban area). The poverty line for rural Andhra Pradesh in 1973-74 was Rs. 41.71 per person per month and that of urban Andhra Pradesh was Rs.55.11 per person

per month. Consumer price indices are used to draw up poverty lines for subsequent years. Based on this method, the poverty line for rural Andhra Pradesh comes to around Rs.262.94 and Rs.457.40 for urban areas in 1999-2000. The major problem with this method is it ignores the changes in consumption basket, and the true cost of adequate calories in 1999-2000 is not Rs.262.94 for rural and Rs.457.40 for urban, but much higher. Poverty estimates based on this method shows a declining trend over the years (figure-4.20)

Figure-4.20

Percentage of people below poverty line in Andhra Pradesh
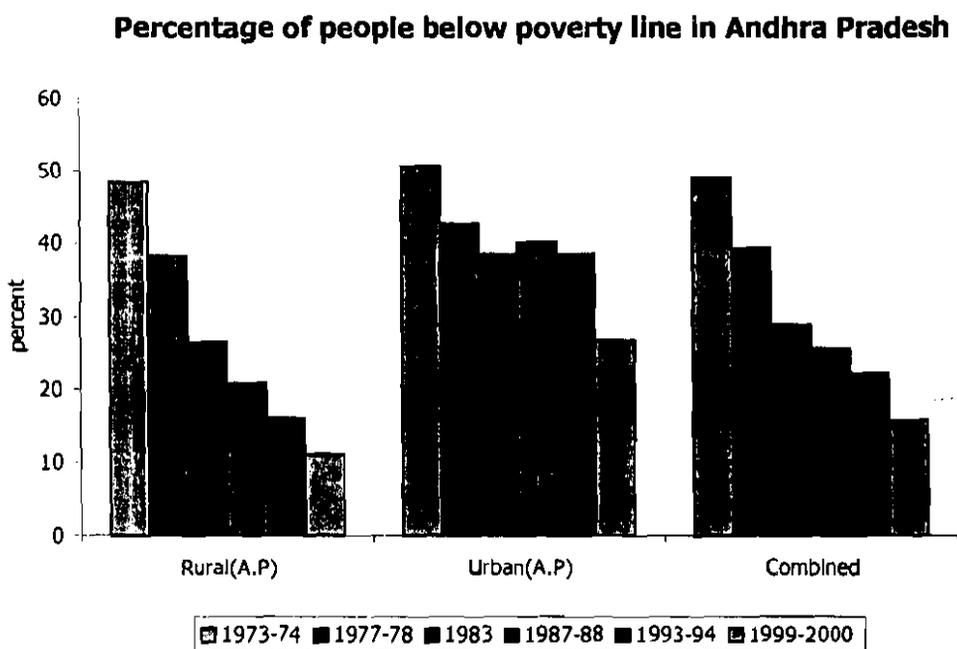
With the decline in cereal consumption calorie intake has declined on the other hand the poverty ratios are also declining. Which shows a paradox between calorie intake and poverty. The official poverty ratios and those based on calorie deprivation (fixed calorie norms) show contrasting trends over the years. While the official poverty estimates indicates a decline in poverty both in rural and urban Andhra Pradesh, but based on calorie deprivation there is an increase in poverty in the 1990's. Meenakshi and Viswanathan (2003) estimated the head count ratios based on official poverty ratios and those based on less than 2,400 calories per day in 1999-2000 for rural areas. Based on

129

this 80.7 percent of them are poor in rural Andhra Pradesh, whereas official estimates shows only 11.1 percent are poor.

Table-4.19: Poverty based on official method and direct calorie norms – Rural Andhra Pradesh

Year	Based on official poverty line	Percentage consuming below		
		2,400 calories per day	2,200 calories per day	1,800 calories per day
1999-2000	11.1	80.7	69.7	36.9

Source: Meenakshi and Vishwanathan (2003).

Ray and Lancaster (2005) provide poverty estimates for socially disadvantaged groups like female-headed households and SC, ST households using different methods.

Table-4.20: Poverty rates among socially disadvantaged groups in Andhra Pradesh – 1999-2000.

	Female headed households				SC/ST households			
	P1	P2	P3	P4	P1	P2	P3	P4
Rural	10.7	50.1	69.9	62.8	14.9	68.9	51.4	39.3
Urban	29.7	37.2	23.9	7.2	39.6	44.1	54.4	37.4

Source: Ray. R and G. Lancaster (2005).
Note: P1 – based on official poverty line, P2 – Calorie norm based poverty, P3 – Nutrient price-based food expenditure norm, P4 – Nutrient price-based total expenditure norm.

From the above table it is clear that the calorie intake is low among SC, ST and female-headed households, this intern translated in to higher calorie based poverty rates of the former group of households. Calorie based poverty (P2) measure of the female headed households have recorded lower poverty than the rest of the population.

Can the nutritional adequacy method assure consistency in terms of real expenditure? The answer is obviously 'no', as the relationship between food intake and income will shift according to differences in tastes, activity levels, and relative prices. The official poverty line may not be capturing the cost of basic necessities particularly non-food components such as health, education, shelter, etc. Thus there is a need to have a comprehensive view on the poverty line by including expenditure on non-food components apart from taking in to account the high cost of food. These results call for recalculating poverty line.

130

To look into the sustainability of food availability within the State we have taken the estimates of the food balance sheet from Ravi (2002).

4.4 Food demand projections for Andhra Pradesh

There are outflows of food from the districts both due to state procurement operations and private trade. There are also inflows of foodgrains due to the existence of the public distribution system and private trade. The net availability at the state level is a result of all these movements. Since there are no estimates of the total exports to other states and private stocks in the state, it is difficult to estimate the net availability of rice at the state level. Therefore, an attempt is made to estimate surpluses of production over and above household consumption and net procurement. The surpluses thus estimated should consist of exports to other states, requirement of seed and private stocks.

Balance sheet for rice in the state shows the deficit is increasing over time. It ranges from 7 lakh tones in 1972-73 to 27 lakh tones in 1999-2000. The deficit would increase if changes in private stocks, feed and seed requirements and exports to other states were taken into consideration.

Table-4.21: Balance sheet for rice in Andhra Pradesh

(In Lakh Tonnes)

Years	Aggregate Household Consumption			Net procure ment	Gross Output	Deficit
	Rural	Urban	Total			
1972-73	38.63	11.06	49.69	0.00	42.56	-7.13
1977-78	50.60	13.95	64.55	0.00	56.05	-8.50
1983-00	60.02	16.79	76.81	5.90	87.91	5.20
1987-88	62.61	19.46	82.07	5.40	70.87	-16.60
1993-94	69.69	22.50	92.19	18.20	95.62	-14.77
1999-00	76.27	23.89	100.16	35.90	106.38	-29.68

Source: Ravi (2002).
Note: Net Procurement = Procurement by FCI- Distribution through PDS
Deficit = Aggregate household consumption + Net procurement – Gross output

This picture is puzzling, as Andhra Pradesh is known to be rice surplus state and exports rice to other states. Food demand projections indicate that additional 30 to 40

131

lakh tonnes of rice will be demanded by 2020. The important question is will the state be able to meet the demand of this scale?

Table-4.22: Projections of Household demand for Rice in Andhra Pradesh

Scenario	ATE Growth	Aggregate Household demand (Lakh tonnes)			
		2000	**2005**	**2010**	**2020**
I	3.00	100.16	109.64	119.52	129.79
II	4.00	100.16	111.50	123.52	136.21
III	4.50	100.16	112.44	125.57	139.53
IV	5.00	100.16	113.39	127.65	142.93
Annual Growth rate					
I	3.00	---	1.82	1.74	1.66
II	4.00	---	2.17	2.07	1.97
III	4.50	---	2.34	2.23	2.13
IV	5.00	---	2.51	2.40	2.29

Source: Ravi (2002).
Note: The scenario I-IV present projected demand under the assumption of different growth rate for Aggregate total expenditure (ATE). All the projections are made at 1999-2000 relative prices.

The demand for rice in 2020 varies on each of the following essential elements such as, population, per capita direct consumption, and per capita income growth. Under various expenditure growth rates the demand for rice would be changing. Now the question is with stagnant net area, whether the State will continue to be self-sufficient in rice production? The possibility of increase in production depends on the improvement in productivity levels.

4.5 Conclusions

Agricultural development in Andhra Pradesh during 1955-56 to 1968-69 was mostly area-led, and during 1968-69 to 1980-81, growth was largely yield-led. This high acceleration is mostly due to rice, the main beneficiary of green revolution in the initial phase, and also due to the good performance of all foodgrains. Regions with dominance of rice and regions that have shifted from coarse cereals to groundnut or cotton attained a higher growth rate of aggregate output than other regions. Growth in foodgrain production in the State has declined during the 1990's. This decline is mainly caused by deceleration in the growth rates of yields of the crop. The other major problem with food production is the prevalence of wide regional disparities in the state. Between the

132

three geo-political regions of the State, the differences in gross cropped area and irrigated area are quite sharp. Another reason for decline in the output growth is decline in total investment in agriculture. Among the districts with the increase in per capita production of cereals during 1980's per capita consumption of cereals increased. But it declined during 1990's. One important reason for this is decline in purchasing power.

Real wages and prices of cereals act as rough indicators in determining the purchasing power of the people. Real wages declined during 1990's and cereal prices raised during 1990's. This affected the cereal demand indirectly, which intern influenced the nutritional intake of the households.

Cereal was the most important source of calorie supply accounting for 71.6 percent of the total calorie intake in rural and 62.6 percent in the urban. More significantly, the very poor group derived almost its entire calorie intake from cereals 80 percent in rural and 83 percent in the urban in 1993-94. Calorie & protein intake is declining over the years whereas intake of fat is increasing, this could be due to increase in milk & milk products consumption. Calorie intake among the bottom 30 percent declined over the years in both the sectors. Despite the decline in income poverty, the food poverty i.e., proportion of households consuming less than the norm have not declined. The declining intake levels have translated, into increased head count ratios of calorie deprivation, although Andhra Pradesh has a well functioning public distribution system the calorie gap ratio has been increasing (Meenakshi, 2003).

Balance sheet for rice in the state shows the deficit is increasing over time. It ranges from 7 lakh tones in 1972-73 to 27 lakh tones in 1999-2000.

Appendix-4.1: Regions and Districts of Andhra Pradesh

Regions	Districts
Coastal Andhra	Srikakulam, Vizianagaram, Visakhapatnam, East Godavari, West Godavari, Krishna, Guntur, Prakasam, Nellore
Rayalaseema	Kurnool, Ananthapur, Cuddapah, Chittoor
Telangana	Ranga Reddy, Hyderabad, Nizamabad, Medak, Mahaboobnagar, Nalgonda, Warangal, Khammam, Karimnagar, Adilabad

Appendix-4.2: Averages of gross cropped and irrigated area 1979-82 to 1998-2001.

District	Gross cropped area (000'ha)			Gross irrigated area (000'ha)		
	1979-82	1998-2001	% Change	1979-82	1998-2001	% Change
Srikakulam	446.9	419.3	-6.2	212.9	195.6	-8.1
Vizianagaram	355.2	452.6	27.4	135612	164667	21.4
Visakhapatnam	417.0	427.0	2.4	140.1	157.3	12.3
East Godavari	566.6	768.6	35.7	375406	469.0	24.9
West Godavari	562.5	693.0	23.2	315.5	604.3	91.5
Krishna	713.2	723.6	1.5	399.8	465.6	16.5
Guntur	730.8	867.6	18.7	332.9	392.3	17.8
Prakasam	659.8	608.6	-7.8	176.3	207.0	17.4
Nellore	375.8	342.0	-9.0	258.7	276.3	6.8
Coastal Andhra	**4828.2**	**5302.6**	**9.8**	**2347.5**	**2932.3**	**24.9**
Chittoor	543.7	498.3	-8.4	212.9	223.7	5.0
Cuddapah	403.0	446.0	10.7	130.0	178.3	37.1
Ananthapur	911.9	1061.0	16.3	151.0	177.3	17.4
Kurnool	961.9	983.0	2.2	146.2	207.0	41.5
Rayalaseema	**2820.7**	**2988.3**	**5.9**	**640.3**	**786.3**	**22.8**
Mahaboobnagar	988.7	911.3	-7.8	161.2	220.3	36.6
Ranga Reddy	345.7	329.6	-4.6	64.6	98.0	51.6
Medak	476.7	543.3	14.0	116.2	194.6	67.5
Nizamabad	359.8	393.3	9.3	186.1	286.0	53.7
Adilabad	608.0	570.3	-6.2	51.5	97.0	88.3
Karimnagar	521.3	543.0	4.2	214.7	398.0	85.3
Warangal	556.4	633.6	13.9	169.5	395.0	133.0
Khammam	445.3	483.6	8.6	92.7	214.0	130.7
Nalgonda	748.0	666.0	-11.0	264.3	318.6	20.6
Telangana	**5950.5**	**5074.3**	**0.5**	**1321.1**	**2221.6**	**68.2**
Andhra Pradesh	**12699.5**	**13365.3**	**5.2**	**4309.0**	**5940.3**	**37.9**

Source: Computed from Season & Crop Report. Bureau of Economics & Statistics, government of Andhra Pradesh, Hyderabad.

Appendix-4.3: Crop concentration ratios in Andhra Pradesh

Rice				
Region	**1980-1985**	**1985-1990**	**1990-1995**	**1995-2000**
West Godavari	2.50	2.53	2.30	2.20
Nizamabad	1.36	1.36	1.28	1.30
Khammam	0.84	0.98	0.47	1.34
Ananthapur	0.21	0.19	0.16	0.18
Coastal Andhra	1.59	1.57	1.50	1.47
Rayalaseema	0.47	0.32	0.32	1.25
Telangana	0.93	0.78	0.86	1.31
Andhra Pradesh	1	0.99	0.99	1.0
Food grains				
Region	**1980-1985**	**1985-1990**	**1990-1995**	**1995-2000**
West Godavari	1.12	1.22	1.28	1.28
Nizamabad	1.17	1.29	1.33	1.29
Khammam	1.21	1.18	1.16	1.06
Ananthapur	0.63	0.44	0.29	0.29
Coastal Andhra	1.02	1.08	1.16	1.23
Rayalaseema	0.88	0.61	0.46	1.23
Telangana	1.37	1.14	1.15	1.10
Andhra Pradesh	1	1	1	0.97
Non-food crops				
Region	**1980-1985**	**1985-1990**	**1990-1995**	**1995-2000**
West Godavari	0.37	0.22	0.28	0.27
Nizamabad	0.23	0.14	0.31	0.37
Khammam	0.42	1.38	0.62	0.74
Ananthapur	2.05	1.70	2.26	2.30
Coastal Andhra	0.85	0.57	0.67	2.13
Rayalaseema	2.06	1.34	1.88	2.50
Telangana	0.92	0.56	0.81	2.19
Andhra Pradesh	1.0	1.0	0.99	1.0

Source: Computed from Season & Crop Report. Directorate of Economics & Statistics, Government of Andhra Pradesh, Hyderabad.

Note:(i) Always surplus: West Godavari, (ii) Mostly surplus: Nizamabad, (iii) Mostly deficit: Khammam, and (iv) Always deficit: Ananthapur

Appendix-4.4: Area, production and productivity of crops in the three regions between 1978-82 and 1998-2001.

Crop	Area			Production			Productivity		
	1979-1982	1998-2001	% change	1979-1982	1998-2001	% change	1979-1982	1998-2001	% change
Coastal Andhra region									
Rice	2188.0	2387.7	9.1	4340.1	6864.4	58.2	1983.6	2874.9	44.9
Jowar	298.7	12.0	-96.0	167.0	6.7	-96.0	559.1	558.3	-0.1
Bajra	182.0	55.0	-69.8	175.4	69.7	-60.3	963.7	1267.3	31.5
Ragi	115.0	57.4	-50.1	122.6	64.3	-47.5	1065.5	1120.2	5.1
Total pulses	479.3	805.0	68.0	187.0	490.3	162.2	390.2	609.1	56.1
Total foodgrains	3441.7	3412.0	-0.9	5120.7	7728.4	50.9	1487.8	2265.1	52.2
Rayalaseema region									
Rice	349.2	313.7	-10.2	639.0	833.0	30.4	1829.9	2655.4	45.1
Jowar	470.0	141.3	-69.9	340.0	158.4	-53.4	723.4	1121.0	55.0
Bajra	129.7	28.3	-78.2	128.3	27.6	-78.5	989.2	975.3	-1.4
Ragi	81.7	19.7	-75.9	104.3	29.3	-71.9	1276.6	1487.3	16.5
Total pulses	148.3	221.0	49.0	31.7	133.4	320.8	213.8	603.6	182.4
Total foodgrains	1530.6	761.7	-50.2	1395.0	1213.0	-13.1	911.4	1592.5	74.7
Telangana region									
Rice	1086.3	1488.7	37.0	2018.0	3960.3	96.3	1857.7	2660.2	43.2
Jowar	1452.0	567.0	-61.0	896.2	393.9	-56.1	617.2	694.7	12.6
Bajra	189.1	43.4	-77.1	92.6	22.7	-75.5	489.7	523.0	6.8
Ragi	54.7	21.3	-61.1	36.4	20.3	-44.2	665.4	953.1	43.2
Total pulses	785.0	684.4	-12.8	148.7	273.4	83.9	189.4	399.5	110.9
Total foodgrains	3953.3	3220.8	-18.5	3571.3	508.3	54.2	903.4	1710.2	89.3

Source: Computed from Season & Crop Report. Directorate of Economics & Statistics, Government of Andhra Pradesh, Hyderabad.