

## **STATUS OF FOOD SECURITY IN ANDHRA PRADESH – AN ECONOMIC ANALYSIS**

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### **ABSTRACT**

*The present study aimed at studying the food security situation with respect to macro, socio-economic and consumption factors prescribed by FAO and to develop a policy prescription for attaining food security in Andhra Pradesh. The results revealed the problem of calorie deficiency, the declining per capita consumption, increase in the non-farming population in Andhra Pradesh, stagnant value addition by agriculture in total GDP, reduced purchasing power, declined access to food in rural areas, increased flexibility available with the government to spend on welfare programmes to increase availability, access and absorption and consequently on food security. Inequality in consumption expenditure, the alarming increase in general price level, the diversion of agricultural land to other non-agricultural uses reduced public investment in irrigation when compared to private investment were identified.*

### **Introduction**

The world food summit, 1996 defined the food security as that exists when all people, at all times, have physical and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life. The Government of India in its National Food Security Bill, 2011 defined food security as condition to enable

assured economic and social access to adequate food, for all persons in the country, at all times, in pursuance of their fundamental right to live with dignity.

Andhra Pradesh is the fifth largest State in the country, in terms of population. As per census-2011, the State accounts for 7.0 per cent of the total population in the country. The population of Andhra Pradesh was more than

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quadrupled in the last century from 19.1 million in 1901 to 84.7 million in 2011. The decadal growth of population which was below 15 per cent until 1961 and raised till 1991 and, in fact, the growth rate of 24.2 per cent during 1981-91 was the highest ever recorded. Later, a significant decline had been observed in the rate of growth of population which was only 14.6 per cent during 1991-2001 had further come down to 11.1 per cent during 2001-11, lower than the all India's growth of 17.6 per cent.

The distinguished feature of the State economy in the recent past was the fact that the State economy witnessed the strongest phase since 2004-05. While the nation's economy grew at an impressive rate of 8.39 per cent during 2004-05 to 2011-12, the performance of the State economy was even more impressive with the average growth of 9.26 per cent. The GSDP at constant (2004-05) prices for the year 2011-12 (advance estimates) is estimated at ₹ 4,07,949 crore as against ₹ 3,81,942 crore for 2010-11 (Quick Estimates) indicating a growth of 6.81 per cent. The corresponding sector-wise growth rates are (-) 1.54 per cent in agriculture sector, 7.33 per cent in industries sector and an impressive growth of 9.80 per cent in the services sector. As per the advance estimates of 2011-12, the per capita income of Andhra Pradesh at current prices increased to ₹ 71,540 from ₹ 62,912 in 2010-11 registering a growth of 13.7 per cent while at constant (2004-05) prices, it has also gone up from ₹ 40,366 in 2010-11 to ₹ 42,710 in 2011-12 registering a growth rate of 5.8 per cent. Average daily employment and employment per lakh of population increased consistently with the population. The figures

of the 2001 and 2010 might be still more encouraging in the light of economic reforms introduced and the growth registered both at State and national levels during the above period. Education indices are supposed to increase the utilisation and absorption of food. Growth rates of enrolment and number of schools and colleges were consistent with the population. The number of white card holders were 1,79,96,243 amidst the total beneficiaries to the tune of 2,26,41,674 of public distribution system in 2011.

A mix of high oil and fuel prices, growing use of bio-fuels, bad weather and soaring futures markets pushed up prices of food in 2007-08 prompting violent protests in countries including Egypt, Cameroon and Haiti. To avoid this, Government of India recently enunciated the Food Security Bill with a view to providing legal food entitlements to 75 per cent of the population by dividing them into priority and general categories. For implementing the same, the national food security ordinance, 2013 was brought with the objective to provide food and nutritional security with human life cycle approach by ensuring access in adequate quantity of quality food at affordable prices to people to live a life with dignity and for matters connected therewith or incidental thereto. Moreover, both Central and State governments in India would be spending large amounts on subsidies in food sector to provide food security and it is increasing year after year.

Taking into consideration the limited availability of the resources meant for the above activities analysing various macro socio-economic and consumption factors will help

us in making fruitful decisions pertaining to food security and government policy making. Hence, a study was undertaken in Andhra Pradesh with the objective to study the present status of food security situation by analysing macro, socio- economic and consumption factors prescribed by Food and Agricultural Organisation (FAO) which affect food security in Andhra Pradesh.

### Methodology

Various factors and parameters under the important dimensions, viz., macro socio-economic and consumption factors of food security as outlined by FAO were discussed and efforts were made to elicit their relationship with the food security in Andhra Pradesh for the period 1990-91 to 2009-10 from the Directorate of Economics and Statistics, Hyderabad, reports of economic survey and other relevant sources of pertinent information. Existing available information or alternative information or proxy data were used wherever it is feasible to justify the relevant indicators.

To capture the food security situation, various factors influencing it, the framework of policies and its implications in the twenty years were considered since there is coexistence of bountiful of yields and decline in food production during the above period both at national and State level, i.e., Andhra Pradesh. The food security indicators pertaining to macro, socio - economic and consumption factors outlined by FAO (2010)\* and having relevance for this study in Andhra Pradesh

which forms the basis for the analysis of food security situation were analysed and discussed to draw useful implications.

### Nutrition-Sensitive Social Development Index (NUSSDI)

The four strongest variables which could neatly capture several different determinants of malnutrition and may be good proxies for broader socio-economic dimensions that is relevant to nutrition outcomes, such as gender empowerment (female education and fertility rates), birth spacing and age at marriage (fertility rates), and overall health access (medically attended births) were utilised to calculate the final Nutrition Sensitive Social Development Index (NUSSDI) (Gillespie and Kadiyala, 2012) which is an equally weighted sum of these four variables, and it ranges between 0 and 100.

### RESULTS AND DISCUSSION

The data collected in the study were analysed and the current status of food security in Andhra Pradesh is presented and discussed under the following heads.

- Food deprivation and consumption factors
- Food production and trade factors
- Macro and socio-economic factors
- Discussion

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\* Food and Agricultural Organisation, Rome, Publications. <http://www.fao.org> accessed on 12-12-11.

## 1. Food Deprivation and Consumption Indicators

**Proportion of Under-nourishment:** The proportion of under-nourished population as a percentage of the population reflects the share of the population with insufficient calorie intake. This measure gives an idea about direct food security level of the society or community under study. Proportion of under-nourishment (per cent) as by the National Family Health Surveys (NFHS) from 1992-93, 1998-99, 2005-06 and 2010-11 in Andhra Pradesh indicated declining trends of under-nourishment during the study period. Among the indicators that were considered for measuring the malnutrition stunting (Low height for age) was increased while the wasting and underweight (Low weight for age) were showed declining trends up to 2010-11. It could be concluded that the food deprivation measured in terms of under-nourishment - stunting showed increasing trend during the study period in Andhra Pradesh from 1998-99 to 2010-11 in terms of low height for age. National Family Health Survey (NFHS) 2005-06 revealed that young children in India suffer from some of the highest levels of stunting, underweight, and wasting observed in any country in the world, and seven out of every ten young children are anaemic. The percentage of children under five years age who are underweight is almost 20 times as high in India as would be expected in a healthy, well-nourished population and is almost twice as high as the average percentage of underweight children in sub-Saharan African countries. The trend is similar in Andhra Pradesh State also. The proportion of under-nourishment is on the increase from NFHS-II to III in Andhra Pradesh.

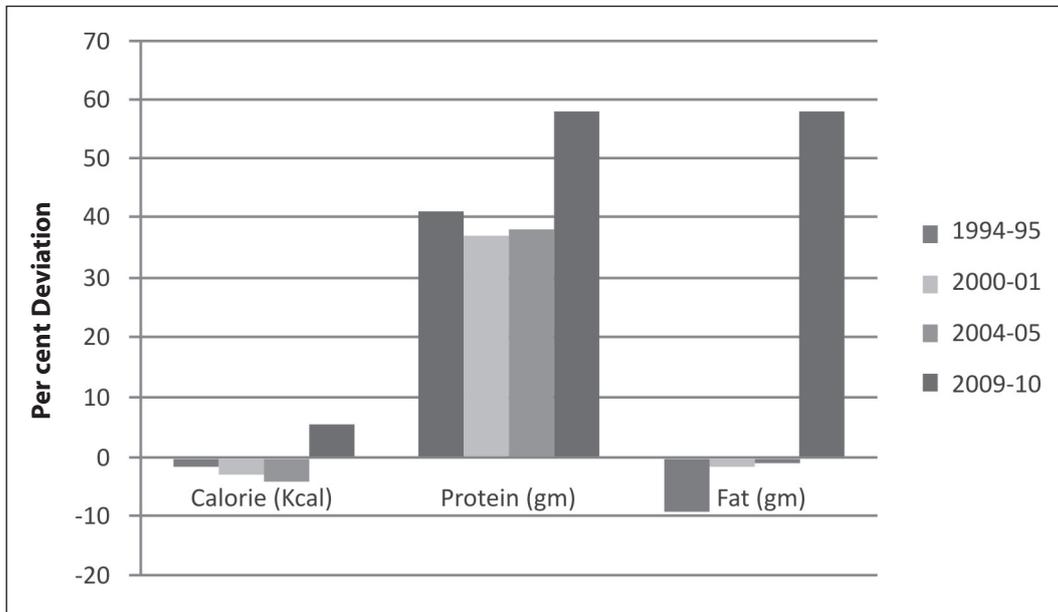
## **Food Needs and Food Supply for Human Consumption :**

The per capita average energy intake (Kcal), protein (gm) and fat (gm) were compared from rural and urban sectors and age group-wise as against the recommended dietary allowances recommended by NIN (2010) during the study period. The results of per cent deviation of actual intake of calorie, protein and fat from recommended intake increased in Andhra Pradesh in rural sector. It could be inferred that the rural Andhra Pradesh was faced with the problem of calorie deficiency and fat under nutrition. From 1994-95 to 2009-10, actual intake in terms of calories (Kcal/day) declined from 2052 to 1995, i.e., by 4.32 per cent. The fat nutrient (gm/day) deficiency narrowed from 9.33 to 1.04 per cent but less than the recommended intake. However, it could be observed that the protein nutrition was more than satisfactory during the study period.

While studying the intake of calorie, protein and fat in urban Andhra Pradesh and also their deviation when compared to the recommended dietary allowances, it appeared that the urban people in Andhra Pradesh were faced with the problem of calorie deficiency while the protein and fat nutrition were satisfactory. Results were in conformity with Sarasawat et al (2012) and Vepa (2012) who identified certain aspects of urban food insecurity, such as poverty, informal work, earning differentials, food prices and slums which need attention in India. However, Andhra Pradesh improved recently in terms of calorie, protein and fat intake.

Malnutrition was much prevalent in case of adults and youth as against the children

**Figure 1 : Per cent Deviation of Intake of Calorie, Protein and Fat in Andhra Pradesh - Rural Sector**



in rural areas of Andhra Pradesh. The children were made available enough nutrition in rural areas in Andhra Pradesh during the period under consideration. This could be attributed to the government programmes, viz., ICDS, mid-day meal scheme in schools, public distribution and other awareness programmes that were in operation during the period.

The perusal of data revealed the same situation among urban people as in the case of rural areas. But the urban malnutrition was less severe in case of youth and adults when compared to rural areas. The malnutrition was more than 100 per cent in rural areas whereas it was only up to 30 per cent in urban areas. The increased awareness of importance of nutrition in urban areas was reflected in case

of the positive scenario in terms of protein, fat and energy intake.

**Major Food Commodities Consumed :** Mean, standard deviation (S.D) and coefficient of variation of average monthly expenditure per person on different groups of items of consumption in rural areas were calculated and ranks were assigned based on the values of mean and coefficient of variation of the monthly average expenditure incurred on different groups of commodities consumed on monthly basis in descending order. Total cereals (fine and coarse) and cereals (only cereals) were the major items of consumption expenditure in urban and rural areas in Andhra Pradesh. Meat, milk and vegetables were the major items of consumption expenditure in

rural areas. Milk was the only item that was consumed more next to cereals in urban areas. Hence, it could be concluded that the diversity of diet was more in rural areas when compared to urban areas in the State. Medical institutional expenditure was exhibiting highest instability whereas the instability was more in case of non-institutional medical expenditure in case of urban areas. It could be inferred that the highest instability in institutional and non-institutional mean medical expenditure in rural and urban areas, respectively reflects the insufficient access of medical and health services by the people of Andhra Pradesh. This might hinder proper absorption of food which is one of the important components of food security by the consumers of Andhra Pradesh. This situation calls for increased investment in health and medical services (preventive medicine) in future in Andhra Pradesh which could improve overall absorption of food such that comprehensive food security can be attained. Grams were the food item that exhibited highest instability indicating the prevalent protein malnutrition among the consumers in Andhra Pradesh. It was more acute in case of rural areas than the urban areas in Andhra Pradesh. Efforts to increase the awareness regarding the importance of grams

consumption to increase the protein consumption, augmenting the production of grams and improving the access of grams through PDS might be some of the measures that can reduce the instability in their consumption and to attain nutritional security in the State. Consumption of fruits was another item whose consumption has to be stabilised to ensure comprehensive nutritional security. However, Putler (1992) indicated that reference price formation does have significant effects on consumer behaviour.

## 2. Food Production and Trade Indicators

**Ratio of Production to Consumption by Major Commodity :** The per capita consumption of major food items in rural and urban areas and their percentage change during 1993-94 to 2009-10 was presented in Table 1. The per capita consumption of majority of food items witnessed decreasing trends, except in case of few items such as milk and wheat. Consumption of milk increased by 28.63 and 16.79 per cent in rural and urban areas of Andhra Pradesh during 1993-94 to 2009-10. In spite of satisfactory positive increase in production to consumption ratio shown in

**Table 1 : Per Capita Consumption of Major Food Items During 1993-94 to 2009-10**

Food Items	Per Capita Consumption 1993-94 (Kg)		Per Capita Consumption 2009-10 (Kg)		Percentage change	
	Rural	Urban	Rural	Urban	Rural	Urban
Rice	10.1	11.5	8.90	10.67	-11.93	-7.23
Wheat	0.8	0.2	1.00	0.32	25.00	61.50
Jowar	0.3	1	0.13	0.30	-56.00	-70.10
Bajra	0	0.1	0.00	0.01	NA	-88.00
Maize	0	0.1	0.00	0.01	NA	-87.00
Other cereals	0.1	0.4	0.05	0.16	-47.00	-59.50
Total cereals	11.3	13.3	10.09	11.48	-10.73	-13.70
Sugar	0.43	0.64	0.37	0.54	-13.49	-15.47
Milk (lit.)	2.62	3.92	3.37	4.58	28.63	16.79

Source : Authors' calculations from NSS reports of the respective years.

Table 2, in all major food items, the per capita consumption seemed to be declining in Andhra Pradesh, which needs analysis of causes. Consumption of all the food commodities in Table 2 increased during 1993-94 to 2009-10 as indicated by the Production

to Consumption ratio in column No.6 and 7. Percentage change was highest in case of bajra, maize and other cereals which reflected the increasing health consciousness among the consumers in Andhra Pradesh during the said period.

**Table 2 : Production to Consumption Ratio of Major Food Items in Andhra Pradesh**

Food Items	Total Production**		Total Consumption#		Production to Consumption ratio##		Percentage change of 7 over 6 ##
	2	3	4	5	6	7	
1	1993-94	2009-10	1993-94	2009-10	1993-94	2009-10	8
Rice	87.92	142.4	14.82	16.34	5.93	8.72	47.05
Wheat	0.008	0.009	0.69	1.10	0.01	0.01	0.00
Jowar	9.09	4.4	0.89	0.36	10.19	12.23	20.02
Bajra	1.29	0.6	0.07	0.01	18.81	55.27	193.83
Maize	8.56	4.15	0.07	0.01	124.80	292.36	134.26
Other cereals	0.01	0.01	0.34	0.18	0.03	0.06	100.00
Total cereals	106.88	151.57	16.87	18.01	6.33	8.42	33.02
Sugar	6.50	5.14	0.73	0.76	8.86	6.74	-23.93
Milk (lit.)	37.66	104	4.49	6.64	8.40	15.72	87.14

Source : Department of Agriculture, Govt. of A.P, #Calculated from NSS data and

##Authors' Calculation.

**Foreign Food Trade:** It appeared that the agricultural exports did not increase substantially in actual value during the period. In fact, their share in total exports was reduced from 30.97 per cent in 1998-99 to 3.99 per cent in 2007-08 with negative annual compounded growth rate of 18.39 per cent.

### 3. Macro and Socio-economic Indicators

**Population :** The share of urban population increased from 26.90 to 38.74 per cent during the nineteen years period. The growth of share of urban population in total population was particularly more in the decade of 2001 to 2011. This would have serious implications on the food production in rural areas and food availability and its access in urban areas. The foodgrain production may hamper in future as there was shift of population from rural to urban areas as much of our agriculture is labour intensive and requires manpower for production *ceteris paribus*. The per capita availability of foodgrains might also decrease in urban areas in near future along with access and distributional problems. However, the most worrisome fact was, the decreasing cultivators (from 27.74 to 27.30 per cent), decrease in agricultural labour (from 40.87 to 35.30 per cent), increase in urban population (26.90 to 38.74) due to migration from rural areas and consequent increase in non-farm activities during 1990-91 to 2010-11 would increase the pressure on already diminishing natural resources affecting all the three important components of food security, i.e., food availability, access and absorption.

**Age Dependency Ratio and Density of Population :** The ratio of population of age group between 15-64 years (age dependency

ratio of working population) and the total population, viz., age dependency ratio, increased from 61.44 to 65.08 during 1990-91 to 2009-10. This implied that the per cent of population that could be engaged in productive work, i.e., 15-64 years had been increasing in Andhra Pradesh State amidst increasing density of population. While increasing density of population poses problems of reduced per capita availability, access, i.e., distribution and absorption, i.e., sanitation, increasing workforce could be involved in productive labour intensive works and innovations such that the income security can be achieved on a sustained basis.

**Macro-economic Aggregates :** Radhakrishna (1996) reported that while India has achieved moderate success in combating transitory food insecurity caused by crop failures due to droughts or floods, it has failed to have much impact on chronic food insecurity. The inadequate policy attention to agriculturally lagging regions resulted in stagnant or declining per capita food production in States outside the green revolution belt. Study of the trends in macro-economic aggregates might help in devising proper policy tools to combat chronic food security in India.

**Gross State Domestic Product (GSDP) :** Gross State Domestic Product of Andhra Pradesh increased from ₹ 43182 at current prices to ₹ 407949 crore during 1991-92 to 2010-11. The per cent of value addition by agriculture in total GDP was almost stagnant around 33 per cent throughout the period, except in early 1990's, indicated the stagnant growth of rural economy. The situation might still be worst as far as the value addition of agriculture in GDP

in real terms is concerned. It might have resulted in reduced purchasing power, declined access to food consequently leading to food insecurity in rural areas.

The per cent of cash surplus/deficit in total GDP of Andhra Pradesh reduced from 2.9 to 0.74 during the period from 1991-92 to 2010-11. It indicated the reduced flexibility that the Government of Andhra Pradesh have had during the period to spend on the welfare programmes including the programmes related to the food availability, i.e., agriculture, access, i.e., public distribution and absorption, i.e., health and nutrition. Kannan (2000) proved in his study in Kerala that through a pro-poor public policy regime, it was possible to enhance food security considerably.

**Poverty :** Poverty forces the society to food insecurity because of insufficient access of food. In case of Andhra Pradesh, the rural, urban and total poverty as reported by Dev (2007) and other data, reduced consistently from 1994-95 to 2010-11. The proportion of population under poverty in rural, urban and overall State reduced reflecting satisfactory availability and access of food at macro level during 1990-91 to 2010-11.

**Inequality in Access to Food (Gini of Consumption Expenditure (per cent)):** Inequality in consumption expenditure among the rural and urban areas of Andhra Pradesh revealed that the inequality in consumption expenditure increased in urban areas during 1990-91 to 2009-10, while the inequality persisted in rural areas during the same period. Dev (2007) studied the inclusive growth in Andhra Pradesh and confirmed that growth may be higher in the last two decades but

inclusive growth or equitable development has been missing that might have caused inequality in consumption. It was emphasised to operationalise a plan for achieving inclusive growth during the 11th Five Year Plan period and beyond in Andhra Pradesh. The action plan should cover the priority areas like agriculture, employment and social sectors. Plans for removing economic and social deprivation across all regions and for socially disadvantaged sections were recommended.

**Consumer Price Index at Current Prices :** The consumer price index increased from 1380 to 42710 during 1980-81 to 2011-12. With different bases over the years, the consumer price index consistently increased over years indicating the alarming increase in general price level. This situation was particularly aggravated since 1993-94 and might have resulted in severe access problems as far as the food was concerned. This case could be much severe in respect of BPL families, low income groups, such as workers in unorganised sector, small and marginal farmers, in Andhra Pradesh. McKeon (2011) identified the price volatility and land grabbing as the important causes for food insecurity at macro level. Severe fluctuation in consumer prices, especially after 1993-94, affected the food security situation in Andhra Pradesh and efforts are needed to overcome the situation.

**Consumer Food Price Index :** The consumer food price indices had irregular fluctuations during 1993-94 to 2010-11 and indicate the inequalities in access of food materials and consequently their consumption in Andhra Pradesh. It appeared that the food price index was in accordance with the supply of the

foodgrains during the same period and reflected the inadequate policy attention towards distribution of foodgrains during 1993-94 to 2010-11. The irregular fluctuations of consumer food price index was further apprehended about the impact in post-reform period on the foodgrain availability, access and also the overall food security in India of which Andhra Pradesh is an integral part. The results were in coincidence with the results obtained by Rameshchand (2005). It was reported that hefty increases in minimum support and procurement prices raised foodgrain prices beyond the purchasing power of common consumers and diverted produce from the market to government warehouses. Mitra (1996) recommended for stringent regulation of food prices in the country and efforts to expand the PDS to improve the food security situation in the country. Narayanamoorthy and Alli (2012) while analysing the cost of cultivation data on paddy crops published by the Commission for Agricultural Cost and Prices (CACP) for 1975-76 to 2008-09 recommended for making efforts to reduce the cost of cultivation through increased public investment and surface irrigation development. Effective regulations also need to be brought into control of both input and output markets where farmers are exploited scrupulously. Farmers' market and farmers' involved regulated markets need to be promoted to increase the remuneration of the

farmers. However, FAO (2011) perceived that high food prices present incentives for increased long-term investment in the agriculture sector, which can contribute to improved food security in the longer term. Domestic food prices increased substantially in most countries during the 2006–08 leading to world food crisis at both retail and farm gate levels. Despite higher fertiliser prices, this led to a strong supply response in many countries. It is essential to build upon this short-term supply response with increased investment in agriculture, including initiatives that target smallholder farmers and help them to access markets. Similar measures present a win-win situation for both farmer and consumer since high volumes through higher supply response provide more income and better margins for small farmers and affordable prices for consumers in Andhra Pradesh.

**Price Volatility :** Fluctuations in the prices of essential commodities over a period of time resulting in uneconomic access of food by poor and vulnerable sections lead to food insecurity in the society. A perusal of the data revealed that wholesale prices of important commodities exhibited increasing trends during 1975 to 2010. Forecasted prices of essential commodities witnessed steady increase except for dry chillies during 2011 to 2015 (Table 3).

**Table 3 : Forecasted Values for Average Daily Retail Prices of Essential Commodities in Andhra Pradesh (2011-2015)**

Year	Rice		Redgram dal		Groundnut Oil		Dry chillies		Tamarind		Onion	
	Forecast (₹)	Standard Error	Forecast (₹)	Standard Error	Forecast (₹)	Standard Error	Forecast (₹)	Standard Error	Forecast (₹)	Standard Error	Forecast (₹)	Standard Error
2010-11	7.90	0.84	61.98	4.75	76.04	4.69	41.89	4.13	54.76	8.48	12.77	2.31
2011-12	8.38	1.26	63.9	6.87	76.79	5.56	45.14	4.47	60.32	9.03	13.21	2.47
2012-13	8.85	1.56	65.71	8.54	78.28	6.06	36.21	5.2	61.95	9.03	13.33	2.67
2013-14	9.32	1.81	67.45	9.97	80.03	6.44	43.01	5.29	60.5	10.15	13.51	2.83
2014-15	9.79	2.03	69.16	11.24	81.88	6.77	40.12	5.44	62.78	11.18	13.69	2.96

**Public Distribution System:** As per the Andhra Pradesh socio-economic survey report 2011-12, there are 44, 579 fair price shops functioning in the State as on 31.11.2011. Out of them 6,747 are in urban areas and 37,832 are in rural areas. On an average, each shop has to serve 535 cards / families. As against Government of India's norm of one fair price shop for every 2,000 persons, there is one shop for every 1,965 persons in Andhra Pradesh. As a nutritional support to the poor, supply of rice to BPL families at ₹1 per kg is being made. A perusal of data revealed that the gap between the allotment of foodgrains, i.e., rice and wheat, from the central pool to Andhra Pradesh was less during early 90s but was higher during 2001-02 to 2006-07 and was gradually reduced later. The per cent of households accessing PDS rice increased from 62.93 to 83.90 per cent in rural areas and from 29.84 to 42.70 in urban areas. While the coverage of PDS in both rural and urban areas of Andhra Pradesh was satisfactory during the 1990-91 to 2009-10 and increased dependence of households on government for staple food needs further analysis from food security point of view.

**Food Subsidies :** Study of subsidy amount spent on rice, wheat and their total worked out from 1991 to 2010 revealed that the subsidy amount spent increased from ₹ 639 crore to ₹ 3606 crore for procurement and distribution of rice and wheat.

**Literacy :** The literacy rate increased from 55.10 to 74.88 per cent in male population in Andhra Pradesh whereas the female literacy increased from 32.70 to 58.68 per

cent during 1991-92 to 2010-11. The total literacy increased from 44.10 to 67.02 per cent in Andhra Pradesh during the above period. The trends of literacy among the male, female and total population of Andhra Pradesh during 1991-92 to 2005-06 revealed that the female literacy increased continuously over years. In fact, it contributed mainly towards the increased total literacy in Andhra Pradesh during the study period.

This aspect might have favoured the food security situation in Andhra Pradesh because female literacy will have direct correlation with the nutritional security of households. As the woman continued to be the chief planner and preparer of food everywhere, literacy will improve the nutritional awareness among women which would definitely contribute to better access and absorption and consequently towards the food and nutritional security.

#### 4. Agriculture Indicators

This section deals with the agricultural inputs as they are crucial for increasing food productivity, per capita availability and finally for sustained food security required for expansion in area, production and productivity of principal crops, exports, imports and investment position in agriculture.

**Labour Force:** The total agricultural labour force and female labour both in urban and rural areas declined during the 1993-94 to 2010-11. The decline was sharper in case of female labour that too in urban areas during the period. The migrated labour from rural

to urban areas particularly women were being used for unproductive works. This has a serious implication for the food security of Andhra Pradesh in the coming future. The efforts of the government in the form of MGNREGA, NFSA and incentives for mechanisation might arrest this trend of decreased labour availability for agriculture in Andhra Pradesh.

**Arable Land :** The quantum of arable land and per cent of it with irrigation are the measures that are directly correlated with the food production and food security. A perusal of the land utilisation in Andhra Pradesh during 1990-91 to 2009-10 revealed that while land under forests, other uncultivable land excluding fallow was stagnant, land not available for cultivation increased and net sown area reduced. The net sown area reduced from 40.07 per cent in 1990-91 to 36.52 per cent in 2009-10.

The other uncultivable land increased from 16.12 to 17.13 per cent during the same period. Population pressure might have resulted in the diversion of agricultural land to other non-agricultural uses which were reflected in the increased percentage of other uncultivable land. Increasing the production of foodgrains from shrinking land resources might be inevitable in Andhra Pradesh in future. According to Swaminathan (2013), the main bottlenecks for achieving sustained food security are diversion of prime farm land to non-farm purposes such as real estate and bio-fuels, global warming and climate change and proposal of cash transfer instead of grain in public distribution. Efficient utilisation of fallow

land through increased cropping intensity and sustainable agricultural practices might be the way out for meeting the challenge of increasing the foodgrain production and productivity in Andhra Pradesh.

**Irrigation :** The area under tubewells substantially increased during the period from 1990-91 to 2008-09. It is implied from the above findings that the private investment in the form of acreage under tubewells in the provision of irrigation facilities was many fold higher than the public investment, i.e., the acreage under canals, tanks, etc. The social and economic dimension in this aspect which is worth considering was that the community entities such as tanks, canals were not exploited to their capacities resulting in declining acreage under them. Village level leadership and community psyche has to be tuned for utilisation of the community assets like tanks and canals to their optimum capacity levels. To be more precise, water user associations have to play a bigger role for augmenting financial and managerial resources for proper utilisation of community irrigation assets viz. canals and tanks.

A close examination of crop-wise irrigated area during 1990-91 to 2007-08 revealed that rice was the only major food crop cultivated under irrigation in Andhra Pradesh. None of the other crops had any considerable area under irrigation. It can be inferred from the above findings that there was a crop shift from other crops to rice in areas that newly came under irrigation in Andhra Pradesh. Less drudgery, less number of mandays, easily adoptable production

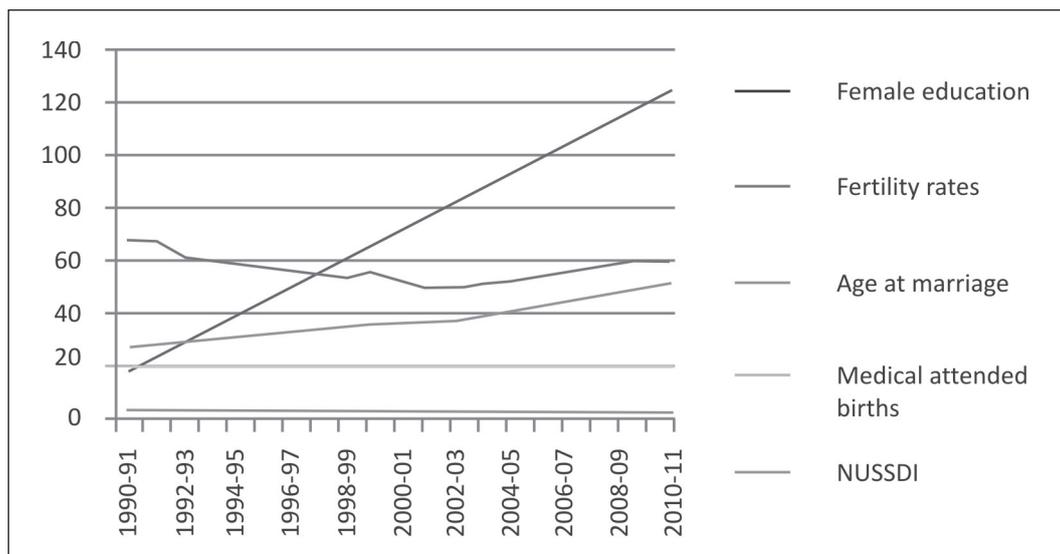
technology coupled with the requirement of the staple food for home consumption were the reasons that might be responsible for rice's continuation as a dominant crop under irrigation.

**Nutrition-Sensitive Social Development Index (NUSSDI)**

The improvements in NUSSDI scores serves as a powerful determinant of reductions in stunting and as an indicator of economic growth. Fertility rates and

medically attended births had driven the NUSSDI towards positive side during 1990-91 to 2010-11 indicating that Andhra Pradesh was advanced in terms of nutritionally sensitive social development. Fertility rates and age at marriage could not be improved as per Fig.2, may be due to the prevailing social conditions and needs improvement in future so as to further advance the nutritional scenario and consequently the social development in Andhra Pradesh.

**Figure 2 : Per Cent of Female Population Educated, Fertility Rates, Age at Marriage, Medically Attended Births and NUSSDI in Andhra Pradesh**



**Conclusions and Implications**

Based on the results, the following conclusions and implications emerged. While comparing the per capita average energy intake (Kcal), protein (gm) and fat (gm) in Andhra Pradesh as against the

recommended dietary allowances recommended by NIN (2010) during the study period, it was inferred that the rural Andhra Pradesh faced with the problem of calorie deficiency and fat under-nutrition and the urban people in Andhra Pradesh

faced with the problem of calorie deficiency while the protein and fat nutrition were satisfactory. The urban malnutrition was more severe in case of youth and adults when compared to rural areas. In spite of satisfactory positive production and consumption ratio in all major food items, the declining per capita consumption seemed to be alarming in Andhra Pradesh. Stagnant value addition by agriculture in total GDP throughout the study period was observed which might result in reduced purchasing power, declined access to food, consequently leading to food insecurity in rural areas. The proportion of population under poverty in rural, urban and overall State reduced reflecting satisfactory availability and access of food at macro level during the study period. Inequality in consumption expenditure increased in urban areas during the study period while the inequality persisted in rural areas during the same period. The irregular fluctuations of consumer food price index further apprehended about the impact of post-reform period on the foodgrain availability, access and also the overall food security in Andhra Pradesh. In Andhra Pradesh, increased purchasing power through enhanced employment, draught resistant technologies for addressing the vagaries of monsoon, improving the irrigation use efficiency in addition to better budgetary management and investments in horticulture are the main issues that need immediate attention. Population pressure resulted in the diversion of agricultural land to other non-agricultural uses which

reflected in the increased percentage under other uncultivable land. Crop shift from other crops to rice was observed in areas that newly came under irrigation in Andhra Pradesh. Andhra Pradesh was advanced in terms of nutritionally sensitive social development as was revealed by the NUSDI calculated during the study period. Since the per cent of population that could be engaged in productive work had been increasing in Andhra Pradesh, export oriented programmes in agriculture involving rural youth would induce purchasing power in villages and in turn access of food and food security. Policy induced measures to stabilise the food prices not only improve the consumption but also encourage the farmers to increase their production. Diversion of land to non-agricultural uses should be discouraged on priority basis. Public investment for the provision of irrigation facilities like canals, tanks, etc., has to be increased so as to reduce the burden on individual farmers to create these facilities at farm level. This would not only increase farm household savings but also increase the surplus, purchasing power and finally would have multiplier effect as per the fundamentals of the economy. Extension efforts to promote the crop diversification and integration of farming systems in lieu of mono cropping, especially rice cultivation has to be intensified in command areas and areas that were coming newly under irrigation in Andhra Pradesh to facilitate comprehensive food and nutritional security.

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