Report No. 141

ASSESSMENT OF MARKETED AND MARKETABLE SURPLUS OF MAJOR FOOD GRAINS IN ANDHRA PRADESH

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Preface

The present study entitled "Assessment of Marketed and Marketable Surplus of Major Food grains in Andhra Pradesh" was carried out and prepared by Agro-Economic Research Centre, Andhra University, Visakhapatnam. It was a co-ordinated study assigned by Directorate of Economics and Statistics, Ministry of Agriculture, Government of India, Krishi Bhavan, New Delhi. This task of coordination has been entrusted with the Centre for Management of Agriculture (CMA), Indian Institute of Management, Ahmedabad (IIMA).

Primarily the study was based on primary data generated from 450 sample households over three selected districts namely West Godavari, Guntur and Kurnool of Andhra Pradesh for Agricultural year 2012-13. This study largely attempted to estimate the marketed and marketable surplus of major food grains (Rice, Maize and Gram) with the intention of providing valuable information for formulation of economic policies at state and national level.

We are grateful to the Commissioner and Director of Agri & Marketing, Government of Andhra Pradesh, Hyderabad and the Assistant Directors of Marketing Guntur, West Godavari and Kurnool districts for providing relevant information. We are also thankful to staff members from Marketing Department of concerned districts who helped us in selecting the mandals, villages and for extending their help in conducting the field survey of selected districts.

We are also thankful to the Research Team for their sincere effort and keen interest in undertaking the study. I thank Dr. M. Nageswara Rao, Research Officer for preparing the total draft report. Further we are thankful to Dr. P. Ramu and Dr. K. Rambabu Senior Research Investigators and B. Krishna, Research Fellow in providing information and data entry and tabulation. I thank to Smt.P. Malathi, Senior Assistant for neat and excellent word processing.

Prof. P. TARA KUMARI
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BIBLIOGRAPHY

1. A. Sivaram Prasad; Agricultural Marketing in India, Mittal Publications – New Delhi – 1985

2. Agriculture Action Plan 2013-14, Department of Agriculture, Andhra Pradesh

3. Gulab Nath Singh, DAL Singar Singh, Ram Iqbal Singh, Agricultural Marketing in India, Analysis Planning and Development: Chaug Publications, Allahabad, India

4. I. Murali Krishna Rao, Marketing in Tribal Economy, Inter India Publications, New Delhi

5. M. Upendra, Marketable and Marketed Surplus in Agriculture: Mittal Publications, New Delhi

6. Ramesh Chand, Agriculture Marketing: Educational Publishers and Distributors, New Delhi – 2011

7. U. Subba RAo, Marketing Problems of Cotton Growers in Andhra Pradesh: Book Links Corporation, Hyderabad, 1994

8. Various Issues of Seasonal Crop Reports of Andhra Pradesh, Directorate of Economics and Statistics, Government of Andhra Pradesh, Hyderabad

9. Various issues of Statistical Abstracts of Andhra Pradesh, Directorate of Economics and Statistics, Government of Andhra Pradesh, Hyderabad

10. Various Issues of Fertilizer Statistics, The Fertilizer Association of India, New Delhi.

11. Wayne D. Durcell, Agricultural Marketing Systems, Coordination, Cash and Future Prices; Reston Publishing Company inc. A prentice – Hall Company – Reston, Viginia.

EXECUTIVE SUMMARY

ASSESSMENT OF MARKETABLE AND MARKETED SURPLUS OF MAJOR FOOD GRAINS IN ANDHRA PRADESH

Agricultural Characteristics of Andhra Pradesh:

Population wise the state of Andhra Pradesh was the 5th largest one in India with a size of 8.46 crores. At the same time it was the 4th largest state in the Country's geographical area with about 275 Sq Kms. The state is composed of mainly with agrarian character and it is considered as one of the most progressive sate in respect of the agricultural development in the country maintaining high levels of crop production when compared with other states in the country. Of the total geographical area in the state the total Gross Cropped Area (GCA) during the year 2013, is about 137 lakh hectares (49.6%) and the Net Cropped Area (NCA) is about 112 lakh hectares (40.4%).

Agriculture is the main source of income and rapid agriculture growth is essential to maintain food security to the population in the state. Therefore an optimistic trend was observed in food grain production and accordingly the state was ranked 6th at the national level during 2003-04. Further it has attained 4th rank (2004-05) and 3rd during (2005-06, 2006-07 and 2008-09). However, the state food grain production has been fluctuating due to occurrence of severe climate changes like droughts and floods, in addition to problems like labour scarcity, high cost of cultivation, changing cropping pattern and prices fluctuation etc.

In Andhra Pradesh major area available for agriculture cultivated mostly conventional crops of Jowar, Castor, Ragi and Mesta before green revolution. But now in post green revolution period the cultivable area changed into Rice, Maize, and Cotton crops including horticultural crops. Rice is the major cereal crop production constituted 75.4 per cent of total food crops production followed by other cereal crops of Jowar (7.8%) and Maize (7.3%) during 1992-93. But the share of Rice production had been declined during the period 1992-93 to 2011-2012. Whereas production of Maize crop registered a massive increase from 2.3 per cent to 19.9 per cent in the same period. Among the Pulse crops Bengal gram production has been increasing in estimated periods. The main reason for all these is that the Central and state governments have been taking needful steps to increase the production and productivity of cereals as well as other food related crops.

Objectives of the study:

The main objectives of the study are:

1. Estimate marketable and marketed surplus for Paddy, Maize and Bengal gram crops in Andhra Pradesh.
2. To estimate farm retention for consumption seed, feed, wages and other payments in kind etc. for selected crops and
3. to examine role of various factors such as institutional, infrastructural, socio-economic etc. influencing household marketed surplus decision at household level.

Sampling Methodology:

The data used in this study has been collected both secondary and primary sources. The study is confined only to three major food grain crops namely Paddy, Maize and Bengal gram in the state of Andhra Pradesh. For primary survey (Household survey) at first stage three districts namely West Godavari, Guntur and Kurnool were selected on the basis of production shares of study crops in states total production.

The selected districts of West Godavari and Guntur which are growing more than one selected crop and their crop production share also above 8 per cent share in states production. At second stage two mandals were selected from each sample district purposively on the basis of their area and production of study crops. At third stage for conducting household survey, two sample villages from each selected mandal (total 18 villages)were selected on consultation with concerned agriculture officers in the district. The two sample villages were selected purposively considering the location, one village near the market yard/town (within 15 km) and the second village had taken at least above 15 km away from the market yard/town from the mandal headquarters. Finally from each selected village at least 12 farmer households which had grown at least one study crop in a reference year 2012-13 and representing in a different farm categories (marginal 0-1 ha, small 1-2 ha, semi-medium 2-4 ha, medium 4-10 ha and large more than 10 ha) were selected. In all a total 450 sample households comprising 88 marginal, 88 small, 92 semi medium, 104 medium and 78 large farmers selected for the survey. Out of 450 total sample HH from selected crops of paddy, maize and gram, 200 households grow paddy, 150 households had grown maize and 100 households grown bengal gram. Across these three districts 175 sample HH were selected from West Godavari district consisting of 100 HH which were paddy cultivators and 75 were maize cultivators. In Guntur district, 225

sample HH were selected consisting of 100 HH which were paddy cultivators and 75 were maize cultivators and 50 HH under gram cultivators. Further from Kurnool district 50 households were selected for gram crop. The Primary data was collected by canvassing a pre-designed schedule for agricultural year 2012-13.

Major findings of the primary survey:

(1) On the whole, average size of the family was 3.69 persons consisting of 1.9 males and 1.79 females. Out of 450 sample households 99.33 per cent are male headed households and the average age of the head of the family was 47 years and the average year of schooling was 8.56 years with highest from large farmers 9.62 years. Overall 94 per cent of HH had agriculture as the main occupation and dairy is the least 1.11 per cent of HH. Majority of HH pursue more than one occupation. Of the total sample HH 70.62 per cent and 20.22 HH belonged to OBC and general category respectively.

(2) The average size of operational holding per HH for entire sample was 4.12 ha. comprising 3.20 ha. Irrigated and 0.92 ha. Un irrigated land. Across sample farmers non-cultivable land was absent and no farmer expressed about cultivable waste. Very few HHs involved in leased-in and leased out land. Canal is the major irrigation in West Godavari and Guntur districts, whereas tube well is the main source of irrigation in Kurnool district. Overall 34 households (7.56%) had taken land on lease (6.1%) and majority of sample farmers (76.47%) are paying fixed money as rent and the remaining (23.53%) are paying 50% share of crop production.

(3) Overall per sample HH, total livestock units were containing 0.40 cattle, 2.16 buffalo, and 1.83 others (goat, sheep etc.) Among farmer groups highest livestock reported per HH was 5.97 under small farmers and least 3.16 for large farmer.

(4) On the whole the average investment per hectare on farm machineries and related implements by sample HH was of Rs.39,984 of the total investment and the highest investment of Rs.32,044 was on tube wells/bore wells followed by tractors Rs.7144 and Rs.796 for threshing machines etc. Therefore use of farm technology is less lack of knowledge and investment of the farmers.

(5) In the selected districts of Guntur, West Godavari and Kurnool the average GCA per HH worked out to be 5.49 ha. Category wise it was 0.92 for MF, 1.89 ha for SF, 3.66 for SMF, 7.96 ha. for medium farmers and 12.97 ha. for LF of the GCA. Of the total area (GCA) 2466.43 ha. of which 57.26 per cent and 42.74 per cent area cultivated under kharif and rabi crops respectively. Among kharif crops paddy was most important food grain crop which alone occupied 54.26 per cent of GCA followed by maize (2.22%) and jowar (0.78%). On the other hand under rabi crops paddy, bengalgram and maize were important food crops claiming 18.97, 12.68 and 11.09 per cent of GCA respectively. Moreover pulses and oilseed crops are also important crops of selected districts. Between kharif and rabi crops. Paddy crop area was the highest under selected districts of West Godavari and Guntur. Due to availability of more irrigated lands. The HH cropping intensity was 133.20 per cent and the highest was reported at 140.31 per cent from marginal and least 120.39 per cent from large farmer per household. It was found cropping intensity is changing across farm size of the farmers. Regarding paddy yield per hectare it was 34.71 quintals, and across farm sizes significant variations was not reported but the highest yield reported was from marginal farmers with 36.42 quintals. For jowar crop yield per hectare was 39.63 quintals under kharif and 36.66 quintals under rabi season. Further for Bengal gram yield per hectare was 21.74 quintals and significant variations was observed among the farm size. The gram crop yield varied between 22.56 qtl for MF and least 19.74 qtl for large farmers.

(6) Overall, on an average per household the total retention of paddy produce was 8.02 qtl, of which 7.49 qtl (96.86%) was for self-consumption and 0.25 qtl (3.14%) was meant for seed purposes. Paddy produce used for payment in kind and other purposes had not reported by the farmers. Since majority of farmers reported that they purchase rice for home consumption, the retention of paddy produce for self-consumption was small in quantity. On the other hand seed was also sold through A.P Seed Corporation at subsidized price. Therefore the retention pattern of the HH for paddy produce is negligible. The highest and least retention of paddy produce found to be in large and marginal farmers respectively.

(7) Overall the total retention maize quantity per household was 0.28 Qtl, which was negligible. Positive relationship was observed between the farm size and total retention of maize produce except large farmer per HH. Total retention of gram per household was 0.15

qtl and this retention of gram ment for only self-consumption per HH. No quantity of gram produce was retained for other uses like seed and payments.

(8) Producers performed different operations during crop harvesting. Majority of farmers used manual methods to carry out during harvesting, threshing and winnowing of selected crops.

Losses during Harvesting Stages (kg)

Crop	Manual Operation (Kg)	Mechanical operation (kg)	Total Losses (Kg)	% Losses to total production
Paddy	1.27	1.61	2.88	1.26
Maize	0.58	0.50	1.09	0.31
Gram	0.50	0.28	0.78	1.14

Regarding Paddy harvesting, threshing and winnowing operations performed by both manual and mechanical methods, majority of large farmers only performed mechanical and their per HH total losses was 2.88 kg (1.26%) of total produce. The harvesting losses as reported reveal inverse relation between land size and harvesting losses of crop per HH. In the case of maize crop, different harvesting operations loss was reported at 1.09 kg (0.31%). The losses reported in different harvesting operations per household was 0.51 kg (0.15%) for harvesting out of which 0.41 kg (0.14%) for threshing and 0.10 kg (0.03%) for winnowing. Further about gram crop per HH total harvesting losses was 0.78 kgs of which among different harvesting operations per HH losses were 0.45 kg (0.66%) of which for harvesting 0.33 kg (0.48%) for threshing (0.12 kg) and no losses for winnowing under gram crop. Therefore non availability of mechanization for unsuitable lands and lack of awareness are the causes for majority of farmers depending on manual methods for harvesting of the study crops. Among study crops percentage losses at harvesting stage under Maize produce was less compared to other two crops (Paddy and Maize) due to majority of farmers sold the produce at their fields to the private buyers.

(9) Majority farmers used head load mode and buffalo cart transportation of produce from field to threshing floor. Further tractor trolly and trucks were the common mode of transportation used by sample HH to transport their produce from field/storage to market yards. The details of transportation losses occurred at the time of packing loading and unloading are given below:

Crop	Paddy	Maize	Gram
Total Transportation Losses Kg/hh.	0.044	0.046	0.026
% of production	0.02	0.01	0.04

Paddy crop produce per HH absolute quantity lost during transportation is increasing with farm sizes. The transportation losses varied from 0.07 kg (0.01%) for LF to 0.03 kg (0.06%) for marginal farmers per HH. But the percentage loss revealed declining trend with increase in farm size of sample HH under Paddy produce. In the case of maize average per HH transport loss was 0.046kg (0.01%) of which transportation loss occurred from field to threshing floor was 0.034 kg (0.01%) and from farm/field to market yard was 0.012 kg per HH and the mode of transport was gunny bags. Moreover about gram transportation used mainly head load and buffalo cart from field to threshing floor and loss was 0.026 kg per HH. Further transportation from farm to market yard tractors and Trucks were had the loss was 0.01kg (0.01%) per household. Therefore among study crops gram production loss in absolute terms was minimal 0.026 kg per HH.

(10) The details of Overall Production Losses during storage of produce of selected crops:

Crop	Quantity stored per HH	Quantity lost	% of storage loss to stored quantity	% of storage loss to production	Average storage cost Rs/month/Qtl
Paddy	14.66	0.02	0.12	0.003	2.00
Maize	8.17	0.09	1.58	0.002	3.41
Gram	128.25	0.18	0.14	0.12	5.35

Very few farmers used hired godowns and house storages. For in house storage, they used home godowns and for packing gunny bags. The storage losses occurred due to weight loss, poor packing, humidity, improper storage rodents and handling etc. The production losses during storage were 0.02, 0.09 and 0.18 percent of paddy, maize and gram respectively. Among selected crops less quantity of produce is stored under maize due to the fact that majority of farmers preferred to sold at their field or farm gate itself.

(11) Production losses under total post-harvest operations were 1.28, 0.35 and 1.62 per cent in harvesting, transportation and storage for paddy, maize and gram respectively. The highest production losses at harvesting stage followed by storage and transportation. Bengal gram crop reported the highest loss due to low market prices. So most of the farmers kept the largest produce at market yards during the survey period. Whereas about the Paddy farmers poor knowledge about the harvest time and low mechanization used at harvesting and natural calamities are also the reason under highest post harvest losses under Paddy crop.

(12) Marketed surplus means actual quantity of produce sells by producer irrespective of his needs, self-consumption and needful requirements.

So marketed surplus = Marketable surplus + distress sale.

(13) Paddy crop produce marketable and marketed surplus accounted for 95.24 and 96.27 per cent respectively. It has a gap between marketable and marketed surplus (1.03%) due to majority of small, marginal and semi-medium farmers are sold at the time of harvesting except some medium and large farmers. Category-wise, marketed surplus output ratio (MSR) of paddy found to be highest at 98.19 per cent for semi medium and lowest at 92.92 per cent for medium farmers. The average distance covered to sell paddy produce was 4.43 km. 83.84 per cent of paddy was sold to private traders/money lenders and village traders. On the other hand overall maize production marketable and marketed surplus accounted for 99.90 and 99.92 per cent respectively and the average distance covered to sold maize produce was 7.92 km. The total marketed surplus 88.14 per cent of maize produce sold to private traders and only 12 per cent sold to government agencies. In the case of gram produce marketable and marketed surplus accounted for 99.58 per cent and 12.70 per cent of production. The gram Marketed Surplus output Ratio was higher because gram is not regularly used in daily diet and the average distance covered was 4.70 km. Majority of farmers stored their Gram produce at market yards for higher price. Sometimes open market price per quintal for gram was higher than MSP of government agencies. Therefore gram producers sold the produce at 92.85 per cent of MSR to private agencies. So government participation to purchase the gram produce is nominal expressed by the farmers.

Majority of marginal and small farmers expressed that the percentage of marketed surplus of paddy and maize found to be higher than marketable surplus, due to their meet for urgent cash needs and repayment of debts to private traders etc. Regarding time of sale, it was found that marketed surplus of paddy and maize produce was immediately disposed after crop harvesting due to distress sale expressed by majority of marginal and small farmers and the sale of these two crops at their fields after harvesting. Some medium and large farmers kept some produce at their house storage or kept in market yards with gunny bags for sale at higher prices. On the other hand marketed surplus was less than marketable surplus due to low price at the time of harvesting under gram produce. The main reasons were both low government procurement price as well as low open market price prevailing at harvesting time.

So farmers kept the large scale produce in market yards for future remunerative price at the market expressed by the farmers.

Private traders and money lenders played a vital role to buy the food grain produce. Total quantity of marketed surplus was 83.84, 88.14 and 92.85 per cent respectively for paddy, maize and gram produce and they sold to the above mentioned agencies due to urgent cash need, and debt repayments. Moreover, food grain procurement operations by the government agencies are not in time and they purchase at less MSP than open market at the time of crop harvesting of the farmer. Therefore unregulated private marketing system exploited the farmers to a great extent through weighing, grading of produce at the time of sale. Across farm size the marginal and small farmers sale the produce at the time of harvesting mainly due to debts. Moreover other causes like transport costs to the markets and packing and loading/unloading costs are more expensive. So they could not prefer to sell the produce at the market yards.

(14) Regarding market information nearly 53.11 per cent of sample farmers had accessed to price through traders and village business men. Next important sources of information were market committee (APMC) yard 13.11 per cent, followed by 1.56 per cent are known through print media 11.11 per cent buyers at village level and 5.11 per cent electronic media.

(15) The study found that all sample farmers had access to the credit and the farm size increases the amount of Credit also increased. Across the credit sources 60.39 percent obtained credit from commercial banks followed by cooperative banks 26.67 per cent and 8.60 per cent from private money lenders. Category wise, across credit ranged from 17.24 per cent for MF to zero per cent from LF. So the private money lending is decreasing as increasing the land size. Therefore institutional credit is the main source, which is available at low rate of interest. Majority of farmers expressed that main purpose to borrow money for crop loans.

(16) Out of 450 sample farmers 36.89 per cent households were knew about MSP of selected crops and the level of awareness and farm size found positively related due to literacy levels of sample HH. Very few farmers have responded about future trading and warehouse receipt programme. Contract farming was not there and storage and warehouse facilities were used only for gram and paddy produce as expressed by the sample farmers. Majority of farmers expressed that as price increases the marketed surplus also increases and farmers self-higher

proportion of produce instead of their self-consumption, seed and feed especially in paddy produce. Government of Andhra Pradesh is supplying the rice and seed at subsidized prices to the marginal, small and semi-medium farmers through Public Distribution System (PDS) and Seed supply Corporation.

Policy Implications:

- Adequate measures should be adopted by the government to increase the productivity levels of agricultural crops through the linkage of MGNREGS scheme, which not only reduces the cost of cultivation but also reduces farmers debt burden.
- Paddy and gram are important food grain crops. The department of agriculture is responsible to supply the farm machineries and related implements exclusively to marginal and small farmers at subsidy prices through government loans. Moreover scientific knowledge and improved methods can also help to reduce the post-harvest losses at farm level to all category farmers.
- Extension of institutional finance through banks and other government financial institutions at low interest rate can protect the rural farmer from the non-institutional finance and private traders which can also reduce the repayment of debt burden from traders and commission agents.
- The government should extend the marketing facilities to purchase all types of agricultural produce at the time of harvesting. There by it can also control the private traders and unregulated markets.
- The Department of Agriculture should extend the mechanization in agricultural production through supply of tractors, harvesters and other technical implements at subsidized prices to the farmers in order to reduce the production costs and losses.
- The Government has to extend and disseminate market information of agricultural commodities relating to provision of loans and advances, supply of seeds, agricultural implements and fertilizers to the farming community at village level through print and electronic media.
- Market committees may take necessary steps to minimize the problems like lack of minimum facilities, delay in disposal of produce, irregular behavior of committee employees and officials at marketing yards.
- Both central and state governments should extend the food grain exports through tax incentives and subsidies and reduce the imports from other nations.

- Extend the purchasing capacity of government agencies like Market Fed, F.C.I etc., to purchase the food grains in the state.
- Fix the Minimum Support Price (MSP) of all types of food grains before the crop season. It will benefit the farmer whether cultivation of the crop is beneficial or not.
- Department of Agriculture and other Governmental agencies should educate the farming community to adopt co-operative farming and corporate agriculture. It will reduce the cost of cultivation and lead to sustainable income to the farmers.
- Farmers can easily access the banking activities, if more number of nationalized bank branches and other government financial institutions at village level are established.

The institutional and infrastructural facilities can enhance the productivity and generate more production value of study crops for the farmers, reducing the losses from different activities involved from harvesting to marketed surplus.

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ASSESSMENT OF MARKETABLE AND MARKETED SURPLUS OF MAJOR FOOD GRAINS IN ANDHRA PRADESH

CHAPTER - I

INTRODUCTION:

Population wise the state of Andhra Pradesh was the 5th largest one in India with a size of 8.46 crores. At the same time it was the 4th largest state in the Country's geographical area with about 275 Sq Kms. The state is composed of mainly with agrarian character and it is considered as one of the most progressive sate in respect of the agricultural development in the country maintaining high levels of crop production when compared with other states in the country. Of the total geographical area in the state the total Gross Cropped Area (GCA) during the year 2013, is about 137 lakh hectares (49.6%) and the Net Cropped Area (NCA) is about 112 lakh hectares (40.4%). Rice is a major food crop and staple food followed by Jowar, Bajra, Maize and pulses which are the major food crops and 66.02 per cent of area is grown under these food crops out of the total cropped area. On the other hand oilseeds, Cotton and Sugarcane are the important non-food crops and the area covered under these crops is 33.98 per cent against total cropped area in the state. Godavari and Krishna are the two important major rivers that flow through the state providing major irrigation. The total gross area irrigated by all sources in the state is 67.84 lakh hectares (49.31%) during 2011-12. The major source of irrigation in the state is tube wells accounting a share of 50 per cent covering 25.45 lakh hectares followed by canals 35.7 per cent (18.18 lakh ha.) and tanks 10.8 per cent (5.50 lakh ha.) and other sources accounted a share of 3.35 percent (1.77 lakh ha.) in the studied state.

Agriculture in the state is basically associated with small farm cultivation. As per 2010-11 agricultural censes, there were about 10.6 million holdings in the state with an average size of 1.36 ha. per holding. In these total holdings, the small and marginal holdings accounted for about 86.0 per cent with 42.7 per cent of the share in the total area. Under the conditions of decelerating crop yields, the small size of the holding and its decline over time has a significant impact on the agricultural incomes and the levels of living of the farm households. The per capita agricultural output recorded a negative growth since the beginning of 1990's and the cost of cultivation per unit of output has been increasing over the years in the state. The decline in per capita agricultural output and increase in the cost of cultivation per unit of output resulted

in the decline in the incomes of the farmers and increased dependence on credit for carrying out the farm activities coupled with the increased costs of their family maintenances.

Agricultural sector plays a vital role in the state's economy and it is the major source of employment to the people. Of the 29.90 million work force in the state, about 20 million (65 per cent) are agricultural workers. As per 2010-11 data about 20.00 per cent of the state's domestic product was contributed by agricultural sector. During the year 2008-09 the state has achieved the highest even food grain production recording about 204 lakh tonnes. But later the production had declined slowly but with a fluctuating trend which is obviously due to various reasons like severe climate changes, shift in cropping pattern from food crops to non-food commercial crops etc.,

Table 1.1

Major Food grain crops Production in Andhra Pradesh (2012-13)

(Production in lakh MT)

		1992-93	1997-98	2002-03	2007-08	2011-12
1	**Rice**	87.92	85.10	73.26	133.23	128.91
2	**Wheat**	0.07	0.59	0.14	0.07	0.10
3	**Jowar**	9.08	5.14	6.07	0.04	4.96
4	**Bajra**	1.28	0.66	0.57	0.92	0.58
5	**Maize**	8.56	10.83	1.48	41.35	36.55
6	**Ragi**	1.59	0.89	0.76	0.69	0.40
7	**Small millets**	0.66	0.35	0.22	0.21	0.18
8	**Bengal Gram**	0.28	0.58	3.81	9.12	5.19
9	**Red Gram**	0.74	0.56	1.50	3.01	1.46
10	**Green Gram**	2.26	1.34	1.17	1.92	1.62
11	**Black Gram**	3.48	2.15	3.76	2.49	3.67
12	**Horse Gram**	0.50	0.44	0.29	2.45	0.13
13	**Cow Gram**	0.07	0.05	0.06	0.09	0.13
14	**Other Pulses**	0.03	0.01	0.02	0.06	0.06
15	**Total Food Crops**	116.58	108.22	106.55	198.17	184.01

Source: State of Indian Agriculture – 2012-13, Government of India

Table 1.1 reveals the production of major food grains in Andhra Pradesh between the study periods 1992-93 to 2011-12. It also reveals that the major food grain production have been declined upto 2002-03. The year 2007-08 had 198.17 lakh Mt. Further the production has slightly declined 184.01 lakh MT in 2011-12 in the state. Where as Cereals crop production obtained the first place and Rice is the major food crop than pulses and others cereal crops production constituted 75.4 per cent over food crops production followed by other cereal crops

of Jowar 7.8 and Maize 7.3 per cent in the state during 1992-93. The share of Rice production has declined from 75.4 to to 70 per cent between 1992-93 to 2011-12 but the maize production registered a massive increase from 7.3 per cent to 19.9 per cent between the periods 1992-93 to 2011-12 in the state. The Pulses production share has slightly increased from 6.3 per cent to 6.7 percent over a period of 20 years in the state (1992-93 – 2011-12). Among Pulse crops Bengal gram production has been increased of all estimated periods of the study period in the state. Redgram production slightly increased from 10 to 11 per cent of total Pulse production in the state. The Government of Andhra Pradesh had taken many steps and introduced several schemes to encourage production and productivity of agricultural sector over a period of 20 years particularly after Green Revolution. Commercial crops of Cotton, Sugarcane and Oilseeds production have increased over twenty years period (1992-93 – 2011-12) in the state, moreover the Government of Andhra Pradesh had also recognized the importance of horticultural crops under dry lands and uncultivable lands priority has given to increase cultivable area and production of horticultural crops through issuing subsidies and incentives to farmers. Therefore production of horticultural crops accounted for about 4.60 lakh tones in TE 1981 and it has increased to 198.39 lakh tones in TE 2009-10. Whereas the production of non-food crops share had increased comparatively over food crops production in the state during the period 1992-2012.

1.2 CONCEPTS OF MARKETED AND MARKETABLE SURPLUS:

Marketable surplus is a theoretical concept which represents the surplus, the farmer/producer had with him for disposal once the genuine requirements of his family consumption, payment of wages in kind, feed, seed and wastage have been met.

The marketable surplus is computed by the formula:

MS = P – C

Where MS = Marketable Surplus

P = Gross production in the year

C = Total requirements in the same year

These requirements are family consumption (Retention + purchase), payment of wages in kind, feed, seed, transactions through barter, payment of loan/irrigation and physical losses/wastage in storage/transportation/threshing etc.,

While "Marketed Surplus" refers to the actually marketed quantities of the produce, by the farmer, marketable surplus denotes the quantity of produce available with the farmer for his and his family's consumption plus for mention his other requirements. In case of commercial agriculture the farmer is motivated by profit consideration, and hence he takes his whole produce to the market and purchases his requirement from the market, but in the case of subsistence agriculture the concept of marketed and marketable surplus becomes relevant as the farmer generally produces the food grain for his own substance and it at all any surpluses are available it is taken to the market for sale. But in the case of non-food cash crops viz. Cotton, Sugarcane the marketable surplus is 100 per cent. The concept of ' Marketable Surplus' is subjective because the quantity of retention the farmer is a matter of subjective guess. On the other hand the concept of 'Marketed Surplus' is objective, because it refers specifically to the marketed amount i.e. the actual quantity which entered into the market.

1.3 Marketed surplus output Ratio for important food crops in Andhra Pradesh and various states of India:

Table 1.2 presents the marketed surplus – output Ratio (MSR) of important food crops in the state of Andhra Pradesh and other Indian states for 2005-06, 2007-08 and 2010-11. The table reveals that Rice is a major food crop and staple food in Andhra Pradesh. The retention of Rice was higher during 2005-06, but it declined during the period 2007-08 and 2010-11. The Marketed surplus of Rice production increased from 76 per cent in 2005-06 to 92 per cent in 2007-08 later it slightly declined to 91.06 per cent in 2010-11. Behind this was the supply of subsidy rice for self consumption through Public Distribution System (PDS) and subsidy seed also supplied by the seed corporation to the farming community by the Agricultural Department, Government of Andhra Pradesh. Therefore marketed surplus under rice produce increased due to declining retention for self-consumption and seed. Bihar, Madhya Pradesh and Punjab states are also reported declining trend between the periods of 2007-08 to 2010-11. Another important Cereal crop Maize Marketed surplus in the state of Andhra Pradesh also increased between from 95 per cent to 100 per cent between 2005-06 and 2007-08, later it declined to 90 per cent in the year 2010-11. In the states of Bihar, Karnataka and Uttar Pradesh, production of Maize Marketed Surplus Output Ratio (MSR)have been fluctuating in all study periods. Orissa state being leading Gram producing state and highest percentage of production generated to markets and the Marketed surplus ratio increased from 83.26 to 97.28 and it slightly declined to 92.92 per cent during the periods 2005-06 to 2007-08 and 2010-11. About all India Marketed

Surplus output Ratio (MSR) of major food crops like Rice and Maize have been increased of all study periods, but the Gram production Marketed surplus output ratio had declined from 90.81 to 86.68 per cent during the period 2007-08 to 2010-11 in India. So the table reveals that the MSR has been increased due to several reasons like increasing output, Marketing facilities and storage facilities etc.,

Table 1.2
Marketed Surplus – Output Ratio (MSR) of Important Food Crops in Various States
(Production in lakh MT)

	States	2005-06	2007-08	2010-11	2005-06	2007-08	2010-11	2005-06	2007-08	2010-11
		RICE			MAIZE			GRAM		
1	Andhra Pradesh	75.99	91.99	91.06	95.15	100.00	90.81	--	--	--
2	Assam	65.64	25.96	38.54	--	--	--	--	--	--
3	Bihar	68.04	80.03	77.50	86.00	90.48	87.19	50.82	70.61	77.27
4	Haryana	96.82	95.18	97.09	--	--	--	--	--	--
5	Karnataka	94.35	85.47	94.56	96.85	98.79	98.26	--	--	--
6	Madhya Pradesh	69.11	78.98	73.77	51.67					
7	Orrisa	59.08	66.18			52.45	77.02	83.26	97.28	92.92
8	Punjab	98.12	98.06	97.70	--					
9	Uttar Pradesh	38.93	36.30	76.20	61.99	54.59	83.28	40.42	85.48	56.83
10	West Bengal	48.51	64.45	67.72	--	--	--			
11	All India	71.25	72.64	80.65	80.01	82.87	86.00	74.06	90.81	86.68

Source: Agricultural Statistics at a Glance 2010, Directorate of Economics and Statistics, Department of Agriculture and Co-operation, Ministry of Agriculture, Government India

1.4. Review of Literature on Marketable and Marketed Surplus:

A brief review of literature is available on Marketable and Marketed Surplus in India. These studies largely attempted to provide estimates of marketable surplus ratio and post harvest losses of food grains in different Indian states.

Reddy (1987) analysed the studies of Marketable Surplus of Paddy in Chittoor district of Andhra Pradesh and reported the marketable surplus of 4.59 per cent in small and marginal category of farmers, 31.12 per cent in medium category and 52.51 per cent in large category of farmers. A similar study was carried out by Upender et.al. who reported that marketable Surplus of Paddy to be 33.49 per cent in small category 27.96 per cent in medium category and 38.56 per cent in large category of farmers in Karimnagar district of Andhra Pradesh. For Karnataka state Devaraja (1999) reported Marketable Surplus of Paddy to be 45.74 per cent in

Hasan District of Karnataka state. In the case of Assam state Ahmed et.al (1990) reported Marketable Surplus of Paddy to be 48.56 on an average and reported that the Marketable Surplus of Fine Winter Paddy was higher than Coarse Winter Paddy. More recently Reddy (2009) conducted a study in Orissa and estimated the marketed Surplus ratio to the tune of 65 per cent. However, Rang (1993) reported that the marketable surplus of paddy in Punjab was 94 per cent of the production, which was much higher than the average

Table -1.3

STATE WISE ESTIMATION OF PRODUCTION OF SELECTED FOOD GRAIN CROPS IN INDIA 2012-13

(lakh tonnes)

State	Paddy	%	Maize	%	Gram	%
Andhra Pradesh	11510	10.94	4855	21.81	762	8.63
Assam	5128	4.87	21	0.10	0	0.01
Bihar	7529	7.15	2475	11.12	86	0.98
Chhattisgarh	6608	6.28	207	0.93	285	3.23
Gujarat	1541	1.46	791	3.55	168	1.90
Haryana	3976	3.78	23	0.10	53	0.60
Himachal Pradesh	125	0.12	657	2.95	0	0.01
Jammu & Kashmir	818	0.78	512	2.30	0	0.00
Jharkhand	3164	3.01	451	2.03	162	1.84
Karnataka	3364	3.20	3475	15.61	623	7.05
Kerala	508	0.48	0	0.00	0	0.00
Madhya Pradesh	2774	2.64	1513	6.80	3812	43.16
Maharashtra	3057	2.90	1824	8.19	854	9.67
Orissa	7295	6.93	227	1.02	31	0.36
Punjab	11374	10.81	475	2.13	2	0.03
Rajasthan	222	0.21	1755	7.89	1277	14.46
Tamilnadu	4049	3.85	946	4.25	4	0.05
Uttar Pradesh	14416	13.70	1234	5.55	676	7.65
Uttarakhand	579	0.55	40	0.18	0	0.00
West Bengal	15023	14.28	416	1.87	29	0.33
Others	2173	2.07	355	1.60	2	0.02
All-India	105241	100.00	22258	100.00	8832	100.00

Source: Directorate of Economics and Statistics in India 2013-14.

marketable surplus of the country. Parmod Kumar (1995) obtained similar extent of marketed surplus for Haryana state paddy produce to be in the tune of 96.31 per cent.

In case of post harvest losses, the National Sciences (1978) reported post harvest losses of Rice in India to the extent of 6 per cent, Bangladesh 7 per cent , Indonesia 6-17 per cent, Malaysia 17.25 per cent, Nepal 4.22 per cent, Pakistan 7 per cent, Philippines 9-34 per cent, Sri Lanka 13-40 per cent and Thailand 8-14 per cent. In another study Krishna murthy K (1973-76) reported that storage losses of foodgrains (9.33%), attributed to threshing yard (1.68%),

Transport (0.15%), processing (0.92%), Rodents (2.50%), birds (0.85%), insects (2.55%) and moisture (0.68%). Another study conducted by Singh T.et.al (1979-86) have reported estimates of post harvest losses of paddy in India to the extent of 11 per cent (threshing 2.5%, transport 1.5%, processing 2%, storage 6%). The Committee pause reported (1998) post harvest losses of food grains to the extent of 9.33% of the total production and retention by the farmers to the extent of 65%.

Table 1.3 gives the state-wise production of selected food grain crops. It reveals that the states of West Bengal, Uttar Pradesh, Punjab and Andhra Pradesh are leading producers of Rice crop. Maize is another important food crop produced in Andhra Pradesh followed by Karnataka and Bihar states in India. In the case of gram Madhya Pradesh, Rajasthan, Maharashtra and Andhra Pradesh are major producing states in India during 2012-13. Therefore the table indicates Andhra Pradesh is one of the major food grain production namely Paddy, Maize and Gram among Indian states in the year 2012-13.

1.5 Relevance of the Study:

The estimation of "Marketable and Marketed Surplus" of agricultural commodities is felt necessary in India, in the context of planning for agricultural development, public distribution programmes and preparation of pricing policies for agricultural commodities. Such data are also needed by the "Department of Statistics" and "Ministry of Planning" to generate estimates of Net National Product (NNP) of Agricultural sector. This information is also used in short and long term demand and supply projections of agricultural commodities in India and State governments.

Directorate of Marketing and Inspection (DMI) has conducted surveys of Marketable Surplus of food grains in the past and these surveys have become little use and out dated in India. Over the years, there is the consistent improvement in pre and post harvest technology and development. Moreover, significant changes of post harvest infrastructure facilities are also changing the farmers behavior about cultivation practices such as crop pattern, use pattern, seed pattern, wastages, marketing and government schemes are also to reduce the distress sale. So all these changes have influenced the marketable surplus of the farmer. There has been more demand for the government organizations in India for revision and updating of data to make it more realistic and updating of the marketable and marketed surplus data on

foodgrains in tune with the recent changes in the agriculture sector and agricultural economy of India. Therefore this information is also helpful to estimate the crucial items like farm retention for family consumption, seed, feed and wastage etc.,

Ministry of Agriculture (MOA), Government of India (GOI) assigned to Agro-Economic Research Centre, Visakhapatnam to undertake this empirical study for Assessment of Marketable and Marketed Surplus for three major food grain cops viz Rice, Maize and Gram in Andhra Pradesh state. These crops occupied a prominent place among food grain crops in the state in respect of area and production under cultivation. Hence an attempt is made to estimate of Marketable and Marketed Surplus of above mentioned three food grain crops in Andhra Pradesh and also to examine factors influencing Marketed Surplus decision at household level. The study is undertaken with the following objectives.

1.6 Objectives of the study:

The main objectives of the study are:

1. Estimate Marketable and Marketed Surplus of selected Cereals, Coarse Cereals and Pulses in selected states.
2. To estimate farm retention for consumption seed, feed, wages and other payments in kind etc. and
3. Examine role of various factors such as Institutional, Infrastructural, Socio-Economic issues etc. in influencing household marketed surplus decision.

CHAPTER - II

SAMPLING DESIGN AND RESEARCH METHODOLOGY

INTRODUCTION: This chapter mainly discussed the sampling design used for the study in selection of sample districts, mandals, villages and households for conducting the present survey. Also the methodology used for the selection of households crop wise and landholding size categories, has been discussed in this chapter.

2.1 Selection of Study crops:

Andhra Pradesh is considered as one of the most progressive state of India with respect of food grain production and Rice is a major food crop and staple food occupying third rank in India's total rice production accounting for about 10.94 per cent in 2012-13. In terms of production of maize, Andhra Pradesh state ranks first in the country and its share is about 21.81 per cent of India's Maize production. Gram is also major food crop and is placed in 3rd rank in the country production. Therefore the importance of these three food crops in the state made the coordinator of the study to suggesting us to take up Rice, Maize and Gram as study crops for the purpose of estimation of marketable and marketed surplus in Andhra Pradesh state.

2.2 Sample Design and Sample Size:

The study used both primary and secondary data. For household data collection, multi stage random sampling design was used for selection of sample districts, mandals, villages and sample farmers. The sample districts have selected on the basis of production shares of sample crops in the state.

1. Selection of Districts: There are 23 districts in the state. For each crop it was decided to select about 8 to 17 per cent of major producing districts of selected crops (Rice, Maize and Gram) in the state. While selecting the districts, we also preferred to select those districts which are growing more than one selected crops with a view to increase the benefits of household survey. At first stage, two sample districts were selected for each study crop purposively by considering their share in states production of the selected crop. Ultimately the 3 districts selected are West Godavari, Guntur and Kurnool.

2. Selection of Mandals: From each selected district, two mandals have selected, having large in production under study crops were selected, purposively with the consultation of District level agricultural officers as well as marketing officers.

Selected Districts of Andhra Pradesh

Table – 2.1
Selected Districts (Crop wise)

Study crop	Selected districts	% Production
Rice	West Godavari (10.15%)	Guntur (8.68%)
Maize	Guntur (17.24%)	West Godavari (8.88%)
Gram	Guntur (11.74%)	Kurnool (8.89%)

Note: 1. Figure in brackets are percentages share of Study crop production of the district to total production in the state 2011-12
2. A P Statistical abstract 2011-12

3. Selection of Sample Villages: For conducting household survey, two sample villages were selected from each selected mandal, purposively considering the location, one village near the market yard/town (within 15 km) and the second village was at least above 15 km away from the market yard/town. The basic aim of the selection of villages at different locations is to know the differences in marketable and marketed surplus and price received by the farmer at different locations for his product.

4. Selection of Sample Households: From each selected village, at least twelve households were selected from each selected crop in the reference year 2012-13 and representing different farm categories (marginal 0-1 ha, small 1-2 ha, semi-medium 2-4 ha, medium 4-10 ha and large more than 10 ha). From each mandal we selected at least 25 sample households in each

study crop. Further, for each study crop we have collected data on marketable and marketed surplus for study crops of paddy, maize and gram. The entire sampling frame work is presented in Table 2.2.

Table 2.2
List of Selected Districts, Blocks, Villages & Number of Sample HHs. in Andhra Pradesh State.

S.No	Agro-Climatic Zone	Selected				MF	SF	SMF	MDF	LF	All
		District	Block/Mandal	Crop	Villages						
1	Godavari zone	West Godavari	Pedda padu	Paddy	Kajigudem	5	5	5	6	4	25
					Kotturu	5	5	5	6	4	25
			Pedavegi	Paddy	Kuchumpudi	5	5	5	6	4	25
					Koppulavarigudem	5	5	5	6	4	25
			Pedavegi	Maize	Kuchumpudi	4	4	4	4	2	18
					Koppulavarigudem	4	4	4	4	3	19
			Chintalapudi	Maize	Yerrapalem	4	4	4	4	3	19
					Velagalapudi	4	4	4	4	3	19
			District Total			**36**	**36**	**36**	**40**	**27**	**175**
2	Krishna Zone	Guntur	Tenali	Paddy	Angalakudhuru	5	5	5	6	4	25
					Kolakaluru	5	5	5	6	4	25
			Tenali	Maize	Angalakudhuru	4	4	4	4	3	19
					Kolakaluru	4	4	4	4	2	18
			Duggirala	Paddy	Eemani	9	9	9	10	6	43
					K.R.Konduru	5	5	5	6	4	25
			Duggirala	Maize	Eemani	5	5	5	6	4	25
					K.R.Konduru	4	4	4	4	3	19
			Chilakaluripeta	Bengal Gram	Gudevaripalem	4	4	4	4	3	19
					Pasumarru	2	2	2	3	3	12
			Yeddalapadu	Bengal Gram	Thurlapadu	2	2	3	3	3	13
					Sadhikudi	2	2	2	3	3	12
			District Total			**44**	**44**	**46**	**52**	**39**	**225**
3	Scarce Rainfall Zone	Kurnool	Uyyalawada	Bengal Gram	Rupanagudi	2	2	3	3	3	13
					Alluru	2	2	2	3	3	12
			Kovelakuntla	Bengal Gram	Kovelakuntla	2	2	3	3	3	13
					Bheemunipadu	2	2	2	3	3	12
			District Total			**8**	**8**	**10**	**12**	**12**	**50**
4		**Total Sample Households**				**88**	**88**	**92**	**104**	**78**	**450**

Source: Field Survey

5. Crop-wise number of Selected Sample Households: Out of 450 total sample HHs from selected crops of paddy, maize and gram, 200 households belonged to Paddy growers, 150 households had grown maize and 100 households grown gram.

2.4 Data Collection:

I. Primary data: For household survey, the questionnaire was prepared by the coordinator CMA, IIM, Ahmedabad for generating primary data in respect of three selected crops Paddy, Maize and Gram. The household survey was conducted from 450 sample households from the selected farmers by interviewing personally the decision marker of selected households usually the head of HH. Out of 450 sample HH from selected crops of Paddy, Maize and Gram, 175 HH were selected from West Godavari district of which 100 were Paddy growers and 75 were Maize growers.

Out of 225 sample households that were selected from Guntur district, 100 were paddy growers 75 were maize growers and 50 gram growers. Further from Kurnool district 50 households had selected exclusively from gram crop. Category wise and crop-wise data on number of sample farmers in each district have been presented in Table 2.3. The collected data related to socio-economic aspects, educational background land holdings, cropping pattern, irrigation, production, quantity sold and marketing pattern, crop retention pattern, crop losses at post harvest stages, major factors influencing marketable and marketed surplus, access to credit and ware housing/storage facilities etc., Further opinions from selected farmers on various aspects related to marketing of crop production, storage etc., were also collected.

Table 2.3
District, Crops-wise & Category-wise Nos. of Selected Sample Farmers in Andhra Pradesh

S.No	District	Crop	MF	SF	SMF	MDF	LF	All
1	West Godavari	Paddy	20	20	20	24	16	100
		Maize	16	16	16	16	11	75
2	Guntur	Paddy	20	20	20	24	16	100
		Maize	16	16	16	16	11	75
		B.Gram	8	8	10	12	12	50
3	Kurnool	B.Gram	8	8	10	12	12	50
Grand total			88	88	92	104	78	450

Source: Field Survey

II Secondary data: Needed secondary data were collected from the Commissionrate of Agriculture Marketing society, Government of Andhra Pradesh, Hyderabad. Various issues of statistical abstracts, Government of Andhra Pradesh, land Websites of Andhra Pradesh Government and Central Government various issues of Season and Crop reports, State Focus

papers and district hand books etc., were published by Directorate of Economics and Statistics, Government of Andhra Pradesh.

2.5 Reference Year: Agricultural Year 2012-13 was selected as reference year

2.6 Concepts and Definitions:

It is always desirable, which clearly states the definitions of various concepts used in the study.

1. **Marketed Surplus**: Marketed Surplus refers to the quantity of produce actually marketed by the producer. Marketed surplus is more than the marketable surplus since the farmer retains a smaller quantity of produce than his actual family consumption needs and farm requirements. This is true especially in the case of small and marginal farmers, where the need for cash is immediate for discharging immediate liabilities and for purchasing of their family necessaries. This is termed as a forced sale. Such farmers generally buy the produce from the market in a later period to meet their requirements. Marketed Surplus is less than the Marketable Surplus, in the case of farmers with large land holdings with better retention capacity and they do so in anticipation of getting higher prices in future (Acharya and Agarwall 2004).

2. **Marketable Surplus**: Marketable Surplus represents the surplus which the farmer/producer has released with himself for disposal once the genuine requirements of the farmer for family consumption are met. Payment of wages in kind, feed, seed, wastages and purchases have also to be met from this Marketable Surplus. The marketable surplus is computed by the following formula.

   M S = P - C

   Where MS = Marketable Surplus

   P = Gross production in the year

   C = Total requirements in the same year for family consumption (Retention + Purchase) payment of wages in kind, feed, seed, barter, payment of loan, physical losses such as wastage in storage/transportation/threshing.

3. **Self Consumption**: For Marketable Surplus, it refers to the quantity that ought to be retained by farm family for its self-consumption depending on the consumption habits of the family.
4. **Retention**: Farmers' needs include family consumption, payment of wages in kind, seed, feed and wastage and other socio-economic conditions of the farm family.

5. **Losses:** Physical losses are estimated in the process of post harvest stages in harvesting, threshing and winnowing, storage and transportation of the selected crops of Paddy, Maize and Gram.

2.7 Methodology:

The study based on both secondary and primary data. The primary data for the study was collected through a multi-stage stratified sampling method. In the first stage, out of twenty three districts three districts were selected for household survey namely West Godavari, Guntur and Kurnool as sample districts for the study crops of Paddy, Maize and Gram in the states. So, the study findings are based on the field data generated from 450 sample households drawn from 18 selected villages from those three sample districts. The definitions used in this study are Marketable and Marketed Surplus of Rice, Maize, Bengal gram mentioned in the section 2.6. The measurement of the above said definitions is clearly mentioned and analysed in section 4.13 to 4.15 of Chapter IV. The data of 450 sample households are tabulated and analysed to study the Marketed and Marketable Surplus of major food grains by farm size and to identify factors effecting them. Also each farm category of HHs are pooled together crop wise also. No separate analysis was attempted at district levels. The tabular analysis among farm size categories is done to examine the effect of particular factors on Marketable and Marketed Surplus. The multiple regression analysis has been undertaken as an analytical tool for state level regression analysis. The household data was collected from only one agricultural year (2012-13).

2.8 Organization of Study Report:

The study is divided into five chapters. Chapter one presents introduction, concepts of Marketable and Marketed Surplus, relevance of the study and main objectives of the study. Second chapter deals with the methodology used for selected on districts/mandals/villages and sample households, sample size. Moreover the details of sample crops covered, data base, analytical and conceptual frame work and concepts used in the study area are presented.

Chapter three presents an over view of agriculture in the state of Andhra Pradesh and selected districts. Major trends in area, production and productivity of selected crops in the state and selected districts were estimated using time series data. In addition major trends in consumption of major inputs and services such as HYV's, irrigation, fertilizer consumption credit etc in state. Chapter four presents the socio economic back ground of surveyed households and different farm size categories. It also studied the operational holding characters, cropping pattern of sample HH cropping intensity, crop productivity, investment on farm machinery, retention pattern of selected crops, production and harvesting losses at different stages are estimated. Further the relationship of Marketed and Marketed Surplus have been analysed and identified the major factors influencing Marketable Surplus of sample HH. Lastly chapter five presents the summary and implications.

CHAPTER – III

OVER VIEW OF FOOD GRAINS ECONOMY OF STATE AND SELECTED DISTRICTS

This chapter has discussed particularly marketed and marketable surplus of major food grain production for the state as well as selected districts of West Godavari, Guntur and Kurnool in Andhra Pradesh. The marketable and marketed surplus of food grains depends on several variables such as crop output, productivity, retention pattern, market pRices, tastes and habits of the population in a particular region/district etc. Moreover, production and productivity is a function of many agro-climatic conditions particularly rainfall, soil fertility, irrigation availability, input used, prevailing agricultural practices like using technology etc. All the above agricultural Non-agricultural characters influence directly or indirectly the marketable and marketed surplus of food grains in selected districts. Therefore some aspects such as land use pattern, distribution of operational holdings, according to size, irrigation, cropping pattern trends in area, production and productivity of selected districts and crops fertilizer consumption, HYV seeds, institutional credit, crop insurance, agriculture market yards, ware housing/storage facilities and structural transformation of the state economy and per capita income etc., have been discussed.

I. Andhra Pradesh: Andhra Pradesh is a major state ranking 4th and 5th interms of geographical area and production among Indian states. Predominantly an agrarian with more than three fourths of its work force engaged in agriculture sector. As per 2011 census population of the state was 8.47 crore (Table 3.1). The state is situated between 12^{o}41 and 22 ^{o}N latitude and 77 ^{o} and 84 ^{o}40E longitudes. It is bounded by the states of Orissa, Tamilnadu, Karnataka and Maharashtra. Andhra Pradesh falls under the 10th and 11th agro climatic zones as per 15 agro-climatic zones classified by the planning commission, Government of India. The state comprising three regions consisting 14 districts of Rayalaseeema and Telangana from a part of the Southern plateau and Hill zone (Zone 10) with 9 coastal districts from part of the East-Coast plain and Hill zone (zone 11). Administratively Andhra Pradesh state is divided into 23 districts comprised of 9 coastal districts, 4 Rayalaseema and 10 Telangana districts. The state has the second largest coast line (974 km) among all the littoral states in India. South west and North West monsoons are the two important periodic winds, which are the main sources of rain in the state. The state is endowed with many major rivers

Table 3.1
Vital Statistics of Selected Districts and State – 2010-11

S.No	Particulars	Unit	Selected Districts			Andhra Pradesh
			West Godavari	Guntur	Kurnool	
1	Area Covered	000Sq.kms	7.74	11.39	17.7	275.0
2	Population	Lakh	39.35	48.89	40.47	846.66
3	Location					
	i) N. Latitudes		$16^0$15′ and $17^0$30′N	$15^0$18′ and $16^0$50′N	14^0 54 ` & 16^0 18′ N	12°41' and 22°N
	ii) E Longitudes		$80^0$50′ and $81^0$55′E	$79^0$10′ and $80^0$55′E	76 ^{0} 58′ & 79 ^{0} 34′ E	77° and 84°40'E
4	Temperature (2008-10)					
	i) Minimum	C^0	-	23.93	23.65	-
	ii) Maximum	C^0	-	32.78	34.56	-
5	Rainfall					
	i) Normal	mm	1153.0	853.0	670.5	940.1
	ii) Actual	mm	1623.4	1357.6	809.8	1227.0
6	Soil type		Alluvial, Sandy alluvial, Deltaic alluvial, Coastal sandy loams	Black Cotton Soils, Red Soils, Coastal Sandy Soils,	Black soils, Red Soils	Alluvial Soils, Black Soils, Red Soils, Lateritic Soils
7	Land Use Pattern (2010-11)					
	i) Total Geographical Area	Ha.	774200	1139100	1765800	27504500
	ii) Forest Area	Ha.	81166	161941	340669	6229899
	iii) Net Sown Area	Ha.	480122	643546	889427	11288211
	iv) Area sown more than once	Ha.	288241	228536	131583	3325790
	v) Gross Cropped Area	Ha.	768363	872082	1021010	14614001
8	Cropping Intensity	%	1.60	1.36	1.15	1.29
9	Irrigation					
	i) Net Irrigated Area		393062	400821	230900	5033712
	ii) Gross Irrigated Area		673127	514144	288639	7153120
	iii) Irrigation Intensity		1.71	1.28	1.25	1.42
	iv) % of NIA to NSA		81.87	62.28	25.96	44.59
	v) % of GIA to GCA		87.61	58.96	28.27	48.95
10	Source wise Irrigation as % to GIA (2010-11)					
	i) Tanks	%	2.87	1.05	4.69	9.09
	ii) Canals	%	27.76	58.55	35.07	24.42
	iii) Dug Well/Tube wells	%	26.35	15.06	35.45	34.41
	iv) Others	%	1.41	3.29	4.78	2.46
11	Fertilizers Nutrients (NPK) Consumption (2009-10)	tonnes	255103	302022	230222	3056756
12	Important crops					
	i) Cereals		Rice, Maize, Jowar,	Rice, Maize, Jowar,Bajra	Rice, Maize, Bajra	Rice, wheat, Maize, Jowar, Bajra, Ragi
	ii) Pulses		Green gram, Black gram, Red gram, Cow gram, horse gram	Green gram, Black gram, Red gram, Bengal gram,	Bengal gram, Red gram, Green gram	Green gram, Black gram, Red gram, Bengal gram, Cow gram, horse gram
	iii) oil seeds		Ground nut, Sesamum, Sunflower, coconut,	Ground nut, Sesamum, Rape& masturd, castor	Groundnut, Sunflower, Castor,	Ground nut, Sesamum, Sunflower, coconut, Rape& masturd, castor
	iv) Others		Chillies, turmeric, sugarcane, mangos, banana, cashew nut, Cotton, tobacco,	Chillies, turmeric, sugarcane, mangos, banana, Cotton, tobacco, onions	Mango, banana, Orange& Batavian, Chillies, Tomato, Bhendi, Brinjal, Coriander, turmeric,	Chillies, turmeric, sugarcane, mangos, banana, cashew nut, Cotton, tobacco, onions

Source: Various issues of Statistical abstracts of Andhra Pradesh, Directorate of Economics and Statistics, Govt. of Andhra Pradesh, Hyderabad

like Godavari, Krishna, Vamsadhara and Pennar. A part from these, there is 37 tributes and other minor rivers flowing through the state. The state received the actual rain fall of 1227.0 mm as against the normal rainfall of 940.1 mm during 2010-11. The total surface water of entire river system of the state is estimated to be of the order of 2746 thousand million cubic feet (TMC) at 75 per cent dependability. The state has tropical to sub tropical climate. In the coastal area, humid to semi-humid conditions prevail in the interior plateau areas have hot summers with relatively pleasant winter.

II Selected Districts: Table 3.1 revealed that the basic data on selected districts of area coverage, population, temperature, rainfall, longitude ,latitude, cropping intensity, irrigation and source of irrigation and important crops etc. Among the selected districts, Kurnool has highest area coverage of 17.70 sq/km followed by Guntur, 11.39 and West Godavari 7.74 thousand sq/km, whereas Guntur district has the highest population of 48.89 lakh and West Godavari reported lowest population 39.35 lakhs. Among the selected districts in the state Guntur and West Godavari districts are irrigated areas by canals compared to the district of Kurnool. Among the selected districts there is a considerable variation in amount of actual and normal rainfall. The normal annual rainfall is highest 1153.0 mm in West Godavari district followed by Guntur 853.0 m.m. and 670.5mm in Kurnool during the 2010-11. Actual rainfall in three selected districts was far better as compared to normal rainfall in the state. Rice is a major food crop and also it is a staple food in the state of all three selected districts. Among these three districts Guntur is a highest area irrigated by canals followed by Kurnool 35.07 per cent and West Godavari 27.76 per cent (2010-11).

3.2 Land Use Patterns: Table 3.1 presented the land use pattern in Andhra Pradesh and selected districts for the year 2010-11. Out of total geographical area of 275.04 lakh hectares, forests occupied at 22.7 per cent. The Net Sown Area was 112.88 lakh hectares accounting for about 41 per cent of total geographical area. The Gross Cropped Area was 146.14 lakh hectares, out of which 33.25 lakh hectares (22.75%) was sown more than once. The cropping intensity in the state worked out at 1.29 per cent in the state (2010-11).

Selected Districts: Land use pattern of Kurnool district is characterized by large scale area covered under forests and barren lands. Net Sown area is also highest 8.89 lakh hectares compared to other two sample districts of West Godavari 4.80 lakh hectares and Guntur 6.44 lakh hectares whereas area shown more than once cropped area is lowest 1.31 lakh hectares

against other two sample districts due to low irrigation facilities and climate conditions. The cropping intensity of West Godavari and Guntur districts are higher than the state average and the district of Kurnool reported lowest at 1.15 per cent in the state. Moreover, Gross and Net irrigated area of West Godavari and Guntur districts are more than the district of Kurnool, due to the Godavari and Krishna (Perennial rivers) rivers are flow through these two districts. Among these sample districts canal irrigation covered the largest area in Guntur district of Andhra Pradesh state.

3.3 Irrigation and Sources of Irrigation:

i. STATE:

The Gross area irrigated by all sources in the state during 2010-11 stood at 71.53 lakh hectares. This is accounted for about 49 per cent of the Gross cropped area. Large scale irrigation in the state is mainly through development of surface water resources. The surface water based schemes like diversions, structures, lift irrigation and canals. The Net and Gross irrigated area and irrigation intensity in the selected districts and state for the year 2010-11 has been presented in Table 3.1. The state NSA was 1,12,88,211 hectares, out of which 50,33,712 hectares was NIA by various sources accounting for about 44.59 per cent. The major sources of irrigation mainly tube wells and canals, accounting for about 34.4 and 24.42 per cent respectively in the state.

ii. SELECTED DISTRICTS:

Among selected districts, very wide fluctuations noticed in per centage of NIA to NSA owing to variation in rainfall and non-availability of water resources. In the selected district of West Godavari the share of NIA to NSA reported was highest in irrigated area, accounting for about 81.87 per cent followed by Guntur 62.28 per cent and 25.96 per cent in Kurnool district. Kurnool district revealed the lowest share of net irrigated area compared to other two selected districts in the state (2010-11) due to low rainfall and inadequate irrigation facilities. These led to drought conditions in the district and the rest of the area was rainfed. The irrigation intensity was found to be highest in West Godavari 1.71 per cent followed by Guntur 1.28 and 1.25 per cent in Kurnool district in Andhra Pradesh (2010-11).

3.4 Cropping Pattern and Crop-wise Area Irrigated in State and selected Districts:

Table 3.2 reveals the cropping pattern and crop wise area and irrigated area share of total gross cropped area in the state and selected districts. Among the crops, Cereals crops grown area occupied 39.86 per cent of the total cropped area followed by Oilseeds 18.15 per cent. Pulses 14.27 per cent and Cotton 11.35 per cent of the total cropped area in the state. Out of total GCA, 54.12 per cent claimed by food grains crops, this indicates that Andhra Pradesh is a leading state in food grains production. With respect to area under agriculture sector, there is a shift in cropping pattern from food to non-food crops in the state. Among the cereals crops Paddy is the major cereal crop i.e. 77.16 per cent over total cereal crop area and it has 30.75 per cent of total cropped area (GCA) of the state. Maize is another important Kharif cereals crop covering 5.81 per cent of states total cropped area. Cereal crops of Jowar, Bajra and Ragi are attained a small extent of area of total cropped area against the Paddy and Maize crops area in the state. Among pulses Bengal gram, Red gram and Black gram are important crops covering 4.49, 3.78 and 3.01 per cent area of GCA respectively. The food grain crops area reported the largest area in the cropping pattern covering 66.40 per cent of GCA. Among Oilseeds Groundnut and Sunflower claimed 11.47 and 2.43 per cent of GCA respectively. Moreover, Cotton and Sugarcane crops area also important commercial crops and attained 11.35 and 1.69 per cent of GCA in the state. The area of horticultural crops like fruits, vegetables and plantation crops are also occupied a prominent place in agricultural sector of Andhra Pradesh (2010-11).

Among selected crops, Rice and Maize are the important crops, which are generally grown in the state under irrigated conditions. The percentage of area irrigated for these crops are 97.13 per cent and 47.70 per cent respectively. Pulse crops of Horse gram, Green gram, Black gram, Red gram, Bengal gram and Cow gram are other important Oilseed crops. Groundnut, Sesamum and Sunflower are generally grown in unirrigated lands in the state.

II Selected Districts:

Further Table 3.2 presented the area under major crops and crop wise irrigation pattern of selected districts have been analysed.

Table 3.2

Cropping Pattern and Crop wise Irrigation Coverage in Selected Districts and State in TE 2010-11

(Area in Hectares)

S.No	Crops	Selected Districts						Andhra Pradesh	
		West Godavari		Guntur		Kurnool			
		Area	% IA	Area	% IA	Area	% IA	Area	% IA
1	Paddy	411850 (59.67)	99.65	321727 (38.70)	100.00	125069 (12.42)	99.88	4193087 (30.75)	97.13
2	Jowar	232 (0.03)	0.00	4246 (0.51)	5.45	64541 (6.41)	28.61	305912 (2.24)	9.17
3	Bajra	0	0.00	499 (0.06)	5.87	7530 (0.75)	3.80	57264 (0.42)	34.92
4	Maize	46555 (6.75)	98.56	82004 (9.86)	79.12	18824 (1.87)	57.58	792679 (5.81)	47.70
5	Ragi	0	0.00	0	0.00	2 (0.00)	0.00	45857 (0.34)	18.26
6	Total Cereals	458637 (66.45)	99.49	408519 (49.13)	94.70	224314 (22.28)	69.03	5434435 (39.86)	83.13
7	Horse Gram	334 (0.05)	0.00	26 (0.00)	0.00	1163 (0.12)	0.03	45480 (0.33)	0.81
8	Green gram	2694 (0.39)	0.67	10212 (1.23)	0.02	3775 (0.37)	21.33	334740 (2.46)	1.66
9	Black gram	14275 (2.07)	12.73	57663 (6.94)	0.11	10069 (1.00)	41.29	410446 (3.01)	2.56
10	Red gram	658 (0.10)	0.96	25909 (3.12)	0.90	44851 (4.45)	5.21	514701 (3.78)	1.18
11	Bengal gram	67 (0.01)	0.00	10459 (1.26)	0.05	226983 (22.54)	1.08	612332 (4.49)	1.46
12	Cow gram	398 (0.06)	0.00	1 (0.00)	0.00	53 (0.01)	0.00	20994 (0.15)	9.92
13	Total Pulses	18426 (2.67)	9.99	104271 (12.54)	0.29	286894 (28.49)	3.41	1944994 (14.27)	2.03
14	Total Food Grains	477064 (69.12)	96.04	512789 (61.68)	75.51	511208 (50.77)	32.20	7379429 (54.12)	61.76
15	Turmeric	184 (0.03)	100.00	4837 (0.58)	100.00	1285 (0.13)	100.00	63414 (0.47)	96.66
16	Chiillies	1946 (0.28)	100.00	65091 (7.83)	76.01	12568 (1.25)	84.17	201791 (1.48)	83.73
17	Mango	12556 (1.82)	0.00	840 (0.10)	0.00	3899 (0.39)	0.00	367749 (2.70)	0.00
18	Total Food Crops	593720 (86.02)	89.88	610623 (73.44)	76.54	398263 (39.55)	52.34	9052691 (66.40)	62.34
19	Cotton	3330 (0.48)	59.32	162622 (19.56)	14.97	37752 (3.75)	21.85	1547454 (11.35)	17.14
20	Ground nut	7588 (1.10)	98.96	4611 (0.55)	28.17	205464 (20.41)	12.47	1563180 (11.47)	19.44
21	Sesamum	1189 (0.17)	65.36	3084 (0.37)	0.00	597 (0.06)	80.41	98594 (0.72)	16.88
22	Sunflower	2359 (0.34)	33.06	58 (0.01)	11.49	121125 (12.03)	0.00	331474 (2.43)	16.29
23	Total Oil Seeds	53888 (7.81)	99.01	10187 (1.23)	13.85	372846 (37.03)	13.19	2474468 (18.15)	22.01
24	Gross Cropped Area	690175 (100.00)	90.10	831424 (100.00)	59.62	1006887 (100.00)	26.94	13634271 (100.00)	48.06

Source: Various issues of Statistical Abstract of Andhra Pradesh, Directorate of Economics and Statistics, Govt. of Andhra Pradesh, Hyderabad

Note: Figures in brackets indicates per centage of individual cropped area to total cropped area.

WEST GODAVARI: In the West Godavari district 66.45 per cent of area occupied to total GCA by cereals. Area under pulses was only 2.67 per cent. So the largest grown area reported from cereal crops, Paddy is the major cereal crop followed by Maize both together accounted for about 66.42 per cent of GCA besides above 99 per cent of grown area under irrigation. The pulse crops area grown in the district reported very small scale. Black gram is the important pulse crop accounted for only 2.07 per cent of GCA. Among Oilseed crops Groundnut crop only important crop and it claimed highest 98.96 per cent of area grown under irrigation conditions.

GUNTUR: Table 3.2 reveals that Paddy and Maize are two important cereal crops area covered 49.13 per cent of GCA. Major pulses are grown in the district are Black gram, Red gram and Bengal gram and the area reported 6.94, 3.12 and 1.26 per cent of GCA respectively, these pulse crops area grown under unirrigated conditions. Whereas Paddy and Maize crops cultivated under 100 per cent and 79 per cent irrigated area in Guntur district. The total food grain crops area occupied 61.68 per cent of GCA followed by Cotton 19.56 per cent and chillies in Guntur district. The Cotton is an important crop only 14.97 per cent of grown area irrigated. Whereas the oil seeds crop area reported grown in the district is very small scale and claimed only 1.23 per cent of GCA and only 13.85 per cent of Oilseed grown area irrigated in the district. About plantation crops of Chilli and Turmeric area grown mostly irrigated in Guntur district.

KURNOOL: Among selected districts Kurnool has the largest GCA than other two districts and cereal crops grown area is lowest 22.28 per cent compared to grown area of pulse crops and Oilseeds crops accounted for 28.49 and 37.03 per cent of total GCA in the district. Among cereal crops Paddy is the main cereal crop followed by Jowar, Bajra and Maize. Bengal gram and Red gram crops are two important pulse crops and the area claiming 22.54 and 4.45 per cent of GCA. Besides Groundnut and Sunflower crops are the most important Oilseed crops, claimed an area share of 20.41 per cent and 12.03 per cent of GCA in Kurnool district.

3.5 Production and Yield of Selected crops in Districts and the State – 2010-11.

Table 3.3.depicted the area, production and yield of selected crops of the state as well as districts (TE 2010-11). Rice is the major cereal crop and the area found to be highest in West Godavari district 9.82 per cent followed by East Godavari (8.96 per cent) Krishna (8.64 per cent) and Guntur (7.67 per cent). These four districts have rich irrigated sources because

of Krishna and Godavari rivers which are perennial rivers. These four districts registered highest production of Rice compared to all other districts in the state. However the productivity of Rice in SPS Nellore district achieved the highest 3784 kg/ha followed by Prakasam and East Godavari in the state. All these districts belong to Coastal Andhra. Across the districts the district of Srikakulam Paddy productivity found to be remarkably lower comparatively over other districts in the state (2010-11).

Maize is another important major food grain crop grown in Andhra Pradesh state. The area under Maize crop reported the highest in Mahabubnagar district (14.48%) followed by Karimnagar and Medak districts of the state. These three districts are under Telangana region and mostly unirrigated lands in Andhra Pradesh state. Guntur district in Coastal Andhra Pradesh region reported the highest (22%) followed by Karimnagar (12.98%) and West Godavari (9.28 %) in the total Maize production in Andhra Pradesh state.

Further among the Maize productivity districts Guntur is the highest followed by Krishna and West Godavari districts in the state. The production and productivity of Maize crop is low but varying comparatively in the districts of Mahabubnagar and Medak districts, low due to unirrigated lands cultivated. Across the districts, significant variation is noticed in Maize yield particularly the districts of Mahabubnagar, Medak, Ranga Reddy and Nalgonda reported the lowest yield than other districts and also below the state average yield and all these districts are exclusively in the Telangana region of the state TE 2010-11.

Table 3.3

District wise Area, Production and Yield of Selected crops in Andhra Pradesh for TE 2010-11

Area in Ha, Prod in Tonns, Yield in Kg/ha

S.No	District	Selected Crops								
		Rice			Maize			Bengal gram		
		Area	Prod.	Yield	Area	Prod.	Yield	Area	Prod.	Yield
1	Srikakulam	199519 (4.76)	325700 (2.47)	1661	5260 (0.66)	33014 (0.91)	6177	15 (0.0)	25 (0.00)	1682
2	Vizianagaram	124145 (2.96)	299920 (2.28)	2403	17242 (2.18)	62658 (1.73)	3632	218 (0.04)	366 (0.05)	1682
3	Visakhapatnam	96010 (2.29)	149242 (1.13)	1494	7225 (0.91)	20719 (0.57)	2867	66 (0.01)	111 (0.01)	1682
4	East Godavari	375732 (8.96)	1297994 (9.86)	3548	8368 (1.06)	57911 (1.60)	6918	514 (0.08)	870 (0.11)	1682
5	West Godavari	411850 (9.82)	1401918 (10.65)	3404	46555 (5.87)	336220 (9.28)	7211	67 (0.01)	109 (0.01)	547
6	Krishna	362171 (8.64)	1242426 (9.44)	3426	22984 (2.90)	180164 (4.97)	7839	879 (0.14)	1479 (0.18)	1682
7	Guntur	321727 (7.67)	1021733 (7.76)	3184	82004 (10.35)	796747 (22.00)	9610	10459 (1.71)	18275 (2.26)	1712
8	Prakasam	139124 (3.32)	496949 (3.77)	3590	7323 (0.92)	52860 (1.46)	7182	87160 (14.23)	150057 (18.58)	1719
9	S.P.S Nellore	264946 (6.32)	1002130 (7.61)	3784	685 (0.09)	5122 (0.14)	7604	9987 (1.63)	12831 (1.59)	1288
10	Chittoor	57338 (1.37)	173383 (1.32)	3025	1749 (0.22)	10550 (0.29)	6092	20 (0.00)	25 (0.00)	810
11	Y.S.R. kadapha	66922 (1.60)	148639 (1.13)	2231	1611 (0.20)	11548 (0.32)	7110	72769 (11.88)	60798 (7.53)	847
12	Ananthapur	53392 (1.27)	154747 (1.18)	2901	12881 (1.62)	75112 (2.07)	5786	86744 (14.17)	83076 (10.29)	957
13	Kurnool	125069 (2.98)	396132 (3.01)	3183	18824 (2.37)	103405 (2.85)	5360	226983 (37.07)	309451 (38.31)	1361
14	Mahabubnagar	168430 (4.02)	456029 (3.46)	2711	114767 (14.48)	209206 (5.78)	1971	25334 (4.14)	38656 (4.79)	1527
15	Ranga Reddy	39941 (0.95)	106926 (0.81)	2695	28690 (3.62)	63852 (1.76)	2216	6765 (1.10)	8838 (1.09)	1306
16	Medak	117195 (2.79)	368352 (2.80)	3082	99404 (12.54)	227551 (6.28)	2338	38551 (6.30)	43718 (5.41)	1128
17	Nizamabad	177640 (4.24)	637634 (4.84)	3531	73485 (9.27)	321538 (8.88)	4392	26236 (4.28)	52485 (6.50)	1977
18	Adilabad	71986 (1.72)	184012 (1.40)	2477	23628 (2.98)	95261 (2.63)	3987	14949 (2.44)	21685 (2.68)	1442
19	Karimnagar	293267 (6.99)	1013749 (7.70)	3402	109357 (13.80)	470157 (12.98)	4277	2478 (0.40)	2513 (0.31)	1037
20	Warangal	207782 (4.96)	622244 (4.73)	2914	71752 (9.05)	268571 (7.41)	3713	1240 (0.20)	1035 (0.13)	828
21	Khammam	172050 (4.10)	535392 (4.07)	3086	36564 (4.61)	214954 (5.93)	5880	209 (0.03)	301 (0.04)	1459
22	Nalgonda	346852 (8.27)	1130997 (8.59)	3269	2323 (0.29)	4885 (0.13)	2203	691 (0.11)	1004 (0.12)	1459
23	Andhra Pradesh	4193087 (100.00)	13166238 (100.00)	3144	792679 (100.00)	3622005 (100.00)	4573	612332 (100.00)	807709 (100.00)	1318

Source: Various issues of Statistical Abstract of Andhra Pradesh, Directorate of Economics and Statistics, Govt. of Andhra Pradesh, Hyderabad

Table 3.3.1

Area, Production and Yield of Major Crops in Selected Districts of Andhra Pradesh for TE 2010-11

S.No	Crops		Selected Districts			Andhra Pradesh
			West Godavari	Guntur	Kurnool	
1	Paddy	A	411850 (9.82)	321727 (7.67)	125069 (2.98)	4193087
		P	1401918 (10.65)	1021733 (7.76)	396132 (3.01)	13166238
		Y	3404	3184	3183	3144
2	Jowar	A	232 (0.08)	4246 (1.39)	64541 (21.10)	305912
		P	785 (0.20)	26783 (6.80)	132999 (33.79)	393652
		Y	3179	6227	2057	1304
3	Bajra	A	0 ()	499 (0.87)	7530 (13.15)	57264
		P	0 ()	920 (1.28)	8374 (11.65)	71902
		Y	0	1210	1098	1238
4	Maize	A	46555 (5.87)	82004 (10.35)	18824 (2.37)	792679
		P	336220 (9.28)	796747 (22.00)	103405 (2.85)	3622005
		Y	7211	9610	5360	4573
5	Total cereals	A	458637 (8.44)	408519 (7.52)	224314 (4.13)	5434435
		P	1738922 (10.03)	1846229 (10.65)	647480 (3.73)	17337874
		Y	N.A	N.A	0	N.A
6	Green gram	A	2694 (0.80)	10212 (3.05)	3775 (1.13)	334740
		P	1410 (1.16)	3391 (2.79)	1211 (1.00)	121577
		Y	527	456	330	356
7	Black gram	A	14275 (3.48)	57663 (14.05)	10069 (2.45)	410446
		P	3819 (1.54)	32563 (13.15)	5044 (2.04)	247601
		Y	304	564	509	608
8	Red gram	A	658 (0.13)	25909 (5.03)	44851 (8.71)	514701
		P	389 (0.17)	27085 (12.13)	19293 (8.64)	223229
		Y	548	1068	428	436
9	Bengal gram	A	67 (0.01)	10459 (1.71)	226983 (37.07)	612332
		P	109 (0.01)	18275 (2.26)	309451 (38.31)	807709
		Y	547	1712	1361	1318
10	Total pulses	A	18426 (0.95)	104271 (5.36)	286894 (14.75)	1944994
		P	6043 (0.42)	81331 (5.65)	335786 (23.32)	1440138
		Y	N.A	N.A	0	N.A
11	Total food grains	A	477064 (6.46)	512789 (6.95)	511208 (6.98)	7379429

		P	1673260 (9.67)	1624015 (9.38)	983266 (5.68)	17309984
		Y	N.A	N.A	0	N.A
12	**Chillies**	A	1946 (0.96)	65091 (32.26)	12568 (6.23)	201791
		P	3520 (0.59)	246831 (41.14)	32012 (5.34)	599966
		Y	2326	4575	0	3697
13	**Sugarcane**	A	33263 (14.47)	758 (0.33)	1400 (0.61)	229812
		P	256061 (17.98)	5973 (0.42)	12773 (0.09)	1423343
		Y	10058	8850	9069	7804
14	**Mango**	A	12556 (3.41)	840 (0.23)	3899 (1.06)	367749
		P	103442 (4.47)	5071 (0.22)	31367 (1.35)	2316554
		Y	N.A	N.A	0	N.A
15	**Ground nut**	A	7588 (0.49)	4611 (0.29)	205464 (13.14)	1563180
		P	15107 (1.32)	12111 (1.06)	150273 (13.12)	1145634
		Y	2021	2636	736	741
16	**Sesamum**	A	1189 (1.21)	3084 (3.13)	597 (0.61)	98594
		P	241 (1.10)	715 (3.27)	204 (0.93)	21889
		Y	201	342	346	224
17	**Sunflower**	A	2359 (0.71)	58 (0.02)	121125 (36.54)	331474
		P	2390 (0.95)	60 (0.02)	86964 (34.67)	250814
		Y	1080	1082	0	748
18	**Coconut**	A	21057 (20.15)	145 (0.14)	56 (0.05)	104478
		P	353111215 (31.72)	1551645 (0.14)	96949 (0.01)	1113218281
		Y	N.A	N.A	0	N.A
19	**Total oil seeds**	A	53888 (2.18)	10187 (0.41)	372846 (15.07)	2474468
		P	481789 (19.14)	14609 (0.58)	274403 (10.90)	2516974
		Y	N.A	N.A	0	N.A
20	**Cotton**	A	3330 (0.22)	162622 (10.51)	37752 (2.44)	1547454
		P	9902 (0.28)	523569 (14.69)	68933 (1.93)	3563629
		Y	514	550	304	393
21	**Tobacco**	A	28817 (16.39)	6528 (3.71)	14127 (8.04)	175807
		P	54884 (17.24)	15893 (4.99)	23799 (7.48)	318343
		Y	2592	3392	1682	1810

Source: Various issues of Statistical Abstract of Andhra Pradesh, Directorate of Economics And Statistics, Govt. of Andhra Pradesh, Hyderabad

Bengal gram is a very important Rabi crop and it is grown on large scale in the districts of Kurnool, Prakasam and Ananthapur. In terms of area under gram, Kurnool district has highest grown area 37.07 per cent followed by Prakasam 14.23 per cent, Ananthapur 14.17 per cent and YSR Kadapa 11.88 per cent of total gram crop area in the state. These four districts grown area covered 77.35 per cent of total Bengal gram crop area in the state. Incidentally these four districts are also leading gram cop production, and share of these four districts is 74.7 per cent to total gram production in the state. In the case of productivity Nizamabad district reported the highest 1977 kg/ha followed by Prakasam 1719 Kg/ha and Guntur 1712 kg/ha respectively in the state of Andhra Pradesh.

2) Area, Production and yield of Major crops in Selected Districts:

Table 3.3.1 presents data on area, production and yield of major crops in selected districts and state. For each crop, grown area and yield depends on two major factors, namely irrigation and land fertility. The area, production and yield under Paddy and Maize crops in West Godavari and Guntur districts are much higher than Kurnool district. This was due to large scale irrigation facilities and soil fertility. But cereal crops like Jowar and Bajra are grown more in Kurnool district against the other two selected districts of West Godavari and Guntur district (TE 2010-11). The area and production of total Cereal crops share found to be higher in selected districts of West Godavari and Guntur. In the case of total pulse crops Kurnool district found to be much higher which constituted 37.07 per cent in crop area and 38.31 per cent in production. Horticultural crops like chillie grown area and production is higher in Guntur district. In the case of Oilseeds Groundnut and Sunflower grown area and production share achieved much higher in Kurnool district against the other two selected districts of the state.

3.6 Trend Rates of Growth in Area(A) Production (P) and Yield(Y) of crops/crop groups in the State- (1991-2011):

Study crops of Rice, Maize and Bengal gram and crop groups (Cereals, Pulses, total food grains and total Oilseeds) in area, production trends and performance have been analysed using Annual Compound Growth Rates (CAGR) for the period 1991-2011. Further, the time series period 1991-2001 was divided into two sub periods. 1991-92 to 2000-01 (period I) and 2001-2011 (period II). The CAGR is estimated by fitting a log-linear Regression trend to the

time series data. The CAGR provides the accurate estimates of average annual CAGR during the period with using all observations in the time series data set. Further to know the changeableness and instability in area, production and yield, co-efficient of variation (CV) was also estimated and presented in table 3.4.

High co-efficient of variation (CV) for area and production reported for Maize and Bengal gram crops in the state due to frequent changes occurred in area and production in many years for our study (Table 3.4). Moreover least changes have been observed in Rice crop under area and production in Andhra Pradesh state between 1990-91 – 2010-11. The CV for productivity of Rice suggests lower instability compared to Maize and Bengal gram crops. Very high CV as observed for Bengal gram and Maize crop productivity indicates that lot of changes might have happend like high fluctuations due to increase in area, availability of high yielding seeds, pricing and marketing area the major causes.

The instability in production under Rice crop was due to several factors like high cost of cultivation, labour scarcity, low level of technology input costs, natural calamities and the causes for low productivity leads to crop holiday as observed by the farmers in the state. Moreover changes have been occurred from traditional crops to commercial crops in the state. But the variability under Rice production is low compared to other two selected crops of Maize and Bengal gram in the state. About Maize and gram crops, CV for area, production and yield reported high due to dry land cultivation, low cost of cultivation, high yielding etc., Therefore the area has been fluctuating for these two crops of Maize and Bengal gram and the CV is very high compared to Rice crop in Andhra Pradesh.

Table 3.4

CAGR of Area, Production and Yield of Selected Crops in Andhra Pradesh 1990-91 to 2010-11

(Area in Ha, Prod in Lakh. M.T, Yield in Kg/ha)

S.No	Year	Rice			Maize			Bengal gram			Total Cereals			Total Pulses			Total Food Grains			Total Oil Seeds		
		Area	Prod.	Yield	Area	Prod.	Yield	Area	Prod.	Yield	Area	Prod.	Yield	Area	Prod.	Yield	Area	Prod.	Yield	Area	Prod.	Yield
1	1991-92	3936	9249	2350	5786	10914	1886	2853	1406	493	8640	12319	1426	3330	2490	748	317	635	2001	64	47	734
2	1992-93	3604	8792	2439	5413	10919	2017	2771	1364	492	8184	12283	1501	3147	2313	735	322	856	2660	60	28	468
3	1993-94	3547	9562	2696	5312	11577	2179	2692	1176	437	8004	12752	1593	3246	2900	893	304	776	2553	89	65	731
4	1994-95	3638	9277	2550	5279	11111	2105	2699	1102	408	7977	12213	1531	3100	2110	681	321	859	2678	168	136	809
5	1995-96	3692	9014	2441	5282	10895	2063	2746	1358	495	8028	12254	1526	3143	3040	967	333	877	2632	113	71	630
6	1996-97	4109	10686	2601	5671	12837	2264	1616	838	519	7287	13675	1877	2986	2396	803	361	1190	3296	106	90	853
7	1997-98	3500	8510	2431	4956	10307	2080	1565	607	388	6521	10914	1674	2597	1424	548	396	1083	2735	147	59	398
8	1998-99	4316	11878	2752	5783	14078	2434	1587	827	521	7370	14905	2022	2747	2466	898	399	1383	3466	146	130	890
9	1999-2000	4014	10638	2650	5493	12896	2348	1645	800	486	7138	13696	1919	2566	1383	539	452	1472	3257	163	95	583
10	2000-01	4243	12458	2936	5771	14975	2595	1902	1054	554	7673	16029	2089	2708	2511	927	528	1581	2994	201	229	1139
11	2001-02	3825	11390	2978	5136	13698	2667	1920	1138	593	7056	14836	2102	2441	1614	661	428	1457	3404	285	363	1274
12	2002-03	2822	7327	2596	4189	9592	2290	2100	1062	506	6289	10654	1694	2316	1256	543	526	1486	2825	390	382	979
13	2003-04	2975	8953	3009	4622	12458	2695	2185	1239	567	6807	13697	2012	2546	1614	634	721	2477	3436	422	457	1083
14	2004-05	3086	9601	3111	4463	12377	2773	1804	1019	565	6267	13396	2138	2918	2209	757	657	2064	3142	341	345	1012
15	2005-06	3982	11704	2939	5386	15575	2892	1782	1376	772	7168	16951	2365	2922	2041	698	758	3087	4073	394	627	1591
16	2006-07	3978	11872	2984	5290	14882	2813	1984	1347	679	7274	16229	2231	2235	1362	609	725	2462	3396	602	653	1085
17	2007-08	3984	13324	3344	5274	17606	3338	2113	1697	803	7387	19303	2613	2657	3390	1276	786	3621	4607	630	912	1448
18	2008-09	4387	14241	3246	5671	18973	3346	1771	1448	818	7442	20421	2744	2599	2189	842	852	4152	4873	607	857	1412
19	2009-10	3441	10538	3062	4734	13866	2929	1932	1429	740	6666	15295	2294	2072	1500	724	783	2762	3527	647	846	1308
20	2010-11	4751	14418	3035	5898	18875	3200	2132	1440	675	8030	20315	2530	2319	1996	861	744	3956	5317	584	720	1233
CAGR for 1991-92 to 2000-01		1.95	2.82	2.76	6.78	9.85	3.62	4.73	3.09	0.80	0.39	2.94	4.97	-3.99	-2.61	0.84	-2.84	2.15	6.19	-5.88	-1.22	-0.26
CAGR for 2001-02 to 2010-11		2.38	2.64	1.76	3.66	4.70	3.10	5.01	4.88	1.32	2.14	3.10	3.63	-0.07	3.21	2.95	2.10	3.19	3.37	-0.81	1.05	1.90
CAGR for 1991-92 to 2010-11		0.55	3.12	7.38	14.81	16.26	6.90	15.72	12.54	5.05	-0.86	4.66	11.78	-2.18	1.66	6.55	-2.23	4.64	9.77	-5.20	-1.34	0.31
CV (%)		12.80	18.36	10.46	36.43	57.88	24.82	68.76	86.97	34.15	8.9	20.4	17.6	20.7	23.1	22.5	8.9	19.7	19.7	13.2	28.5	23.0

Source: Various issues of Statistical Abstract of Andhra Pradesh, Directorate of Economics and Statistics, Govt. of Andhra Pradesh, Hyderabad

Further table 3.4 revealed the estimated CAGR for area production and yield for selected crops of Rice, Maize and Bengal gram. The estimated CAGR production and yield for Rice crop was higher for combined period in the state (1991-2011) whereas the growth rate in area of the state has grown at less than one per cent 0.55%. But yield registered CAGR is 7.38 per cent per annum. Therefore higher growth rate of yield was reported under Rice crop in A.P. during the period 1991-92 to 2010-11. Rice crop yield and its production growth rate are higher than area growth rate during the period I due to availability of HYV seeds and extension of the irrigation facilities (1990-91 to 2000-01), where as in the period II (2001-02 to 2010-11) the area and production growth rate is higher than the yield growth rate under Rice crop in the state was due to frequent calamities high input costs, scarcity of labour. For Maize crop CAGR for area, production and yield were higher for the total period 1991-2011. Regarding Maize crop its CAGR for area, production and yield was faster in the Ist period (1991-92 – 2000-01) compared with IInd period. Further in the total period (1991-92 to 2010-11) the observed growth rate had registered in area 14.8% and production 16.26 per cent compared to yield 6.90 per cent. The higher growth of Maize production due to major expansion of area played a dominant role and some extent of higher yield under irrigated lands. So the Maize crop achieved registered production CAGR of 16.26 per cent for the combined period in Andhra Pradesh.

The estimated values for CV under Bengal gram crop area, production and yield reveals very high variation across years during the estimated periods under consideration. During period I CAGR of area for gram 4.73 per cent which is higher than the production (3.09 per cent) and yield growth (0.80 per cent). In the case of period II growth rate of gram crop area, production and yield was faster than the period I. The growth rate of production was 4.88 per cent due to significant increase in area growth rate 5.01 per cent as well as yield growth rate 1.32 per cent during the period 2001-02 to 2010-11.

For total cereal crops the area, production and yield were positive in two sub periods (1991-92 to 2000-01 and 2001-02 to 2010-11) in the state due to high growth rate of productivity and some extent of area growth rate. Whereas in the total period (1991-92 to 2010-11) CAGR production for cereals increased significantly but area was negative -0.86 per cent. This shows that increase in cereal production due to yield growth during the total period. Regarding CV under cereal crops productivity variation was high compared to area. Hence it may be concluded that production of cereal crops depends on yield growth and also largest

area variations occurred under cereal crops due to changes in cropping patterns the natural calamities and pRice fluctuations in the state of Andhra Pradesh.

The CAGR of area and production under pulse crops were negative and yield growth rate increased below one per cent in period – I. But in the period II production and productivity reported the significant growth but the growth rate of area is found to be negative -0.07 per cent. For the total period (1990-91 to 2010-11) area growth rate had declined marginally -2.18 per cent and the production and yield CAGR revealed more than one per cent under pulses crops in Andhra Pradesh. Whereas CV under pulse crops, large scale fluctuations were observed in area production and yield due to cropping pattern and government incentives in the state. For the total foodgrains, CAGR in the total period (1991-92 to 2010-11) area growth rate had declined and the yield and production registered at high growth whereas the period – I (1991-92 to 2000-01) the area growth had declined and yield and production growth had increased significantly. But in the period II (2001-02 to 2010-11) total food grain area, production and yield reported significant growth in Andhra Pradesh. In the case of CV under food grains, large variations were observed in yield and production. Finally under total Oilseeds area, production and yield growth rate was negative in the first period. In the second period area growth rate was negative but the production and yield growth rate increased at more than one per cent. During the total time period the CAGR of area and production was negative but yield growth slightly increased at less than one per cent (0.31 per cent) under Oilseeds in the state (1991-92 to 2010-11). Finally the area under Oilseed crops, growth rate had been continuously declining due to crop shifting that occurred from Oilseed crops to horticultural crops which are giving more profits than Oilseed crops exclusively in Rayalaseema region in Andhra Pradesh state.

3.7. Category-wise Number of Area of operational Holdings (2010-11 Census):

Table 3.5 presented category wise number of farmers and operational holdings in the state for selected districts (As per 2010-11 census). The highest number of holdings are obtained under marginal category farmers (63.95%) followed by small (22.15%), semi medium (10.62%) medium (3.01%) and large (0.27%) holdings. Marginal and Small holdings put together, constitute about 86.1 per cent of total operational holdings of the state. Although area under small and marginal holdings was only 54.91 per cent of total operated area. In the case of large farmers category number of holdings were only 0.27 per cent, and this category

had covered the area 3.86 per cent of total operated area of the state. The average size of operational land holding in the state is 1.08 hectares (Table 3.5).

Table 3.5

Category wise Number and Area of Operational Holdings in State and Selected Districts (as per 2010-11 Census)

Operational Holdings	Unit	Selected Districts			Andhra Pradesh
		West Godavari	Guntur	Kurnool	
Marginal Farmers (<1 ha)	Nos.	428699 (75.76)	536458 (70.53)	282405 (44.62)	8425000 (63.95)
	Ha.	173327 (36.87)	248125 (35.38)	158156 (15.06)	3727000 (26.08)
Small Farmers (1-2 ha)	Nos.	87299 (15.43)	150845 (19.83)	187698 (29.66)	2918000 (22.15)
	Ha.	121288 (25.80)	209008 (29.80)	267721 (25.50)	4120000 (28.83)
Semi Medium Farmers (2-4 ha)	Nos.	37856 (6.69)	58319 (7.67)	112419 (17.76)	1399000 (10.62)
	Ha.	101315 (21.55)	155633 (22.19)	303055 (28.86)	3685000 (25.78)
Medium Farmers (4-10 ha)	Nos.	11127 (1.97)	14408 (1.89)	46266 (7.31)	397000 (3.01)
	Ha.	61471 (13.08)	76451 (10.90)	262023 (24.95)	2209000 (15.46)
Large Farmers (>10 ha)	Nos.	850 (0.15)	618 (0.08)	4114 (0.65)	36000 (0.27)
	Ha.	12650 (2.70)	12187 (1.74)	59131 (5.63)	552000 (3.86)
Total	Nos.	565831 (100.00)	760648 (100.00)	632902 (100.00)	13175000 (100.00)
	Ha.	470051 (100.00)	701404 (100.00)	1050086 (100.00)	14293000 (100.00)
Average size of holding	Ha.	8.31	0.92	1.66	1.08

Source: Agricultural Census, 2010 – 11. Govt. of India

Note: figures in brackets indicates per centages

Selected districts: Regarding the total land holdings of the sample districts, the marginal and small holdings put together constitute 91.19 per cent in the district of West Godavari followed by Guntur with 90.36 per cent and Kurnool with 74.28 per cent. Further highest per centage of farm area was also covered by these marginal and small farm holdings accounting for 62.67 per cent in West Godavari, 65.18 per cent in Guntur and 40.56 per cent in Kurnool district. The proportion of large farmers in West Godavri , Guntur and Kurnool districts were reported below one per cent accounting for about 0.15, 0.08 and 0.65 per cent to total sample

farmers. Therefore the largest extent grown area was obtained under marginal and small farmers in the state of Andhra Pradesh.

3.8 Fertilizer Consumption:

Agriculture yield growth depends on use of fertilizers and nutrients and it is an important input. The Fertilizer Nutrient (NPK) consumption per hectare mainly depends on farmer's resources nature of crops, availability of irrigation and soil type. The consumption per hectare nutrients in the state has been increasing since 1991-92. Table 3.6 indicates Per hectare average consumption of fertilizer nutrients in the state which increased over a period of time. During 1991-92 to 2011-12 in Andhra Pradesh NPK consumption increased from 15.82 to 33.42 kg/ha. Due to increase in the supply of fertilizers at subsidy pRices by the government and expansion of area under HYV's by the farmers, cropping pattern and extension of irrigation water facilities in addition to availability of institutional credit were also mainly responsible for sustainable increase in per hectare utilization of fertilizer consumption in the state during 1991-92 to 2011-12.

Table 3.6
Consumption of Fertilizer in Andhra Pradesh

(Kg/ha)

Type	Fertilizer quantity consumed				% change in 2011-12	
	1991-92	2000-01	2010-11	2011-12	Over 1991-92	Over 2000-01
Nitrogenous (N)	9.98	13.62	19.07	19.77	98.10	45.15
Phosphorus (P)	4.55	6.03	10.00	10.43	129.23	72.97
Potassium (K)	1.29	2.09	4.89	3.22	149.61	54.07
Total NPK	15.82	21.75	33.97	33.42	111.25	53.66

Source: Various issues of Agricultural Statistics at a Glance and Statistical Abstract of Andhra Pradesh.

Table 3.6 further indicated that the overall consumption of fertilizer quantity in Andhra Pradesh has increased during 1991-92 to 2011-12 by 111.25 per cent and during 2000-01 to 2011-12 by 53.66 per cent. The use of potassium fertilizer during 2011-2012 slightly declined.

3.9. Crop-wise Area under HYVs Seeds:

Table 3.7 presented the data of area under HYV seeds for selected crops in the state. The area under HYV for Paddy, Maize and gram have been fluctuating among the years from 1988-99 to 2010-11. The largest per centage of area grown under HYV seeds in the year

1999-2000 accounted for about 88.63 and 88.70 per cent of the area under Rice and Maize crops respectively. Data on Bengal gram crop area under HYV seeds is not available. Between 2001-02 to 2010-11 the per centage of HYV area under Paddy and Maize crops have been changing due to importance of cash crops like Cotton and other horticultural crops.

Table 3.7
Area under HYVs of Study Crops in Andhra Pradesh

Area in ha

Year	Rice	%	Maize	%	Bengal gram
1998-99	3599000	83.38	290000	72.75	NA
1999-2000	3558000	88.63	401000	88.70	NA
2000-01	3599000	84.83	290000	54.96	NA
2008-09	3848611	87.72	420783	49.39	NA
2009-10	2829289	82.23	442232	56.51	NA
2010-11	3804802	80.08	272478	36.65	NA

Source: Various issues of Agricultural Statistics at a Glance and Statistical Abstract of Andhra Pradesh.

3.10 Institutional Credit and Crop Insurance:

Table 3.8 revealed that the highest amount of Agricultural loan has been disbursed into crop loans which accounted for about 53.30 per cent through commercial banks followed by co-operative bank (30.99 per cent) and Regional Rural Banks (15.71 per cent) in the state during 2001-02. Agriculture term loan also reported the highest loan disbursed from commercial banks (56.33 per cent) to total credit followed by co-operative banks and regional rural banks in the state. The agricultural credit disbursement has increased 6 times between 2001-02 to 2011-12 in the state. About 71.28 per cent crop loans were issued by commercial banks than the other two banks, whereas agriculture- term loans also disbursed 87.80 per cent from commercial banks in the state during 2011-12. Therefore the agricultural credit disbursement has been increased in the state and the commercial banks issuing highest loan share compared to other financial institutions in the state.

The status of agricultural insurance and weather based crop insurance are shown in Table 3.8 and Table 3.9. The performance of weather based crop insurance has been much better than that of National Agriculture Insurance Scheme (NAIS). The total number of insured farmers under Kharif season was more than total insured farmers under Rabi season from 2007 to 2012 in the state. Similarly the same trends were observed in the case of Area insured under NAIS in Andhra Pradesh. Table 3.9 reported the number of farmers insured under Weather based crop insurance scheme which has increased from 173.03 lakh during Kharif

2009 to 8836.80 lakh in year 2011. In all in 2009 168.79 lakh farmers were benefitted in Rabi and 6724.19 lakh farmers under Kharif season in the state under weather based insurance scheme in the year 2011. On the other hand the growth in claims have been increasing the weather based Insurance schemes under Kharif season. The NIAS claimed almost total Rs 23.87 lakh farmers insured in both Kharif and Rabi farmers and claimed 463 crore the state of Andhra Pradesh from the year 2007 - 08 to 2011-12.

Table 3.8
Performance of National Agricultural Insurance Scheme in Andhra Pradesh

S.No	Crop Season/Year	Farmers Insured (000' No)	Farmers Benefited (000' No)	Area Insured (000' Ha)	Sum Insured (Rs in Crore)	Premium Paid (Rs in Crore)	Claims (Rs in Crore)	State share (Rs in Crore)
1	Kharif 2007	2111	14	3477	4201	8	7	NA
2	Kharif 2008	1706	760	2851	3358	7	802	NA
3	Kharif 2009	3051	1154	4503	6606	14	699	NA
4	Kharif 2010	2192	785	3229	5989	12	768	NA
5	Kharif 2011	1694	362	2329	4911	11	249	NA
6	Kharif 2012	1178	0	1648	4192	10	0	NA
7	Kharif Avarage	1989	513	3006	5039	10	421	NA
8	Rabi 2007-08	223	11	388	500	1	4	NA
9	Rabi 2008-09	447	50	788	944	1	37	NA
10	Rabi 2009-10	297	83	480	810	1	32	NA
11	Rabi 2010-11	470	57	675	1261	2	66	NA
12	Rabi 2011-12	554	182	911	2087	3	74	NA
13	Rabi Avarage	398	77	648	1120	2	43	NA
14	Grand Total	2387	589	3655	6159	12	463	NA

Source: Agriculture Insurance Company of India Limited,

3.11 Agriculture Marketing:

Well-functioning markets are essential for driving up growth in the Agriculture sector and for generating employment and economic prosperity in rural areas. In Andhra Pradesh, comprehensive market legislation covering the entire state came into force in 1966 called the Andhra Pradesh (Agricultural Produce and Livestock) markets Act 1966. The farmers sell their produce in both regulated as well as non-regulated (private) markets. The unregulated market sources could be village traders, wholesalers, and middlemen etc., Table 3.10 presents district-wise number of regulated agricultural market yards in Andhra Pradesh. There are 305 total regulated markets in the state. Among the 23 districts Nalgonda and Karimnagar districts have

highest Agricultural markets(19 each) and Visakhapatnam district with lowest market yards (8).

Table 3.9
Performance of Weather Based Crop Insurance Scheme in Andhra Pradesh

S.No	Crop Season/Year	Farmers Insured (lakh' No)	Farmers Benefited (lakh' No)	Area Insured (lakh Ha)	Sum Insured (Rs in Crore)	Premium Paid (Rs in Crore)	Claims (Rs in Crore)	State share (Rs in Crore)
1	Kharif 2007	NA	NA	NA	NA	NA	NA	NA
2	Rabi 2007-08	NA	NA	NA	NA	NA	NA	NA
3	Kharif 2008	NA	NA	NA	NA	NA	NA	NA
4	Rabi 2008-09	NA	NA	NA	NA	NA	NA	NA
5	Kharif 2009	173.03	168.79	119.39	143.06	6.87	17.18	NA
6	Rabi 2009-10	0.05	0	0.15	0.14	0	0	NA
7	Kharif 2010	1155.49	580.13	1225.92	376.94	18.48	10.53	NA
8	Rabi 2010-11	2.45	2.44	5.52	3.57	0.21	0.84	NA
9	Kharif 2011	8836.3	6724.19	14748.48	3118.4	115.5	196.2	NA
10	Rabi 2011-12	126.66	93.15	126.31	92.93	5.34	12.69	NA

Source: Agriculture Insurance Company of India Limited,

Table 3.10
District wise number of Agricultural market in Andhra Pradesh

Name of the District	No of Markets	Name of the District	No of Markets
Srikakulam	13	Mahabubnagar	16
Vizianagaram	9	Ranga reddy	9
Visakhapatnam	8	Hyderabaderabad	12
East Godavari	14	Medak	10
West Godavari	16	Nizamabad	9
Krishna	16	Adilabad	16
Guntur	16	Karimnagar	19
Prakasam	14	Warangal	13
Nellore	11	Khammam	12
Chittoor	17	Nalgonda	19
Cuddapha	12	Total Andhra Pradesh	305
Ananthapur	12		
Kurnool	12		

Source: Commissionarate of Agricultural Marketing Committee, Govt. of AP. HYDERABAD

Moreover Andhra Pradesh state is one of the largest producer of fruits and vegetable in the country. However due to perishable of nature of these products and non-availability of scientific storage facilities nearly 1/3rd of this total production is lost due to spoilage. In addition to fruits and vegetables, food grains, cereals and pulses also face a loss upto 20-25 per cent due to rodents, spoilage infestation etc. Marketing infrastructure is important to promote direct marketing so as to reduce intermediaries and to provide facilities for grading,

standardization and quality control which promote negotiation of pRice of the produce to increase farmers' income.

3.12 District-wise Godowns in Andhra Pradesh State:

Among three regions of Andhra Pradesh Coastal region of Andhra Pradesh has the highest number of godowns, both in terms of number and capacity followed by Rayalaseema region. Districts of East Godavari, West Godavari, Krishna in coastal region and Kurnool in Rayalaseema region of the state have more such facilities when compared to other districts. Table 3.11 shows that Guntur district has highest number of godowns (155)as well as the highest capacity 109, 360 MTs followed by Krishna and West Godavari districts in the state (2013-14).

Table 3.11
Commodity wise Arrivals at Agri Markets in Andhra Pradesh

(Lakh Qtls)

S.No	Commodity	Arrivals in tones			
		2002-03	2008-09	2009-10	2010-11
1	Paddy	1017.12	1800.92	1824.67	2008.69
2	Maize	40.35	139.35	131.08	129.29
3	Bengal gram	3.11	13.35	8.91	0.17

Source: Directorate of Economics and Statistics, Govt. of Andhra Pradesh, Hyderabad

Under rural godown scheme, additional storage capacity has been created in the state mostly by private agencies owning storage capacity of 20 lakh MT. Considering the fact that atleast 25 per cent of food grains and seeds produced and fertilizers handed require storage space, there is a huge potential for creation of scientific storage infrastructure in the state. However, the godowns created are mostly 5000 tonne capacity and hence there is a need for setting up of smaller godowns in the villages/production centres of the districts.

3.13 Ware House/Storage Facilities:

As reported in the year 2012-13, there are 176 godowns of which 84 are owned by APSWC, 35 are hired ones and the rest 57 are the private ones. On the whole these 176 godowns have the warehousing capacity of about 26.3 lakh M.Ts. But the total market arrival in the state is by and large more than the available warehousing capacity. Hence there is an urgent need for further expansion of warehousing in the state.

Table 3.12
Warehousing Capacity and No of Godowns (2012-13)

S.No	Particulars of Godowns	No of Godowns	Warehousing Capacity (in M.Ts)	Utilization Warehousing Capacity	
				M.Ts	%
1	Own Constructed (SWC)	84	590813	N.A	-
2	Other Than Own Constructed				
	a) Hired from	35	742989	N.A	-
	b) Private	57	1301097	N.A	-
	Total (1+2)	176	2634899	2659086	101

Source: A.P.State Warehousing Corporation, Hyderabad.

3.14 Structural Transformation of the State Economy and Sectoral Shares of the Economy:

The major indicator to measure economic progress of agricultural sector is the share of agricultural sector in Gross State Domestic Product (GSDP) and Net State Domestic Product (NSDP). NSDP/GSDP are valued at current pRices as well as at constant pRices as prevailed in the base year 2004-05. It is valued at constant pRices with a view to know in the real income over the time.

Table 3.13 depicted three major sectoral value shares of GSDP in the state economy from the year (1980-81) onwards at current and constant (2004-05) pRices. Andhra Pradesh economy is predominantly an agrarian one. The value of agricultural production had been increasing but the share value has been declining in GSDP over the years (1980-81 to 2011-12). The state GSDP at current pRices for the year 2011-12 is estimated at Rs.6,76,234 crores showing an increase of 14.82 per cent over the previous year 2010-11 and 200.93 per cent over the year 2004-05. At constant pRices (2004-05) state GSDP for 2011-12 estimated to be Rs.4,07,949 crore showing an increase of 81.54 per cent over 2004-05. During the year 1980 to 2000 share of agriculture revenue at current pRices in GSDP has declined sharply from 43.95 to 32.56 per cent, Further it has declined continuously from 20.82 per cent in GSDP at current pRices during 2004-05 to 2011-12. Therefore the share revenue of agriculture in Gross Domestic product continuously declines over a period of twenty two years except the year 2007 at both current and constant pRices in Andhra Pradesh. On the other hand the share revenue of agriculture in GSDP at constant pRices reported the same trend declined from 43.95 per cent to 19.22 per cent during 1980-81 to 2011-12. The share revenue of industry and service sectors in GSDP started increasing from 1980-81 to 2011-12 both current and constant pRices. Comparatively between the two sectors the service sector showed a significant improvement

than industrial sector. But the share value of agricultural sector in GSDP is declining even though the government provide the large scale incentives to the farm sector in the state.

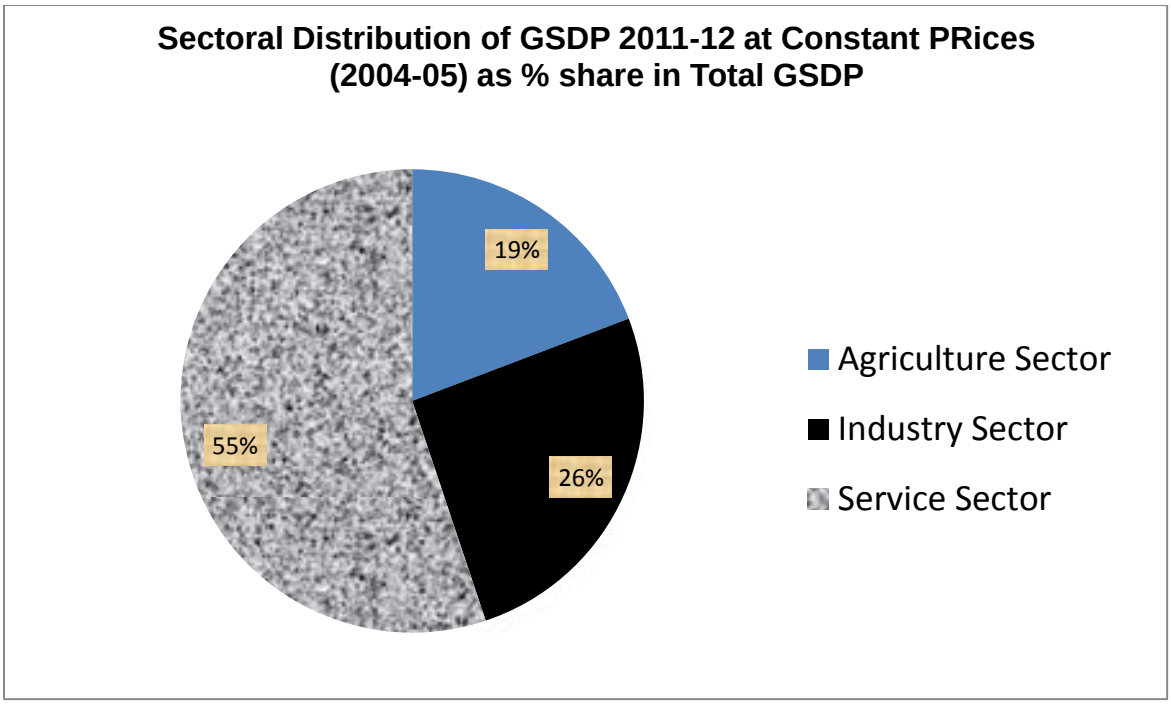
Table 3.13

Year wise Gross State Domestic Product (GSDP) at Current and Constant (2004-05) PRices

S.No	Year	Gross State Domestic Product (GSDP) at Current PRices (Rs in Crore)				Gross State Domestic Product (GSDP) at Constant(2004-05) PRices (Rs in Crore)			
		Agri	Indus	Service	Total GSDP	Agri	Indus	Service	Total GSDP
1	1980-81	3600 (43.95)	1557 (19.01)	3034 (37.04)	8191 (100)	3600 (43.95)	1557 (19.01)	3034 (37.04)	8191 (100)
2	1993-94	20675 (35.73)	12684 (21.92)	24507 (42.35)	57867 (100)	20675 (35.73)	12684 (21.92)	24507 (42.35)	57867 (100)
3	1999-00	40772 (32.56)	27786 (22.19)	56678 (45.26)	125236 (100)	23834 (29.94)	18690 (23.48)	37081 (46.58)	79605 (100)
4	2004-05	56344 (25.07)	54557 (24.28)	113812 (50.65)	224713 (100)	56344 (25.07)	54557 (24.28)	113812 (50.65)	224713 (100)
5	2005-06	62513 (24.42)	63739 (24.90)	129689 (50.67)	255941 (100)	59789 (24.28)	60042 (24.39)	126379 (51.33)	246210 (100)
6	2006-07	67356 (22.37	80969 (26.90)	152710 (50.73)	301035 (100)	60966 (22.27)	70611 (25.80)	142153 (51.93)	273730 (100)
7	2007-08	86775 (23.79)	98717 (27.06)	179321 (49.15)	364813 (100)	71563 (23.34)	78287 (25.53)	156795 (51.13)	306645 (100)
8	2008-09(R)	99520 (23.32)	117129 (27.45)	210116 (49.23)	426765 (100)	72108 (22.00)	83883 (25.60)	171740 (52.40)	327731 (100)
9	2009-10(P)	112064 (22.85)	133478 (27.22)	244869 (49.93)	490411 (100)	73059 (21.03)	89238 (25.69)	185047 (53.27)	347344 (100)
10	2010-11(Q)	132725 (22.54)	159740 (27.12)	296498 (50.34)	588963 (100)	79631 (20.85)	97465 (25.52)	204846 (53.63)	381942 (100)
11	2011-12(A)	140769 (20.82)	185973 (27.50)	349492 (51.68)	676234 (100)	78408 (19.22)	104614 (25.64)	224927 (55.14)	407949 (100)

Source: Various issues of Statistical Abstract Andhra Pradesh, Directorate of Economics and Statistics, Govt. of Andhra Pradesh, Hyderabad

Figure – 3.1



ii. Sectoral Share in NSDP:

Table 3.14 shows the sector wise data on NSDP at current pRices, constant pRices and per capita income. The State's NSDP at current pRices for the year 2011-12 is estimated at Rs.609434 crores showing an increase of 202.74 per cent over 2004-05. At constant pRices (2004-05) state NSDP for 2011-12 was estimated at Rs.363835 crore showing an increase of 80.74 per cent over 2004-05. The share of agricultural sector in total NSDP at current pRice was 26.25 per cent in 2004-05 and 21.83 per cent in 2011-12, showing a declining trend. Whereas at constant pRices (2004-05), the contribution of agriculture sector showed down ward trend and it came down from 26.25 per cent in 2004-05 to 20.22 per cent. Therefore from the beginning of 1980-81 onwards, share of agriculture revenue has been declining in total NSDP at constant and current pRices in the state. On the other hand the service and industrial sector revenues increased in NSDP of both current and constant pRices of the estimated period in the state (1980-81 to 2011-12).

Table 3.14
Year wise Net State Domestic Product (NSDP) and Per capita Income at Current and Constant PRices (2004-05)

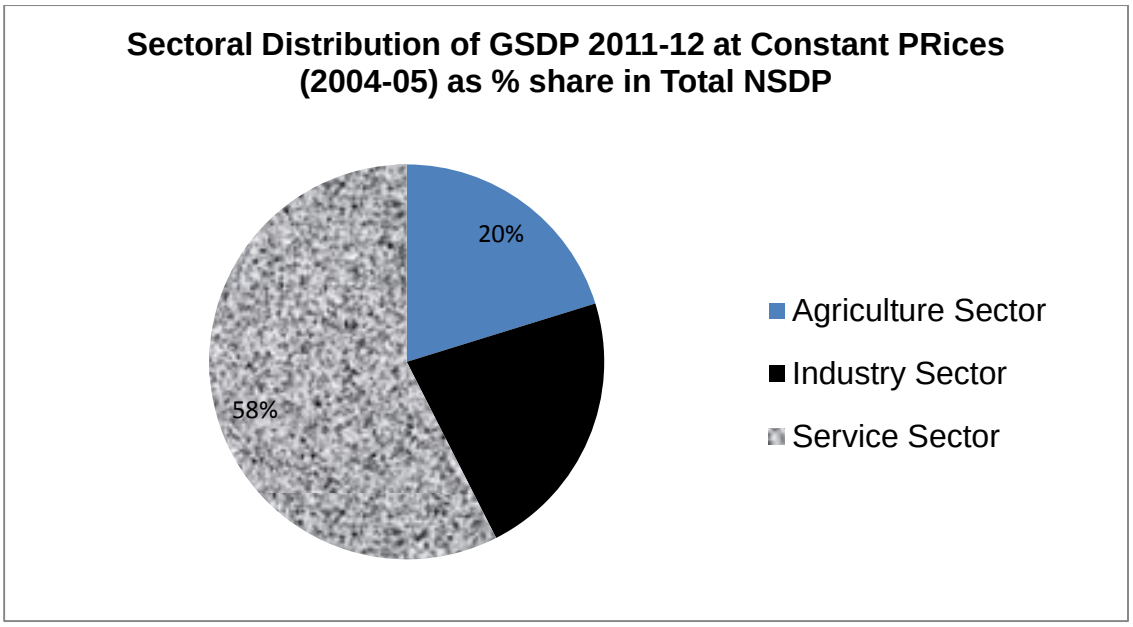
S.No	Year	Net State Domestic product (NSDP) at current PRices (Rs in Crore				Net State Domestic product (NSDP) at constant PRices (Rs in Crore)				Per capita income (Rs)	
		Agriculture	Industrial	Service sector	Total	Agriculture	Industrial	Service sector	Total	Current pRices	Constant pRices
1	1980-81	3414 (46.61)	1217 (16.62)	2693 (36.77)	7324 (100)	3414 (46.61)	1217 (16.62)	2693 (36.77)	7324 (100)	1380	1380
2	1993-94	19633 (38.01)	9702 (18.78)	22320 (43.21)	51655 (100)	19633 (38.01)	9702 (18.78)	22320 (43.21)	51655 (100)	7447	7447
3	1999-00	38615 (34.18)	22044 (19.15)	52307 (46.30)	112966 (100)	38615 (34.18)	22044 (19.51)	52307 (46.30)	112966 (100)	15040	9440
4	2004-05	52382 (26.25)	43108 (21.41)	105363 (52.34)	201303 (100)	52832 (26.25)	43108 (21.41)	105363 (52.34)	201303 (100)	25321	25312
5	2005-06	58358 (25.44)	50770 (22.13)	120239 (52.42)	229367 (100)	55799 (25.26)	47701 (21.59)	117401 (53.15)	220901 (100)	28539	27486
6	2006-07	62575 (23.25)	64629 (24.01)	141916 (52.73)	269120 (100)	56609 (23.14)	55633 (22.75)	132345 (54.11)	244587 (100)	33135	30114
7	2007-08	81354 (24.96)	77678 (23.83)	166923 (51.21)	325955 (100)	66841 (24.51)	59760 (21.91)	146125 (53.58)	272726 (100)	39727	33239
8	2008-09(R)	93841 (24.44)	94871 (24.71)	195292 (50.86)	384005 (100)	67599 (23.13)	64876 (22.20)	159783 (54.67)	292258 (100)	46345	35272
9	2009-10(P)	105698 (23.93)	108990 (24.67)	227097 (51.40)	441784 (100)	68501 (22.10)	69432 (22.40)	172076 (55.51)	310009 (100)	52814	37061
10	2010-11(Q)	125560 (23.64)	130821 (24.63)	274758 (51.73)	531139 (100)	74801 (21.95)	75671 (22.20)	190320 (55.85)	340792 (100)	62912	40366
11	2011-12(A)	133027 (21.83)	152371 (25.00)	324036 (53.17)	609434 (100)	73569 (20.22)	81127 (22.30)	209138 (57.48)	363835 (100)	71540	42710

Source: Various issues of Statistical Abstract Andhra Pradesh, Directorate of Economics and Statistics, Govt. of Andhra Pradesh, Hyderabad

III. Per capita Income:

Per capita income year –wise estimates from 1980-81 to 2011-12 NSDP at constant pRices (2004-05) are given in Table 3.14. The per capita income at constant pRices during 2011-12 is estimated at Rs.42710 as compared to Rs.25312 in 2004-05. Thus per capita income in 2011-12 has increased 68.73 per cent from 2004-05. The per capita income at current pRices also moved from Rs.25321 in 2004-05 to 71540 in the year 2011-12, showing an increase of 182.53 per cent, as compared to 2010-11 per capita income. Thus the per capita income had been continuously increasing since 1980-81 at both current and constant pRices in Andhra Pradesh.

Figure 3.2



3.15 Composition of Value of Output of important crops in State:

Total value of important agricultural crops output is presented in Table 3.15 and 3.16. Table 3.15 revealed the value of total food grains production which increased from Rs.8992.04 crores in 2000-01 to Rs.20440.36 crores in 2010-11 showing an increase of 127.32 per cent due to increase in the price of crop output production. Demand and consumption were also responsible for increase in the value of output of food grain crops in the state between the years 2000-01 to 2010-11. On the other hand the value of total agricultural crop was Rs.19084.50 crores in 2001-02 and it increased to Rs.39946.7 in 2010-11 showing an increase in the value at 108.79 per cent as compared to 2000-01. Value of output of Paddy, Maize, Bengal gram, Groundnut, dry chilies and Cotton increased in manifold proportion between 2009-01 to 2010-11.

Table 3.16 depicted the value of important crops at current prices and the percentages of total value at current process in Andhra Pradesh. Among the important crops, Paddy crop production received the highest value than other crops during the period 2000-01 and 2010-11. Paddy, Maize and Jowar crops are the most important food grain crops in the state. Among the pulse crops the percentage share of value of Bengal gram moved up from 0.23 per cent to 0.70 per cent and the total value reported the highest contribution in total food grains

compared to the pulse crops of Red gram, Green gram, and Black gram. In the case of oil seed crops of Groundnut increased the output as well as the per centage share in total output between the estimated periods, followed by horticultural crops of dry chillies and turmeric. Further Cotton is other important commercial crop and its gross value increased from Rs.3371.00 crores to Rs. 9281.83 crores during 2000-01 to 2010-11 and the share of Cotton crop gross value output recorded marginal change during period 2000-01 to 2010-11.

Table 3.15
Category wise total value of produce at current pRice

(Rs. In Crore)

S.No	Crops	2000-01		2010-11	
		Value of output (Rs)	% of Grand Total	Value of output (Rs)	% of Grand Total
1	Total Food Grains	8992.04	47.12	20440.36	51.30
2	Total Oilseeds	1124.21	5.89	1102.529	2.77
3	Others	8968.25	46.99	18303.81	45.94
4	Grand Total	19084.50	100.00	39846.7	100.00

Source: Directorate of Economics and Statistics, Govt. of Andhra Pradesh, Hyderabad.

3.16 Year-wise Marketed Surplus Ratio (MSR) of selected crops in Andhra Pradesh (1999-2000-2011-12):

The table 3.17 revealed the per centage of output of marketed for Rice and Maize crops. But the Bengal gram crop MSR data was not available. The data of selected crops of Rice and Maize is varying in the share of MSR across different years. For Rice, it varied from 72.60 per cent in 1999-2000 to 91.99 per cent in 2007-08. In the case of Maize crop MSR shows fluctuating trend from 88.50 per cent in 1999-2000 to 100 per cent in the year.

Table 3.16
Value of Produce of Important Crops at Current PRice

(Rs. In Crore)

S.No	Crops	2000-01		2010-11	
		Value of output (Rs)	% of Grand Total	Value of output (Rs)	% of Grand Total
1	Paddy	6658.78	34.89	15153.29	38.03
2	Jowar	13.40	0.07	87.32	0.22
3	Maize	299.70	1.57	1958.75	4.92
4	Red gram	222.32	1.16	237.37	0.60
5	Black gram	139.27	0.73	103.31	0.26
6	Green gram	97.36	0.51	47.57	0.12
7	Bengal gram	43.90	0.23	277.65	0.70
8	Ground Nut (Kernals)	101.01	0.53	714.71	1.79
9	Sunflower	70.77	0.37	166.09	0.42
10	Dry Chillies	795.97	4.17	2767.89	6.95
11	Turmeric	104.89	0.55	777.70	1.95
12	Onions	113.90	0.60	164.71	0.41
13	Tamarind	86.85	0.46	99.28	0.25
14	Cotton (kapas)	3371.00	17.66	9281.83	23.29
15	Jute (Mesta)	43.12	0.23	39.69	0.10
16	Jaggery	216.34	1.13	364.34	0.91
17	Cashew nut	189.39	0.99	89.63	0.22
18	Coconuts	970.37	5.08	403.11	1.01
19	Others	5546.16	29.06	7112.46	17.85
Total value of Agricultural commodities		19084.50	100.00	39846.70	100.00

Source: Various issues of Statistical Abstract Andhra Pradesh, Directorate of Economics and Statistics, Govt. of Andhra Pradesh, Hyderabad

Rice and Maize are the important cereal crops in the state. The Maize marketed however surplus ratio found to be much higher than that of Rice. The proportion of marketed surplus output ratio is high as large scale dry lands are cultivated by this crop and majority of its output is sold at the farm gate. Whereas Rice crop cultivated exclusively in wet lands and irrigation is compulsory to its high productivity. West Godavari and Guntur districts NIA and irrigation intensity is higher than the Kurnool district. Rice crop production highly depends upon the behavior of rainfall but in the state of Andhra Pradesh frequently natural calamities are occurring like droughts and cyclones in addition to irregular power supply which are the major causes for low yield over the years in Andhra Pradesh. Although Rice is the major food crop and also pRice fluctuations are also low Marketed Surplus Ratio (MSR) is comparatively higher than Maize produce in the state of Andhra Pradesh.

Table 3.17
Marketed Surplus Ratio (MSR) of Selected Crops in Andhra Pradesh (MSR in %)

Year	MSR (%) of selected Crops		
	Rice	Maize	Bengal gram
1999-2000	72.60	88.50	N.A
2000-01	80.10	100.00	N.A
2001-02	80.30	100.00	N.A
2002-03	N.A	N.A	N.A
2003-04	85.17	98.51	N.A
2004-05	83.06	89.01	N.A
2005-06	79.99	95.15	N.A
2006-07	84.46	97.59	N.A
2007-08	91.99	100.00	N.A
2008-09	81.63	97.58	N.A
2009-10	88.40	99.63	N.A
2010-11	91.06	90.81	N.A
2011-12	83.07	96.01	N.A

Note: N.A: Not Available; * Based on cost of cultivation data
Source: Agricultural Statistics at a Glance, DES, MoA, GOI, New Delhi.

CHAPTER – IV

ASSESSMENT OF MARKETED AND MARKETABLE SURPLUS OF MAJOR FOOD GRAINS IN ANDHRA PRADESH : An Empirical Analysis

Introduction:

Marketed surplus of food grains depends on the size of producer family, socio-economic conditions, consumption habits of the producers family, nature of crop etc., The size of output is the most important determinant of marketed surplus of the farmer. Moreover, the socio-economic factors like land holding size, cropping pattern, crop production marketing facilities, market prices and investment pattern of sample farmers may also be considered. Marketing pattern of farm production would be helpful in understanding the aspects of marketed and marketable surplus. Notice that increased production would not lead to automatic increase in marketed and marketable surplus. Some other factors also effect marketed surplus such as level of debt, cash need of the producers, institutional factors and consumption habits of sample farmers etc.

4.1 Socio-Economic Profile of the Sample Households:

Data related to the socio-economic and demographic characteristics of sample households were presented in Table 4.1 Of the 450 sample households, 88 marginal (MF) , 88 small (SF), 92 semi-medium (SMF), 104 medium (MDF) and 78 large (LF) farm households were represented. Among twenty three districts in united Andhra Pradesh state, three districts were selected for household survey, namely West Godavari, Guntur, Kurnool in the state. Three crops namely Paddy, Maize and gram represent the present study of the 175 sample households selected from West Godavari district, 100 HH represented Paddy and 75 HHs are associated with Maize crop. Of the 225 sample HH selected from Guntur district, 100 HH were Paddy growers, 75 were Maize and 50 HH were gram crop farmers. Further from Kurnool district 50 HH were selected for gram crop in the state of Andhra Pradesh.

Table 4.1
Socio-Economic and Demographic Characteristics of Sample Households

Characteristics	Marginal	Small	Semi-Medium	Medium	Large	All Farms
Age of decision maker (yrs)	46.44	45.33	47.62	47.95	47.92	47.07
Main Occupation (%)						
Crop Farming	100.00	93.18	94.57	91.59	89.74	93.56
Dairy	0.00	0.00	0.00	2.80	2.56	1.11
Service	0.00	1.14	3.26	5.61	7.69	3.56
Farm labour	0.00	5.68	2.17	0.93	0.00	1.78
Others.	0.00	0.00	0.00	0.00	0.00	0.00
Education of Decision Maker						
No. of Illiterate Head of HHs.	31	30	25	33	23	142
%	35.63	33.71	27.17	31.73	29.49	31.56
Education(years of schooling)	8.57	8.10	8.04	8.61	9.62	8.56
Average Family Size (no.)						
Male	1.71	1.98	1.90	1.93	1.96	1.90
Female	1.67	1.79	1.95	1.72	1.83	1.79
Total	3.38	3.76	3.85	3.65	3.79	3.69
Social Grouping						
SC	17.24	8.99	6.52	5.77	6.41	8.89
ST	0.00	1.12	0.00	0.00	0.00	0.22
OBC	59.77	65.17	68.48	77.88	82.05	70.67
General	22.99	24.72	25.00	16.35	11.54	20.22
Gender of head of household (%)						
Male	100	100	98.91	98.08	100	99.33
Female	0.00	0.00	1.09	1.92	0.00	0.67

Source: Field Survey

The retention pattern of food grains and there by marketed and marketable surplus of food grains depends mainly upon the size of family members and their consumption habits, debt conditions and socio-economic factors. Moreover the availability of human labour from the family members also effect the cost of cultivation of crop and profitability from sale of crop produce. In this context firstly we have to examine the size of family of sample households. Table 4.1 shows, that overall average size of family size was of 3.7 persons, consisting of 1.9 males and 1.8 females. While the average size of family reported among semi medium farmers was 3.85 persons it followed by large group farmers with 3.79 members, small farmers with 3.76 persons, medium with 3.65 persons and 3.38 members from marginal farmers group. Among the farmers, male farmers reported highest in all farming groups except semi-medium farmers of the household survey.

All the households except 0.72 per cent are the male headed ones. The average age of head or decision maker of the family was of 47 years and category wise it ranged from 46.4 years from marginal farm households to 47.9 years for medium farm households.

Level of education of the head of the HH plays an important role in decision making in the household, regarding input use, use of HYV seeds, enhancing technology and crop pattern. Moreover, head of the household having good education leads to better understanding about crop production and prevailing market situations. Education helps the farmer gets higher returns from farm products. Therefore the level of education of head of the sample household is one of the important factor to achieve higher production and farm returns. Table 4.1 shows that the average year of schooling of head of households was 8.6 years and category wise it ranged between 8 years in semi-medium and 9.6 years in large scale farm households.

The data also overall that 93.5 per cent households had agriculture as their main occupation. While 3.6 per cent households represent service occupations 1.8 per cent are farm labour and 1.1 per cent dairy as the main occupation. Moreover, about the subsidiary occupation, the data revealed that many sample households pursue more than one subsidiary occupations.

Table 4.1 also reveals that very low representation of scheduled Tribes (0.2%) and Scheduled Castes (8.9%) in the sample households. On the whole 70.6 per cent and 20.2 per cent of sample households belonged to other Backward Classes (OBC) and general category respectively. Among farmers groups the large farmer households constituted highest per centage from OBC category when compared to other farmer categories.

4.2 Category-wise Average size of Operational Holding per Household:

1. For Overall Sample:

The cost of cultivation mainly depends on size of operational land holding and government subsidies. The farmer's decision to allocate land area to cultivate food grain crops may be on the size of capital investment in agriculture. In this context, size of operational land holding of sample farmer has been examined. Table 4.2 presents category-wise data on total operational land area of all sample households which was 1854.71 hectares. The overall average operational land size for entire sample worked out to be 4.12 ha, comprising of 3.20 ha, irrigated and 0.92 ha, Un irrigated land. Among farm-size groups, the overall average size of operational land per household worked out to be 0.66 ha for marginal farmers, 1.40 ha, for small farmers, 2.52 ha for semi-medium farmers, 5.77 ha for medium farmers and 10.77 ha, for

large farmers. Majority of sample farmers did not express anything about cultivable waste land. Only medium farmers expressed about the non-cultivable land, which is very less 3.64 ha, Few households were involved in leased out and leased in land as reported by the farmers of the household survey.

Table 4.2
Operational Holding Characteristics

(Area in Hectare)

Size Class of Farm	Owned Land			Own area available for cultivation			Cultivable Wasteland			Non-Cultivable land			Leased in Land			Leased out land			Total Operational Holding Area under cultivation(1.1)+ Leased in Land(2)-Leased out Land(3)		
	Irr.	Unirr	Total	Irr.	Unirr	Total	Irr.	Unirr	Total	Irr.	Unirr	Total	Irr.	Unirr	Total	Irr.	Unirr	Total	Irr.	Unirr	Total
Marginal	32.75 (0.38)	22.9 (0.26)	55.65 (0.64)	32.75 (0.38)	22.9 (0.26)	55.65 (0.64)	0	0	0	0	0	0	2.05 (0.02)	0	2.05 (0.02)	0	0	0	34.8 (0.40)	22.9 (0.26)	57.7 (0.66)
Small	94.43 (1.06)	29.32 (0.33)	123.75 (1.39)	94.43 (1.06)	29.32 (0.33)	123.75 (1.39)	0	0	0	0	0	0	2.23 (0.03)	0	2.23 (0.03)	0	0	0	95.65 (1.07)	28.51 (0.32)	124.16 (1.40)
Semi-Medium	163.67 (1.78)	55 (0.60)	218.67 (2.38)	161.65 (1.76)	55 (0.60)	216.65 (2.35)	0	0	0	0	0	0	11.31 (0.12)	4.04 (0.04)	15.35 (0.17)	2.02 (0.02)	0	2.02 (0.02)	172.96 (1.88)	59.04 (0.64)	232 (2.52)
Medium	461.17 (4.43)	134.38 (1.29)	595.55 (5.73)	456.31 (4.39)	131.14 (1.26)	587.45 (5.65)	0	0	0	0	3.64 (0.04)	3.64 (0.04)	6.48 (0.06)	8.91 (0.09)	15.39 (0.15)	4.86 (0.05)	3.24 (0.03)	8.1 (0.08)	467.65 (4.50)	132.77 (1.28)	600.42 (5.77)
Large	622.25 (7.98)	196.51 (2.52)	818.76 (10.50)	593.51 (7.61)	175.06 (2.24)	768.57 (9.85)	0	0	0	0	0	0	58.47 (0.75)	19.43 (0.25)	77.9 (1.00)	28.74 (0.37)	21.45 (0.28)	50.19 (0.64)	670.24 (8.59)	170.19 (2.18)	840.43 (10.77)
All farms	1374.27 (3.05)	438.11 (0.97)	1812.38 (4.03)	1338.65 (2.97)	413.42 (0.92)	1752.07 (3.89)	0	0	0	0	3.64 (0.01)	3.64 (0.01)	80.54 (0.18)	32.38 (0.07)	112.92 (0.25)	35.62 (0.08)	24.69 (0.05)	60.31 (0.13)	1441.3 (3.20)	413.41 (0.92)	1854.71 (4.12)

Source: Field survey

Figures in parenthesis indicate average operated area per HHs.

4.3 Source of Irrigation:

Table 4.3

Source of Irrigation on the sample Farm Households (Own+Hired) (% HHs.)

Size Class of Farm	Source of Irrigation (%)				
	Canal	Electric Tube Well	Diesel Tube Well	Bore well	Tanks
Marginal	24.14	17.24	6.90	16.09	11.49
Small	13.48	7.87	3.37	44.94	11.24
Semi-Medium	4.35	4.35	0.00	58.70	4.35
Medium	5.77	4.81	0.96	59.62	9.62
Large	10.26	10.26	0.00	60.26	14.10
All farms	11.33	8.67	2.22	48.22	10.00

Source: Field survey

Generally, crop productivity mainly depends on the availability of water for irrigation apart from other requisite inputs. Table 4.3 shows the sources of irrigation available on farms of sample households. The lowest source of irrigation in diesel tube well. The highest water resources of sample farmers as reported are bore wells followed by canals, tanks electric tube wells and diesel tube wells. Among the irrigation sources 48.22 per cent of households used borewells as the main source of irrigation followed by 11.33 per cent HH used canal water, 10.00 per cent of HH used tank, 8.67 per cent used electrical tube wells and 2.22 per cent HH used diesel tube wells. Some sample households had used more than one source of irrigation for their crops.

4.4 Proportion and Terms of Leased–in Land:

Table 4.4 presents terms of leased –in land taken by sample households. Out of 450 sample households 34 households (7.56%) has taken land on lease. Of the total operational area of sample households, 4.34 per cent has leased in area. Category wise it ranged from 3.55 per cent for marginal farmers (MF) to 6.96 per cent for semi medium farmers (SMF). The table reveals that 16.17 per cent of land from large farmers had leased- in land which accounted for 6.96 per cent of their total operational area. Of the 34 sample farmers, who had leased in land 76.47 per cent had taken land on lease by paying fixed money as rent which ranged from Rs. 27600 per hectare by large farmers to Rs.31200 per ha, by semi-medium farmers. From sample farmers who leased in the land, 23.53 per cent had taken it on terms of sharing 50 per cent (net of paid out cost) of crop production.

Table 4.4
Terms of Lease

Size Class of Farm	Nos. of HHs with Leased-in land	Incidence		Terms (%)			Rent		
		% Area leased in (total)	% HHs leasing in	For fixed yearly money	Fixed produce (Qtl.)	Share of Produce (%)	For fixed yearly (Rs.)	Fixed produce (Qtl./ha)	Share of Produce (%)
Marginal	5	3.55	5.75	60.00	0.00	40.00	29268	0.00	50
Small	3	1.80	3.37	100.00	0.00	0.00	30450	0.00	50
Semi-Medium	9	4.88	9.78	77.78	0.00	22.22	31200	0.00	50
Medium	4	1.08	3.85	75.00	0.00	25.00	28500	0.00	50
Large	13	6.96	16.17	76.92	0.00	23.08	27600	0.00	50
All farms	34	4.34	7.56	76.47	0.00	23.53	29436	0.00	50

Source: Field survey

4.5 Farm Size and Live Stock:

Table 4.5 reported the ownership of number of livestock units per sample households. Among the farm size the ownership of total live stock represents highest under small farmers, per household which was 5.97 followed by semi-medium 5.07, medium farmers 5.35, marginal 4.08 and large farmer per household was 3.16. On an average, number of livestock unit per household contains 0.40 cattle, 2.16 buffalo and 1.83 others (goat, sheep etc). Ownership of number of cattle per household reported highest 1.24 and least 0.15 under medium and large farmer households, whereas buffalo's reported highest 3.45 under small farmer household followed by medium, 2.51, semi-medium 2.01, small & marginal 1.83 and 1.09 for large farmer per household. On an average small difference of other live-stock (goat, sheep etc.,) reported among all size groups respectively in the survey.

TABLE – 4.5
Farm Size and Livestock

Size of Farm	Cattle	Buffalo	Others	Total
Marginal	**0.32**	**1.83**	**1.93**	**4.08**
Small	**0.63**	**3.45**	**1.89**	**5.97**
Semi-Medium	**1.15**	**2.01**	**1.91**	**5.07**
Medium	**1.24**	**2.51**	**1.60**	**5.35**
Large	**0.15**	**1.09**	**1.92**	**3.16**
All farms	**0.40**	**2.16**	**1.83**	**4.39**

Source: Field survey

4.6 Cropping Pattern for Sample Households:

Cropping pattern depends on several factors like availability of inputs prevailing price of crop, consumption habits, irrigation sources and availability of infrastructural facilities etc., suitability of soil and climatic conditions, marketing facilities. The main objective of the study is to know the retention pattern of food

Table 4.6: Cropping Pattern

(Area in ha/HHs)

Season/Crops	Marginal	Small	Semi-Medium	Medium	Large	All Farms
No. of HHs.	88	88	92	104	78	450
Kharif.						
Paddy	0.39 (42.39)	0.83 (43.92)	1.65 (45.08)	3.87 (48.62)	5.55 (42.79)	2.43 (45.16)
Maize	0.05 (5.43)	0.06 (3.17)	0.10 (2.73)	0.29 (3.64)	0.34 (2.62)	0.17 (3.12)
Jowar	0.02 (2.17)	0.04 (2.12)	0.05 (1.37)	0.06 (0.75)	0.13 (1.00)	0.06 (1.08)
Sunflower	0.02 (2.17)	0.03 (1.59)	0.07 (1.91)	0.12 (1.51)	0.06 (0.46)	0.06 (1.16)
Chilies	0.02 (2.17)	0.05 (2.65)	0.01 (0.27)	0.04 (0.50)	0.01 (0.08)	0.03 (0.50)
Total Kharif	0.50 (54.35)	1.01 (53.44)	1.88 (51.37)	4.38 (55.03)	6.09 (46.95)	2.75 (51.02)
Rabi						
Paddy	0.15 (16.30)	0.23 (12.17)	0.73 (19.95)	1.56 (19.60)	2.31 (17.81)	0.98 (18.28)
Maize	0.09 (9.78)	0.20 (10.58)	0.36 (9.84)	0.60 (7.54)	1.31 (10.10)	0.50 (9.21)
Bengal Gram	0.12 (13.04)	0.28 (14.81)	0.46 (12.57)	0.75 (9.42)	1.87 (14.42)	0.67 (12.44)
Black gram	0.02 (2.17)	0.03 (1.59)	0.02 (0.55)	0.05 (0.63)	0.04 (0.31)	0.03 (0.60)
Green gram	0.01 (1.09)	0.02 (1.06)	0.01 (0.27)	0 (0.00)	0 (0.00)	0.01 (0.15)
Total Rabi	0.39 (42.39)	0.76 (40.21)	1.58 (43.17)	2.96 (37.19)	5.53 (42.64)	2.19 (40.67)
Oil Palm	0.03 (3.26)	0.12 (6.35)	0.20 (5.46)	0.62 (7.79)	1.35 (10.41)	0.45 (8.31)
Total Cropped Area	0.92 (100.00)	1.89 (100.00)	3.66 (100.00)	7.96 (100.00)	12.97 (100.00)	5.49 (100.00)
GCA	81.85	166.33	336.80	868.37	1013.08	2466.43

Source: Field Survey

grains and assessment on marketable and marketed surplus of major food grain crops. The study crops are Paddy, Maize and bengalgram to examine crop pattern followed by sample households.

Table 4.6 shows the cropping pattern data per household of major foodgrain crops of sample households. The data are given for overall sample households of selected districts together i,e Guntur, West Godavari and Kurnool in Andhra Pradesh state but not a district wise. Over all (Guntur, West Godavari and Kurnool) average Gross Cropped Area (GCA) per household worked out to 5.49ha, Category wise it was 0.92 ha, for marginal farmer, 1.89 for

small farmer, 3.66 ha for semi medium farmer, 7.96 ha,, for medium farmer and 12.97 ha, For large farmer. Total cropped area of all sample households together was 2466.43 ha, Overall, of the Gross Cropped Area (GCA), 51.02 per cent belonged to kharif crops and 40.67 per cent area devoted to rabi crops. Some other horticultural crops like oilpalm devoted in West Godavari district 0.45 per cent area reported by sample households.

Among Kharif crops, Paddy was the most important food grain crop, which alone occupied 45.16 per cent of Gross Cropped Area followed by other important kharif food grain crops were Maize (3.12%) and Jowar (1.08%) and the other two major crops are Sunflower and Chilli. Which are horticultural crops. Among the study districts of Guntur and West Godavari large scale cropped area irrigated by canals. Paddy is the major food grain crop and most of the farmers trended to devote a higher proportion of their area grown under Paddy cultivation. Paddy crop area under kharif crops to GCA reported highest per centage area of all farm size groups.

In Rabi season Paddy and bengalgram were most important food grain crops claiming 18.28 and 12.44 per cent of GCA respectively followed by Maize 9.21 per cent of GCA. The overall Gross Cropped Area (GCA) 40.67 per cent devoted to Rabi crops. Some other rabi crops like pulses and oilseeds crops reported minimum area devoted to them. Category wise among farm size groups reported while farm size increases the area of both kharif and rabi crops area also increased in absolute terms. Overall, Paddy total crop area was highest comparatively over food grain crops under both kharif and rabi crops, moreover category wise the highest per centage of area devoted under Paddy crop in all farm size groups of both kharif and rabi seasons of selected districts in the state. Paddy is the staple food in the state of Andhra Pradesh.

4.7 Cropping Intensity:

Table 4.7 contains data regarding cropping intensity of sample household (per hh's). The study crops namely Paddy, Maize and gram required irrigation. So the study crops are also irrigated crops. Hence the study need to know the cropping intensity of sample households.

Table 4.7
Cropping Intensity of Sample Households

Particulars	Category of Sample Households					
	Marginal	Small	Semi-Medium	Medium	Large	All Farms
Average Operated Area Per hhs.	0.66	1.41	2.52	5.77	10.77	4.12
Gross Cropped Area Per hhs.	0.92	1.89	3.66	7.96	12.97	5.49
Cropping Intensity (%)	140.31	133.96	145.14	137.88	120.39	133.20

Source: Field Survey

In the overall sample households, cropping intensity worked out to be 133.20 per cent and across farm size groups, the highest crop intensity reported 140.31 per cent by marginal farmers and lowest 120.39 per cent for large farmers. Among farmer groups category wise the data reveals that cropping intensity is slightly changing.

4.8 Crop Productivity:

The productivity of sample crops sown in the sample farms have been given in Table 4.8. Among study crops under kharif, rice crops overall productivity per hectare was 34.71 quintals. The highest productivity was reported from marginal farmers which per hectare was 36.42 qtls, followed by 32.84 qtl for small farmers, 35.40 qtl for semi medium farmers, 35.24 qtl for medium farmers and 35.24 qtl for large farmers per hectare respectively. In case of Maize, overall yield per hectare was 57.22 qtl and across different farm size, it varied from 60.23 qtl for marginal and lowest at 53.91 qtl for semi medium farm households. Jowar is another important food grain crop and productivity per hectare for jowar was 39.63qtl and it was highest 43.35 qtl for medium farmer group and lowest at 36.12 qtl for semi-medium farm households.

Table 4.8
Cropping Pattern: Yield (ha)

Season/Crops	Productivity (Qtl/ha,)					
	Marginal	Small	Semi-Medium	Medium	Large	All Farms
Kharif						
Paddy	36.42	32.84	35.40	35.24	33.64	34.71
Maize	60.23	56.44	53.91	58.29	57.25	57.22
Jowar	40.00	37.01	36.12	43.35	41.65	39.63
Rabi						
Paddy	39.11	36.58	39.47	34.88	33.25	36.66
Maize	85.01	84.02	79.25	86.70	83.29	83.65
Bengal Gram	22.56	22.10	22.37	21.92	19.74	21.74

Source: Field Survey

Table 4.8 also reveals that the Rabi crops overall, productivity per hectare was 36.66 qtl and it was found varying between 39.11 qtl (MF) and 33.25 Qtl for (LF). In the case of Maize crop, overall productivity per hectare was 83.65 qtl. Across the farm size, it was highest at 85.01 qtl for marginal farmers and lowest 79.25 qtl for semi medium farmers. Further Bengal gram is another important study crop of rabi season. Overall productivity per hectare for gram crop was 21.74 qtl and across farm size categories, the productivity of this crop varied between 22.56 qtl for marginal farmers and lowest at 19.74 qtl for large farmers. The large farmers productivity declined for all the three study crops comparatively over marginal farmers due to inadequate irrigation facilities, low level of technology and other infrastructure facilities.

Across study crops Rabi crops of Paddy and Maize yield per hectare reported highest under rabi season when compared with kharif season. Marginal farmer category per hectare yield reported highest in all study crops of Paddy Maize and gram crop than other farmer groups of sample farmers under both in kharif and rabi seasons in the study districts of West Godavari, Guntur and Kurnool in the state.

4.9: Investment on Farm Machineries by Sample Households:

The use of modern farm machineries and implements under cultivation of agriculture production leads to increase productivity as well as reduce the cost of cultivation. Investment on irrigation and farm mechanization helps to farmers effective utilization of agricultural inputs like maintaining timely agricultural operations. Therefore these two reduce the cost of cultivation and increase the productivity under farm sector. Further the availability of agriculture labour also was scarce, so there is need to introduce modern farm mechanization, which was only substitute the agriculture labour. On the other hand low rainfall and inadequate irrigation water leads to droughts and frequent climate changes also influence the crop productivity. So tube wells/bore wells are important for providing irrigation as and when needed. It is only the substitute to increasing productivity of land. Therefore it is pertinent to examine investment on farm power and machineries by sample households.

TABLE – 4.9

Farm Machinery (One Table for all crops)

Size of Farm	Farm Machinery Investment in Rs/Ha,				
	Tractors	Combined Harvester	Threshing Machine	Tube Well	Total
Marginal	0	0	0	36000	36000
Small	5600	0	0	42000	47600
Semi-Medium	7600	0	540	36500	45640
Medium	12680	0	880	25200	38760
Large	9840	0	1560	20520	31920
All farms	7144	0	796	32044	39984

Source: Field Survey

Table 4.9 presented the data relating to level of investment per hectare on farm machineries and related implements of tubewells/bore wells by sample households. On the whole, total investment per hectare on machineries by average sample household was Rs.39,984 . Of the total investment, highest investment of Rs.32, 044 was on tube wells/bore wells followed by tractors Rs.7144 and less investment reported Rs. 796 from threshing machineries. None of the farmer had reported about investment on combined harvester. Therefore the study found mechanization in agriculture is low.

Overall, total investment per hectare on machineries by MF,SF,SMF,MF and large farmers (LF) found to be Rs. 36,000/- Rs, 47,000/-, Rs.45,640/-, Rs. 38760/- and Rs.31,920/- respectively. Among the farmers small farmer groups had highest and large farmers had least investment per hectare on farm machinery and other implants. All most all farmers had given highest priority for tube wells/bore wells as most valuable, important and essential asset for agriculture production. Thus we found negative correlation between land hold size of farmers and their investment per hectare on tube wells as well as total farm machinery. Both Central and state governments have been promoting farm mechanization and creation of irrigation facilities through subsidies. Therefore all these government schemes helped them particularly in marginal, small and medium farmers comparatively large farmers of the study districts in the state category of farmers.

4.10 Total availability of Selected Crops with Sample Households:

Total 4.10 presented the category-wise total availability of selected crops with sample households during reference year 2012-13.

Paddy: Paddy is the main food crop in our sample districts of Guntur and West Godavari and it is a staple food in the state of Andhra Pradesh. In fact, availability of Paddy produce is influenced by a number of Socio-Economic factors, including farm size; overall per Paddy growing household, total availability of Paddy per household was 233.14 quintal. The beginning stock of Paddy was 3.71 qtl and across farm size the average beginning stock per household of marginal, small and semi-medium farmers reported zero and medium farmers 5.84 qtl and 12.72 qtl large farmers per HH. Overall, on an average production per household varied from 42.36 quintals for marginal farmers followed by 86.88 qtl for small farmers, 138.54 qtl for semi-medium 312.65 Qtl for medium farmers and 566.71 qtl for large farmers per household respectively. Per household the average quantity of production increased with corresponding increase in farm size. The Net average availability of Paddy per household (previous stock+ current production) also reported positively when an increase in the farm size of sample households took place. Therefore interms of net availability of Paddy output for sale, the large farmers are much better position than marginal farmers because they kept some produce for future sale at higher prices.

Maize: Overall, on an average per Maize producer total availability of Maize during reference year was 385.72 quintals, which comprised 8.00 qtls, as beginning stock and 377.71 qtls as production. Total availability of Maize per household varied from 52.28 qtl for marginal farmer to 943.30 qtl for large farmer per household. Total availability of Maize per household and farm size are positively related in average production and net average availability for marketing per house hold of selected farmers during the reference year.

Bengalgram: Overall, on an average, total availability of gram per household production was 178.88 quintals, which comprised of 110.18 quintals beginning stock and 68.70 quintals of production during the reference year. Across farm size Table 4.10 data reveals the average beginning stock was high due to low price in the market (2012-13) private traders are purchased at low price, Government procurement is limited. Therefore large quantity of stocks hold in the market yards in the state. Among farm size total availability of gram per household

was only 23.00 qtl for marginal farmer and 366.13 qtl for large farmer. There is a significant variation of availability of gram among the farmers groups. As increase in farm size the net availability of gram per house hold also increased.

Table 4.10
Crop Wise Availability by Farm Size in Quintals

Qtl./HHs

Farm Size	No. of HHs	Availability of Selected Crops (Qtl./hhs)		
		Average Beginning Stock (1)	Average Production (2)	Net Average Availability (1+2)
Paddy				
Marginal	40	0.00	42.36	42.36
Small	40	0.00	86.88	86.88
Semi-Medium	40	0.00	138.54	138.54
Medium	48	5.84	312.65	318.49
Large	32	12.72	566.71	579.43
All farms	200	3.71	229.43	233.14
Maize				
Marginal	32	0.00	52.28	52.28
Small	32	0.00	110.45	110.45
Semi-Medium	32	4.24	195.79	200.03
Medium	32	12.66	460.60	473.26
Large	22	23.14	920.16	943.30
All farms	150	8.01	377.71	385.72`````````
Bengal Gram				
Marginal	16	5.88	17.13	23.01
Small	16	48.44	31.00	79.44
Semi-Medium	20	119.50	53.90	173.40
Medium	24	158.33	94.08	252.41
Large	24	218.75	147.38	366.13
All farms	100	110.18	68.70	178.88

Source: Field Survey

4.11 Retention Pattern of Selected Crops:

Retention of crop produce depends on producers needs and their production levels. There is a need to determine the compulsory retentions from the production of a producer for different purposes like self-consumption, farm seed and other socio-economic factors etc., So the marketable surplus determination depends on the above mentioned factors of the sample farmer. Moreover the retention pattern of the crop produce will also be decided by the farm size and consumption habits of the family for each study crop. Table 4.11.1 depicted purpose

wise retention of selected crops of Paddy, Maize and Bengal gram production expressed by the sample households.

Paddy:

Overall the average per household total retention of Paddy was 8.02 quintals. Out of which 7.49 quintals (96.86 per centage)was retained for self consumption 0.25 quintals (3.14 per cent) retained for seed purposes. Quantity of produce used for payment in kind and other purposes was zero. Moreover for marginal, small, semi medium, medium and large farmers per HH total Paddy quantity retained per HH was 0.54, 2.05, 4.39, 10.51 and 22.59 quintals respectively. Among farm sizes highest quantity per HH Paddy retention was 22.59 quintal from large farmer group and least 0.44 quintal from marginal farmers category.

Further table 4.11.1 revealed that all farm categories reported that a small quantity of Paddy produce was retained for home consumption and seed purposes due to the Government of Andhra Pradesh supplying rice at subsidy price every month through public Distribution System (PDS) to poor small and middle class farmers. On the other hand regarding seed also supplying by Andhra Pradesh Seed Development Corporation at subsidized prices to the farmers benefits. Therefore the above mentioned causes are the small amount of Paddy retention for both self-consumption and seed purposes per HH of all farmer groups expressed at the time of household survey.

Maize:

Table 4.11.1 depicted that the overall total retention of Maize quantity per HH was 0.28 quintals. The total retention of Maize produce kept for self-consumption was negligible in quantity and seed, feed and other payments in kind and other purposes was zero. The data further reveals a positive relation across the farm size under Maize crop of the sample HH.

Bengalgram:

Item wise retention of bengalgram production per HH is given in table 4.11.1. Overall, total retention of farm produce per HH was 0.15 quintals. The total quantity of grain retained only for self-consumption was 0.10 quintals for marginal farmers, 0.08 for small farmer, 0.15 for semi-medium, 0.24 for medium and 0.16 quintals for large farmer kept for self consumption.

All the Bengal gram sample farmers reported that gram produce was not used for other purposes like seed and other payments etc.,

Table 4.11.2 revealed that the purpose wise share of retention of sample crops of production to total production. Overall, total retention of Paddy produce was 8.02 qtls (3.49 per cent) of which 3.49 per cent of production was retained for self-consumption and very little produce retained 0.11 per cent for seed purpose. Among the farmer groups the share of retention of Paddy produce for self-consumption was highest share of 3.99 per cent from large farmers. Whereas 1.04 per cent for marginal farmer group. Marginal, small and semi-medium farmers purchased rice from public distribution system at subsidized prices. On the other hand most of the medium and large farmers are also purchased the good quality rice from the market. Moreover the highest per centage 0.58 per cent retained for seed from semi-medium farmer group. On the whole the per centage share of retention to total production was lowest 1.27 and 2.36 per cent from marginal and small farmers group. Due to immediate cash needs for payment of debts and urgent needs of family obligations like daughter marriages, medical productions etc. It is called as a distress sale.

On the other hand overall, total retention of Maize was 0.28 quintals per HH and accounted for only 0.08 per cent of total Maize crop production across different farm categories, it varied from 0.25 per cent from marginal to 0.06 per cent from large farmers groups per HH to total retention. Purpose-wise retention for Maize produce reported for self-consumption and other purposes are reported zero. Further table 4.11.2 total retention of gram per HH accounted for about 0.21 per cent of total gram production. The retention of gram produce kept for home consumption reported meager quantity and the other purposes zero. The Maize quantity retained by marginal, small, semi-medium, medium and large farmers per HH was 0.10, 0.08, 0.15, 0.24, and 0.16 quintals and their per centages 0.58, 0.26, 0.28, 0.26 and 0.11 per cent respectively.

Table 4.11.1
Crop retention pattern

(Retention in Qtl./HHs)

Farm Size	Self-Consumption			Seed (2)	Feed (3)	Others (4)	Payments in kind	Total retention (1+2+3+4)
	Retention (1)	Purchased[1]						
		Qty	Price				Qty	
Paddy								
Marginal	0.44 (81.48)	2.25	-	0.10 (18.52)	0.00	0.00	0.00	0.54 (100.00)
Small	1.75 (85.37)	2.40	-	0.30 (14.63)	0.00	0.00	0.00	2.05 (100.00)
Semi-Medium	3.59 (81.78)	2.55	-	0.80 (18.22)	0.00	0.00	0.00	4.39 (100.00)
Medium	10.45 (99.43)	1.96	-	0.06 (0.57)	0.00	0.00	0.00	10.51 (100.00)
Large	22.59 (100.00)	2.31	-	0.00 (0.00)	0.00	0.00	0.00	22.59 (100.00)
All farms	7.49 (96.86)	2.49	-	0.25 (3.14)	0.00	0.00	0.00	8.02 (100.00)
Maize								
Marginal	0.13 (100.00)	0.00	-	0.00	0.00	0.00	0.00	0.13 (100.00)
Small	0.15 (100.00)	0.00	-	0.00	0.00	0.00	0.00	0.15 (100.00)
Semi-Medium	0.27 (100.00)	0.00	-	0.00	0.00	0.00	0.00	0.27 (100.00)
Medium	0.30 (100.00)	0.00	-	0.00	0.00	0.00	0.00	0.30 (100.00)
Large	0.53 (100.00)	0.00	-	0.00	0.00	0.00	0.00	0.53 (100.00)
All farms	0.28 (100.00)	0.00	-	0.00	0.00	0.00	0.00	0.28 (100.00)
Bengal Gram								
Marginal	0.10 (100.00)	0.00	-	0.00	0.00	0.00	0.00	0.10 (100.00)
Small	0.08 (100.00)	0.00	-	0.00	0.00	0.00	0.00	0.08 (100.00)
Semi-Medium	0.15 (100.00)	0.00	-	0.00	0.00	0.00	0.00	0.15 (100.00)
Medium	0.24 (100.00)	0.00	-	0.00	0.00	0.00	0.00	0.24 (100.00)
Large	0.16 (100.00)	0.00	-	0.00	0.00	0.00	0.00	0.16 (100.00)
All farms	0.15 (100.00)	0.00	-	0.00	0.00	0.00	0.00	0.15 (100.00)

Source: Field Survey

Note: Brackets in figures indicates per centage of total retention per HH of sample crops.

Table 4.11.2

Purpose-wise Per centage Share of Retention of selected Crops to total Farm production

Farm Size	Self-consumption (1)	Seed (2)	Feed (3)	Others (4)	Payments in kind Qty (6)	Total retention (1to 6)
Paddy						
Marginal	1.04	0.24	0.00	0.00	0.00	1.27
Small	2.01	0.35	0.00	0.00	0.00	2.36
Semi-Medium	2.59	0.58	0.00	0.00	0.00	3.17
Medium	3.34	0.02	0.00	0.00	0.00	3.36
Large	3.99	0.00	0.00	0.00	0.00	3.99
All farms	3.38	0.11	0.00	0.00	0.00	3.49
Maize						
Marginal	0.25	0.00	0.00	0.00	0.00	0.25
Small	0.14	0.00	0.00	0.00	0.00	0.14
Semi-Medium	0.14	0.00	0.00	0.00	0.00	0.14
Medium	0.07	0.00	0.00	0.00	0.00	0.07
Large	0.06	0.00	0.00	0.00	0.00	0.06
All farms	0.08	0.00	0.00	0.00	0.00	0.08
Bengal Gram						
Marginal	0.58	0.00	0.00	0.00	0.00	0.58
Small	0.26	0.00	0.00	0.00	0.00	0.26
Semi-Medium	0.28	0.00	0.00	0.00	0.00	0.28
Medium	0.26	0.00	0.00	0.00	0.00	0.26
Large	0.11	0.00	0.00	0.00	0.00	0.11
All farms	0.21	0.00	0.00	0.00	0.00	0.21

Source: Field Survey

Note: Figure denotes per centage to total farm production of respective crop.

Therefore overall, total retention of Rice quantity per HH was 8.02 quintals accounted for about 3.49 per cent of total farm production of Rice (table 4.11.2). As Rice is most important staple food of the people and the per centage of Rice produce to total retention is larger quantity compared to other two sample good grain crops of Maize and Bengalgram in the study crops. The per centage share of retention from total Paddy produce among the farmers groups reported declining trend as land size increases. Some farmers belonging to different farm categories retained less quantity than the actual quantity required for home consumption due to subsidy rice supplied by the fair price shops to the poorer sections and other medium and large land holding categories are also purchased good quality rice at higher price from the market. Moreover the government of Andhra Pradesh also supply the Paddy seed at the Kharif season through seed corporation at subsidy prices to the farmers benefit. Further Maize and gram reported meager quantity of produce retained for self-consumption and the per centage

share also report as farm size increases the per centages retention to total production declined. So there was a negative relation reported. The share of retention to total production from marginal to large farmers of these two crops (Maize and Bengal gram).

4.12.1 Production Losses during Different Harvesting Operations:

Table 4.12.1 displayed the quantity and per centage losses of production during different stages of harvesting, threshing and winnowing for selected crops of Paddy, Maize and gram. Generally sample farmers used both manual and mechanical methods, to carryout the availability of methods used for during harvesting, threshing and winnowing. During the use of manual or mechanical methods for harvesting some losses of produce occurred. The sample farmers expressed their losses and estimated the quantity of loss and its per centage separately presented in Table 4.12.1

I PADDY: Overall, per household total losses of Paddy production during different harvesting operations turned out to be 2.88 kgs which was 1.26 per cent of total production. For Paddy, harvesting, threshing and winnowing operations performed by both manual and mechanical and the large farmers only operated under mechanical. Total losses per household of Paddy during crop harvesting losses accounted for 1.48 kgs, which was 0.65 per cent losses of total production and losses during threshing accounted for 0.99 kgs (0.43%). Further winnowing accounted for 0.41 kgs (0.18%) of total Paddy production losses during harvesting operations.

The total loss per household under Paddy crop was 2.88kg (1.26%) of total produce per household. Category-wise per centage of total losses of Paddy production during different harvesting operations was 0.69, 0.56, 0.48, 0.26 and 0.12 per cent for MF, SF, SMF, MDF and LF respectively. There was inverse relation between land size and production loss during total harvesting operations per HH of sample farmers.

Table 4.12.1
Crop losses on farm

(Qty in Qtl/hh's)

Farm size	Mode /Method	Losses							
		Harvesting		Threshing		Winnowing		Total	
		Qty.	%	Qty.	%	Qty.	%	Qty.	%
Paddy									
Marginal	Manual	0.13	0.31	0.07	0.17	0.02	0.045	0.22	0.53
	Mechanical	0.02	0.05	0.03	0.07	0.02	0.045	0.07	0.16
	Total	0.15	0.36	0.10	0.24	0.04	0.09	0.29	0.69
Small	Manual	0.20	0.23	0.12	0.13	0.04	0.05	0.36	0.41
	Mechanical	0.07	0.08	0.04	0.05	0.02	0.02	0.13	0.15
	Total	0.27	0.31	0.16	0.18	0.06	0.07	0.49	0.56
Semi-Medium	Manual	0.22	0.16	0.05	0.04	0.00	0.00	0.27	0.19
	Mechanical	0.10	0.07	0.20	0.14	0.10	0.07	0.40	0.29
	Total	0.32	0.23	0.25	0.18	0.10	0.07	0.67	0.48
Medium	Manual	0.30	0,10	0.10	0.03	0.02	0.01	0.42	0.14
	Mechanical	0.10	0.03	0.18	0.06	0.10	0.03	0.38	0.12
	Total	0.40	0.13	0.28	0.09	0.12	0.04	0.80	0.26
Large	Manual	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Mechanical	0.34	0.06	0.20	0.04	0.09	0.02	0,63	0.12
	Total	0.34	0.06	0.20	0.04	0.09	0.02	0.63	0.12
All farms	Manual	0.85	0.37	0.34	0.15	0.08	0.03	1.27	0.55
	Mechanical	0.63	0.28	0.65	0.28	0.33	0.15	1.61	0.71
	Total	1.48	0.65	0.99	0.43	0.41	0.18	2.88	1.26
Maize									
Marginal	Manual	0.05	0.10	0.01	0.02	0.01	0.02	0.07	0.14
	Mechanical		0.00	0.00	0.00		0.00	0.00	0.00
	Total	0.05	0.10	0.02	0.02	0.01	0.02	0.07	0.14
Small	Manual	0.07	0.06	0.02	0.02	0.02	0.02	0.11	0.10
	Mechanical		0.00	0.00	0.00		0.00	0.00	0.00
	Total	0.07	0.06	0.02	0.02	0.02	0.02	0.11	0.10
Semi-Medium	Manual	0.09	0.05	0.02	0.00	0.01	0.01	0.10	0.05
	Mechanical		0.00	0.07	0.05	0.00	0.00	0.09	0.05
	Total	0.09	0.05	0.09	0.05	0.01	0.01	0.19	0.10
Medium	Manual	0.14	0.03	0.00	0.00		0.00	0.14	0.03
	Mechanical		0.00	0.12	0.03	0.02	0.00	0.14	0.03
	Total	0.14	0.03	0.12	0.03	0.02	0.00	0.28	0.06
Large	Manual	0.16	0.02	0.00	0.00	0.00	0.00	0.16	0.02
	Mechanical		0.00	0.23	0.02	0.04	0.00	0.27	0.03
	Total	0.16	0.02	0.23	0.02	0.04	0.00	0.43	0.05
All farms	Manual	0.51	0.15	0.03	0.01	0.04	0.01	0.58	0.17
	Mechanical	0.00	0.00	0.44	0.13	0.06	0.02	0.50	0.14
	Total	0.51	0.15	0.47	0.14	0.10	0.03	1.09	0.31
Bengal Gram									
Marginal	Manual	0.03	0.18	0.01	0.06	0.00	0.00	0.04	0.23
	Mechanical		0.00	0.00	0.00		0.00	0.00	0.00
	Total	0.03	0.18	0.01	0.06	0.00	0.00	0.04	0.23
Small	Manual	0.04	0.13	0.02	0.06	0.00	0.00	0.06	0.19
	Mechanical		0.00		0.00		0.00	0.00	0.00
	Total	0.04	0.13	0.02	0.06	0.00	0.00	0.06	0.19
Semi-Medium	Manual	0.04	0.07	0.02	0.04	0.00	0.00	0.06	0.11
	Mechanical		0.00	0.00	0.00		0.00	0.00	0.00
	Total	0.04	0.07	0.02	0.04	0.00	0.00	0.06	0.11
Medium	Manual	0.14	0.15	0.00	0.00	0.00	0.00	0.14	0.15
	Mechanical		0.00	0.12	0.13		0.00	0.12	0.13
	Total	0.14	0.15	0.12	0.13	0.00	0.00	0.26	0.28
Large	Manual	0.20	0.14	0.00	0.00	0.00	0.00	0.20	0.14
	Mechanical		0.00	0.16	0.11	0.00	0.00	0.16	0.11
	Total	0.20	0.14	0.16	0.11	0.00	0.00	0.36	0.24
All farms	Manual	0.45	0.66	0.05	0.07	0.00	0.00	0.50	0.73
	Mechanical	0.00	0.00	0.28	0.41	0.00	0.00	0.28	0.41
	Total	0.45	0.66	0.33	0.48	0.00	0.00	0.78	1.14

Source: Field Survey

II Maize: For Maize crop harvesting operations carryout for both manual as well as mechanical. Overall, per household total losses of Maize production during different harvesting operations workedout to be 1.09 kg per household. Out of the total losses 0.58 kgs (0.17%) and 0.50 Kgs (0.14%) occurred during both manual and mechanical operations respectively. Of the total Maize production losses 0.15, 0.14 and 0.03 per cent occurred at harvesting, threshing and winnowing stages respectively. Category-wise total losses of production vary from 0.14 per cent for MF to 0.05 per cent for large farmers.

III GRAM: Overall, per household total losses of gram production during various harvesting operations was 0.78 kg. (1.14 per cent), of the total production losses, harvesting was 0.45 Kg(0.66%) and threshing was 0.33 kg (0.48%) respectively. Category wise per centage of production losses was 0.23, 0.19, 0.11, 0.28 and 0.24 for MF, SF, SMF, MF and LF respectively.

Therefore production losses during various harvesting operations of the study crops Paddy, Maize and gram reported that the low level of mechanical instruments used for harvesting operations due to low level of agriculture mechanization. Most of the farmers depending on manual methods used in different stages of harvesting operations for selected crops of Paddy, Maize and gram. Lack of awareness of the mechanization about harvesting operations and non suitability of land holdings are the main causes expressed by the farmers.

4.12.2 Production Losses during transportation at Producers level-Selected crops:

Transportation is another activity of producer in the production process. The transportation activity is mandatory at producer's level. During the transportation of produce from field to market some wastage/losses of crop will occur due to lack of proper handling of the produce at the time packing and transportation process. Majority of farmers used head load mode and buffalo cart transportation of produce from field to threshing floor. Further the surplus produce transported from farm/storage of market place carried by buffalo cart, tractor, trolley and truck. Majority farmers carried out their marketed surplus to the market place in gunny/polyethylene bag packing. Losses occurred at packing, dividing, loading and un loading of produce are considered here as a part of transportation losses.

Table 4.12.2
Crop losses during transport

(Qtl/HHs)

Farm size	Filled to threshing floor				Field/farm to market				Total transport losses	
	Mode/ Method	Packing	Qty (Qtl.)	% losses	Mode/ Method	Packing	Qty (Qtl.)	% losses	Qty (Qtl.)	% losses
Paddy										
Marginal	1	1	0.020	(0.04)	3	1	0.010	(0.02)	0.030	(0.06)
Small	1,2	1	0.020	(0.02)	3	1	0.010	(0.01)	0.030	(0.03)
Semi-Medium	1,2	3	0.030	(0.02)	3	1	0.020	(0.01)	0.050	(0.04)
Medium	2,3	3	0.020	(0.01)	3,5	1	0.020	(0.01)	0.040	(0.01)
Large	2,3	3	0.050	(0.01)	3,5	1	0.020	(0.00)	0.070	(0.01)
All farms	-	-	0.028	(0.01)			0.016	(0.01)	0.044	(0.02)
Maize										
Marginal	1	1	0.030	(0.06)	2,3	1	0.010	(0.02)	0.040	(0.08)
Small	1,2	1	0.020	(0.02)	2,3	1	0.010	(0.01)	0.030	(0.03)
Semi-Medium	1,2	1	0.040	(0.02)	2,3	1	0.010	(0.01)	0.050	(0.03)
Medium	1,2	1	0.040	(0.01)	3,4	1	0.010	(0.00)	0.050	(0.01)
Large	1,2	1	0.040	(0.00)	3,4	1	0.020	(0.00)	0.060	(0.01)
All farms	-	-	0.034	(0.01)			0.012	(0.00)	0.046	(0.01)
B.Gram										
Marginal	1	1	0.010	(0.06)	2,3	1	0.008	(0.05)	0.018	(0.11)
Small	1,2	1	0.015	(0.05)	2,3	1	0.006	(0.02)	0.021	(0.07)
Semi-Medium	1,2	1	0.015	(0.03)	3,5	1	0.009	(0.02)	0.024	(0.04)
Medium	1,2	1	0.020	(0.02)	3,5	1	0.012	(0.01)	0.032	(0.03)
Large	1,2	1	0.020	(0.01)	3,5	1	0.015	(0.01)	0.035	(0.02)
All farms	-	-	0.016	(0.02)			0.010	(0.01)	0.026	(0.04)

Source: Field Survey

Note: * Head load=1, Bullock/camel/buffalo cart=2, Tractor Trolly=3, Tempo/three wheeler=4, Truck=5,Others = 6

** bags = 1, In bulk = 2, Both in bags and bulk = 3,

Figures in brackets denotes the per cent of losses to average production per HH

1.Paddy: Overall, average losses of Paddy during transportation was 0.04 kg per household, which was accounted for 0.02 per cent of total Paddy production. Category wise absolute quantity of Paddy lost during transportation varied from 0.07 kg for LF (0.01% of production) to 0.03 kg for MF and SF (0.06% of production). During the stage of transportation process from field to market place Paddy production losses increased with an increase in farm size to absolute quantity of transportation losses also increased. Therefore total transport losses in absolute terms increased per HH as increases in land sizes. But the per centage of transport losses of Paddy per HH declining trend with increasing farm size. In the case of transport losses from field to threshing floor Paddy transportation losses was 0.028kg of produce and major mode of transport is head load, buffalo cart and tractor. On the other hand during

field/farm to market of marketed surplus of Paddy produce carry through gunny bags and transportation losses was 0.016 quintals (0.01%) of total produce under Paddy crop.

2. Maize: Overall, total transportation losses per household for Maize crop was 0.046 kg of which was (0.01 per cent) for transportation of Maize produce from field to threshing floor 0.034 kg. Transportation of marketed surplus from farm/field to market place was 0.012 kg per household and the mode of transport was gunny bags.

3. Bengal gram: Overall, total losses of gram produce per household during transportation was 0.026kg which was 0.04% of total gram production. The total transport losses of gram output 0.016 kg per household reported during transportation from flied to threshing floor. The transportation used mainly head load, buffalo cart and the transportation losses of gram from field to market place was 0.010kg per HH and used tractor trolley and truck as a mode of transport. Farm category wise absolute quantity lost during transportation per household is increasing with the increase in farm size since majority of farmers used gunny bags packing for transportation from farm to market place.

4.12.3 Crop Losses during Storage at Producers level:

The details of crop loss during storage at producers' level for selected crops have been given in table 4.12.3. Traditionally majority of farmers used in house storage. Some economically rich farmers kept part of their marketable surplus of food grains as stock for future sales in anticipation of further increase in price. Such stock they stored mostly in home godowns. It may be pucca or kutcha, The storage of food grains are packed in jute/polythene bags to protect grains from pests, rodents, rain and wind. The quantity of grains stored was gradually withdrawn from the storage as and when the need of the sample farmer occurred.

Paddy: Overall, average quantity of Paddy stored per household was 14.66 quintals against the storage capacity 52.50 quintals. For storage, farmers used both Kutcha, earthen storage and pucca storage with cement floor. Quantity of Paddy stored by medium and large farmers was 8.50 and 20.82 quintals respectively. Average quantity lost during storage was 0.02 quintals, which accounted for 0.12 per cent of total quantity stored. Category-wise storage loss was highest among the farmers group 0.19 per cent for medium farmers and 0.09 per cent for large farmers and overall, 0.12 per cent of total Paddy production. Overall, average monthly cost of Paddy storage at producers level estimated to Rs.10.50 per quintal and

Rs.11.20 for large farmers and Rs.9.80 for medium farmers. The other farmer groups were not stored the Paddy produce for future trade and majority of marginal, small and semi-medium farmers purchased rice from public distribution system setup by the Andhra Pradesh government, more over for seed also

Table 4.12.3
Crop losses from storage at producers level

Farm size	Type of storage *	Amount of quantity stored (Qtl.)	Capacity storage (Qtl.)	Quantity lost (Qtl.)	% of Quantity lost to total stored	% of storage loss to Avg.Prod.	Storage time in days	Average cost of storage (Rs./Month)	Average cost of storage (Rs./Qtl/ Month)
Paddy									
Marginal	1,2	-	-	-	-	-	-	-	-
Small	1,2	-	-	-	-	-	-	-	-
Semi-Medium	1,2	-	-	-	-	-	-	-	-
Medium	1,2	8.50	25.00	0.02	0.19	0.005	120	9.80	1.40
Large	1,2	20.82	80.00	0.02	0.09	0.003	120	11.20	2.00
All farms	1,2	14.66	52.50	0.02	0.12	0.007	120	10.50	1.70
Maize									
Marginal	1,2	-	-	-	-	-	-	-	-
Small	1,2	-	-	-	-	-	-	-	-
Semi-Medium	1,2	-	-	-	-	-	-	-	-
Medium	1,2	6.20	10.00	0.02	0.32	0.00	60-90	10.83	2.87
Large	1,2	10.14	15.00	0.16	1.58	0.02	60-90	12.67	3.41
All farms	1,2	8.17	12.50	0.09	1.10	0.03	60-90	10.67	2.49
B.Gram									
Marginal	1,2	15.00	20.00	0.00	0.00	0.00	365	11.82	2.82
Small	1,2	26.50	50.00	0.05	0.19	0.16	365	13.50	3.67
Semi-Medium	1,2	48.40	100.00	0.15	0.31	0.28	365	15.94	4.01
Medium	1,2	81.02	140.00	1.12	1.38	1.19	365	16.20	4.99
Large	1,2	128.25	200.00	0.18	0.14	0.12	365	18.66	5.35
All farms	1,2	59.83	102.00	0.30	0.50	0.44	365	15.22	4.17

Source: Field Survey

Note: * Kutcha storage with Earthen floor, wall, roof = 1,
Pucca storage with cemented floor, wall, roof = 2
Steel storage bin = 3

supplied by the agriculture department at subsidized prices. Therefore storage for home consumption and seed purpose need not required storage facilities and large scale Paddy produce sale at the harvesting stage to local traders expressed by the majority of Paddy crop sample households in household survey. Therefore the per centage losses coming out very small quantity per HH of sample farmers under Paddy crop.

Maize: Overall average quantity of Maize stored per household was 8.17 quintals as against storage capacity was 12.50 quintals. Majority of sample farmers reported that the mode of storage used was both kutcha and pucca storage. Average quantity stored by medium and large farmers expressed at very low, which was 6.20 and 10.14 quintals respectively. An average storage loss reported by sample households was 0.09 quintals the storage losses were 0.03 per cent of total Maize production. Overall per household monthly average storage cost of Maize worked out at Rs.2.49 per quintal per month.

Gram: In the case of gram, overall average quantity stored per household was 59.83 quintals as against storing capacity was 102.00 quintals. The mode of storage was kutcha and pucca storage with cement floor and some medium and large farmers were kept in agriculture marketing yards. Category-wise average quantity of gram stored varied between 15.00 quintals for MF to 128.25 quintals for large farmers. The average quantity lost during storage was 0.30 quintals, which accounted for 0.50 per cent of total quantity stored and it varied from 0.05 quintal to 0.18 quintal between small and large farmers. Overall, storage loss as per centage to total production was 0.44 per cent and varied from 0.28 per cent from semi medium farmers to 0.12 per cent for large farmer. Average monthly cost of storage per quintal worked out to Rs.4.17. Therefore storage facilities are used only some sections of medium and large farmer groups.

4.12.4 Estimation of total Production Losses at Different stages of handling – selected crops:

Table 4.12.4 shows that estimation of total production losses at different stages for selected crops of Paddy, Maize and gram. The overall total losses of Paddy production at various stages per household accounted for 1.28 per cent. For Maize and gram overall total losses at different stages was 0.35 and 1.62 per cent of total production of the sample households. Across these selected crops Bengal gram produced highest losses, accounted for 1.62 per cent than other two selected crops of Paddy and Maize. For Paddy Maize and gram crop farmers reported highest loss occurred at harvesting stage followed by storage and transportation operations. For Paddy per centage of total production losses is declining with increase in farm size like marginal, small and semi medium farmers are not capable and unaware to use mechanization due to unsuitable lands and socio-economic factors.

Table: 4.12.4
Estimation of Production losses at different stage of handling

Farm Size	Production (Qtl./HHs)	% Losses of production at stages			
		Harvesting	Transportation	Storage	Total
Paddy					
Marginal	42.36	0.69	0.07	-	0.76
Small	86.88	0.56	0.03	-	0.59
Semi-Medium	138.54	0.48	0.04	-	0.52
Medium	312.65	0.26	0.01	0.005	0.28
Large	566.71	0.11	0.01	0.003	0.12
All farms	229.43	1.25	0.02	0.007	1.28
Maize					
Marginal	52.28	0.14	0.08	-	0.22
Small	110.45	0.10	0.03	-	0.13
Semi-Medium	195.79	0.10	0.03	-	0.13
Medium	460.6	0.06	0.01	0.00	0.07
Large	920.16	0.05	0.01	0.02	0.08
All farms	347.86	0.31	0.01	0.03	0.35
Bengal Gram					
Marginal	17.13	0.23	0.11	0.00	0.34
Small	31.00	0.19	0.07	0.16	0.42
Semi-Medium	53.90	0.11	0.04	0.28	0.43
Medium	94.08	0.28	0.03	1.19	1.50
Large	147.38	0.24	0.02	0.12	0.38
All farms	68.70	1.14	0.04	0.44	1.62

Source: Field Survey

4.13 Marketed Surplus of Selected crops and its Sale Pattern:

Table 4.13 shows crop-wise and farm size wise marketed surplus, time of sale after harvest and actual quantity sold at different market agencies.

Paddy: Overall Paddy production per sample household was 229.43 quintals, and the marketed surplus output ratio to total production was 96.16 per cent. Category-wise the marketed surplus output Ratio (MSR) of Paddy was found to be highest for semi medium farmers at 98.19per cent and the lowest from medium farmers at 92.92 per cent. Table 4.13 revealed that the marketed Surplus per household found to be positively related with farm size that increased upto semi medium farmer. Regarding the month of sale, it was found that the farmers sold the marketed surplus of Paddy in the month of December and January. This indicates that very few medium and large farmers kept some quantity of produce for speculative purposes. Majority of farmers from all farm categories expressed to sale the produce immediately after harvesting. The reasons mainly were socio-economic causes like cash needs, debt payments to money lenders or private traders, repayment of bank debts.

Very few medium and large farm categories kept Paddy for speculative purposes. The average distance covered to sell was 4.43 km. that depends on existence of rice mills. The total quantity of marketed surplus was 83.84 per cent of Paddy that was sold in unregulated markets such as private or village traders and money lenders and remaining 16.16 per cent sold at government agencies due to untimely marketing. So most of the farmers sold their produce to private agencies due to immediate cash needs, indebtness and other economic factors. Therefore unregulated marketing system exploited the farmers by paying low price against the minimum support price besides private traders manipulating at the time of waving also expressed by the farmers.

Maize: Our data revealed that Per household Maize production was 347.86 qtls., of which the total marketed surplus accounted for 99.92 per cent. Farm Category-wise it ranged from 99.75 per cent from marginal farmers to 99.94 per cent in the case of large farmers. So there is no big variation among the farmer groups regarding the MSR. Very few Maize growing producers kept this produce for self-consumption. All farm categories reported that the Maize produce sold at the farm gate at the time of harvesting in the months of March and April. About the marketing, the total marketed surplus 88.14 per cent of Maize was sold to private traders/money lenders due to debts and other economic factors. Average distance covered to sell the Maize was 7.92 k.m. from the village. Private agencies played a dominant role in purchasing the Maize produced from the farmers as the farmers felt immediate cash needs and to reduce the burden from transportation, packing, loading, unloading and other market problems.

Table 4.13
Marketed Surplus of Selected Crops and its Sale Pattern

(Per hhs)

Farm size	Total Prod. (Qtl.)	Total Qty.Sold (Qtl.)	MSR (%)	Month of Sale	Average Distance	Agencies to whom sold								
						Govt Agencies			Pvt. Trader/ money lender			Others		
						Qty (Qtl)	% to total sold	Price (Rs/Qtl.)	Qty (Qtl)	% to total sold	Price (Rs/Qtl.)	Qty (Qtl)	% to total sold	Price (Rs/Qtl.)
Paddy														
Marginal	42.36	41.08	96.98	12-1	3.75	2.71	6.92		36.45	93.08		-	-	-
Small	86.88	84.99	97.82	12-1	2.51	8.44	10.38		72.84	89.62		-	-	-
Semi-Medium	138.54	136.03	98.19	12-1	5.40	17.40	13.27		113.74	86.73		-	-	-
Medium	312.65	290.50	92.92	12-1	4.69	65.38	21.38		240.48	78.62		-	-	-
Large	566.71	537.80	94.90	12-1	5.82	129.99	23.37		426.25	76.63		-	-	-
All farms	229.43	218.08	96.16	12-1	4.43	35.99	16.16		186.75	83.84		-	-	-
Maize														
Marginal	52.28	52.15	99.75	3-4	4.80	0.00	0.00		52.15	100.00		-	-	-
Small	110.45	110.30	99.86	3-4	6.95	12.81	11.61		97.49	88.39		-	-	-
Semi-Medium	195.79	195.52	99.86	3-4	8.20	40.32	20.62		155.2	79.38		-	-	-
Medium	460.6	460.30	99.93	3-4	10.50	62.15	13.50		398.15	86.50		-	-	-
Large	920.16	919.63	99.94	3-4	9.16	115.25	12.53		804.38	87.47		-	-	-
All farms	347.86	347.58	99.92	3-4	7.92	41.21	11.86		306.37	88.14		-	-	-
B.Gram														
Marginal	17.13	2.03	11.85	5	2.50	0.00	0.00		2.03	100.00		-	-	-
Small	31	4.42	14.26	5	3.80	0.00	0.00		4.42	100.00		-	-	-
Semi-Medium	53.9	5.35	9.93	5	4.61	0.35	6.54		5.00	93.46		-	-	-
Medium	94.08	12.82	13.63	5	7.28	1.02	7.96		11.80	92.04		-	-	-
Large	147.38	18.97	12.87	5	5.30	1.72	9.07		17.25	90.93		-	-	-
All farms	68.7	8.72	12.70	5	4.70	0.62	7.15		8.10	92.85		-	-	-

Source: Field Survey

Bengal Gram: Overall, the average gram production per household was 68.7 qtl. of which total marketed surplus was 8.72 qtl with 12.70 per cent only. Category-wise MSR was highest 14.26% in small farmers to lowest 9.93 per cent from semi medium farmers as compared to other groups of farmers. During the field survey all groups of farmers reported that the price of Bengal gram always fluctuate and during the years 2011-12 and 2012-13 the market price is very low. Therefore the gram producers kept large quantity of produce stored in market yards and farmers requested the government agency to purchase at higher prices than market prices. Regarding the time of sale reported as by the farmers is the month May and the average distance covered to sell the gram produce was 4.70 kms. Majority of produce was purchased by the government agencies in the state due to low market price during the reference year.

4.14 Extent of Marketable Surplus of Selected Crops:

Table 4.14 depicted the marketable surplus, retention, purchases and post harvest losses of the sample farmers of selected crops.

Paddy: Overall marketable surplus was 95.24 per cent against total production. Out of total Paddy production of 45886.00 quintals by sample farmers, the total retention for different purposes and losses were 1709.31 quintals and 10.16 quintals respectively. Moreover farmers had repurchased 488 quintals for self-consumption and seed and other purposes from the public distribution system and seed corporation supplied by the Government of Andhra Pradesh at subsidy prices. The percentage of Marketable Surplus also increased with farm size increases. It varied from 91.60 per cent for marginal farmer to 96.02 per cent for large farmer.

Table 4.14
Extent of Marketable Surplus of selected Crops

Farm Size	Total prod. Qtl	Total Retention	Purchased (Qtl.)	Losses (Qtl.)			Marketable Surplus (2-(3+4+7)	
				Transport	Storage	Total	Qty. (Qtl)	%
1	2	3	4	5	6	7	8	9
Paddy								
Marginal	1694.40	51.20	90.00	1.20	0.00	1.20	1552.00	91.60
Small	3475.20	75.54	150.00	1.20	0.00	1.20	3248.46	93.48
Semi-Medium	5541.60	100.25	120.00	2.00	0.00	2.00	5319.35	95.99
Medium	15007.20	813.20	55.00	1.92	0.96	2.88	14136.12	94.20
Large	18134.72	669.12	50.00	2.24	0.64	2.88	17412.72	96.02
All farms	45886.00	1709.31	465.00	8.56	1.60	10.16	43701.53	95.24
Maize								
Marginal	1672.96	4.26	0	1.28	0.00	1.28	1667.42	99.67
Small	3534.40	4.86	0	0.96	0.00	0.96	3528.58	99.84
Semi-Medium	6265.28	8.64	0	1.60	0.00	1.60	6255.04	99.84
Medium	14739.20	9.48	0	1.60	0.64	2.24	14727.48	99.92
Large	20243.52	11.62	0	1.32	3.52	4.84	20227.06	99.92
All farms	52179.00	38.86	0	6.76	4.16	10.92	52129.22	99.90
B.Gram								
Marginal	274.08	1.60	0	0.29	0.00	0.29	272.19	99.31
Small	496.00	1.28	0	0.34	0.80	1.14	493.58	99.51
Semi-Medium	1078.00	3.00	0	0.48	3.00	3.48	1071.52	99.40
Medium	2257.92	5.76	0	0.77	2.88	3.65	2248.51	99.58
Large	3537.12	3.84	0	0.84	4.32	5.16	3528.12	99.75
All farms	6870.00	15.48	0	2.71	11.00	13.71	6840.81	99.58

Source: Field Survey

Maize: Overall, total Maize production was 52,179.00 qtls and the marketable surplus was 99.90 per cent (52129.22 quintals). Among farm categories, it varied from 99.67 for marginal farmers to 99.92 per cent for large farmers. The per centage of marketable surplus indicates a small variation among farm size groups. Out of the total production of (52,179.00 qtl) only 0.10 per cent retained for self-consumption and other purposes including losses of transportation and storage. Farmers need not repurchase the Maize produce for self-consumption from the market.

Gram: Overall, total Bengal gram production was 6870.00 qtls and 6837.30 quintals and marketable surplus was 6840.81 quintals. So out of total gram production 99.58 per cent was

marketable surplus. Across the farmer groups marketable surplus reported a very small variation i.e. 99.31 per cent to 99.75 per cent from marginal farmer to large farmer and the per centage of marketable surplus also increased as land size increased, so it indicates positive trend across farm categories. The total retention quantity of gram produce was 29.19 quintals (0.41 per cent), and it was retained only for self-consumption expressed by the farmers.

4.15 Relationship of Marketable and Marketed Surplus:

Marketed Surplus mainly depends on the family's socio-economic factors. So marketed surplus may be less, equal or even more than the marketable surplus. The marketed surplus will be higher when the farmer retains lesser of the produce for his requirements like self-consumption and seed purposes. This would be true especially of small and marginal farmers. It may call as distress or forced to sell the produce due to several causes like urgent cash needs, payment of debts and purchasing necessities for family etc., later he may repurchase the required same quantity of product from the market to meet his family requirements. Some times marketed surplus cab be less than the marketable surplus, when the farmer kept for some of his marketable surplus produce. It may occurred mainly medium and large farmers for anticipation of higher price. Finally marketable surplus can be equal to marketed surplus indicates no distress sale or storage of marketable surplus.

Table 4.15
Marketable and Marketed Surpluses for Selected Crops

(Figures in % of Prod.)

Farm size	% of Production					
	Paddy		Maize		Bengal Gram	
	Marketable Surplus	Marketed Surplus	Marketable Surplus	Marketed Surplus	Marketable Surplus	Marketed Surplus
Marginal	91.60	96.98	99.67	99.75	99.31	11.85
Small	93.48	97.82	99.84	99.86	99.51	14.26
Semi-Medium	95.99	98.19	99.84	99.86	99.40	9.93
Medium	94.20	92.92	99.92	99.93	99.58	13.63
Large	96.02	94.90	99.92	99.94	99.75	12.87
All farms	95.24	96.27	99.90	99.92	99.58	12.70

Source: Field Survey

Table 4.15 shown the data of trends of marketed and marketable surplus for studying the relationship of the study crops Paddy, Maize and Bengal gram. For table 4.15 data

indicates the per centage of marketable and marketed surplus among the farmer groups. Firstly the study crop of Paddy revealed as land size increased the share of both marketable and marketed surplus found to be more than the marketable surplus upto the semi medium farmer groups. This indicates marginal, small and semi-medium farmers distress sale is more due to meeting his immediate needs and repayment of debts and other economic factors compared to medium and large farmers. On the other hand in variation between marketable and marketed surplus under Bengal gram produce indicating very small variations due to very less self consumption. So there was no distress sale and storage of Maize produce kept for very small quantities and most of the produce of Maize produce sell at the time of harvesting at their farm fields. Therefore there was a small variation between marketable and marketed surplus under Maize crop. Further Bengalgram produce the per centage of marketable surplus found to be lower than the marketed surplus reported by all farm groups due to low price in the market due to price fluctuations and limited procurement by the government agencies. So all land size farmers groups kept the major share of Bengal gram produce in marketing yards in anticipation of fetching higher prices in future during my survey period. Therefore the per centage share of marketable surplus is higher than the marketed surplus in all farm sizes under Bengal gram produce reported by sample farmers.

4.16 Determinations of Factors affecting Marketed Surplus-Regression Analysis:

In this section an attempt has been made to determine the factors that influence the marketed surplus of the study crops Paddy, Maize and Bengal gram. Previous sections gave us the tabular analysis regarding the behaviour of marketed surplus against total output of study crops across various farm size groups. This analysis takes into consideration the aggregate impact of all the variables. The multiple regression analysis gives us the direction of the relationship as well as the quantum effects of each individual variable effecting the marketed surplus. In this section for each selected crop, regression analysis is carried out on the aggregate data for all the categories, rather than separate regression for each farm size. In the regression analysis, the marketed surplus was taken in physical terms.

The regression analysis worked out with an object to ascertain of tabular analysis from various factors influencing marketed surplus of food grain crops. This section attempted for three crops namely Paddy, Maize and Bengal gram. The regression equation used as

Where, $y = ax_1^{b_1} x_2^{b_2} x_3^{b_3} x_4^{b_4} x_5^{b_5} x_6^{b_6} e^{v}$

Y = Total Marketed Surplus

x_1 = Education of Decision makers (year of schooling)

x_2 = Family size (No. of Members)

x_3 = Farm Size (Ha)

x_4 = Total Production of Crops (Qtl)

x_5 = Productivity (Qtl/ha)

x_6 = Total Retention (Home consumption, feed, seed and

a = Constant

e = error term

The study crops estimated regression coefficients of variables are presented in Table 4.16

The co-efficiency multiply determination (R^{-2}) turned out to be significant for Paddy, Maize and Bengal gram. While confirm that included variables explained about 84, 95 and 90 per cent variations in the marketed surplus of Paddy, Maize and Bengal gram respectively. The co-efficient of production found positive and significant at 10 per cent level for Paddy and Bengal gram crops. With regard to the co-efficient of productivity found to be significant at 1% level in Paddy and 10 per cent of Maize crop marketed surplus. Whereas the other important variable which is retention is turned out to be statistically significant for all the crops with different significant levels i.e. 5% and 10% respectively.

Table 4.16

Table: 4.16 Regression Coefficients of Factors Affecting Marketed Surplus of Selected Crops

Factors	Paddy			Maize			Bengal Gram		
	Co-efficient	Std. Error	t	Co-efficient	Std. Error	t	Co-efficient	Std. Error	t
Constant	88.47	53.18	1.66*	0.05	0.03	1.58*	0.07	0.06	1.19
Education of HH	-1.75	8.74	-0.20	0.02	0.03	0.82	0.09	0.07	1.24
Family Size	17.10	7.76	2.20**	-7.12	0.06	-1.04	1.48	0.04	0.15
Farm Size	-16.88	11.28	-1.50	0.14	0.07	-1.21	-0.04	0.03	-0.98
Production	1.37	.285	4.81***	4.71	0.09	1.31	0.75	0.05	5.45***
Productivity	-.023	.013	-1.78*	0.17	0.04	4.86***	-0.08	0.07	-1.22
Retention	-11.58	4.77	-2.43**	-1.00	0.25	-4.46***	-1.00	.004	-249.04***
R^2	**0.85**			**0.95**			**0.91**		
Adjusted R^2	**0.84**			**0.94**			**0.90**		
No. of Observations	**200**			**150**			**100**		

Notes: * 1% level of significance, ** 5% level of significance, * 10% level of significance**

Source: Field Survey.

FACTORS AFFECTING OF MARKETED SURPLUS – FARMER'S PERCEPTION

The farm producers' income level mainly depends on marketed surplus of food grain. The supply of food grains is important for both farmers as well as non-farming community in the country in the context of food security. Therefore it is necessary to know the factors operating at farmers level for production, which are effecting the marketed surplus of food grain crops.

Our analysed data reveals that size of output had a positive factor on marketed surplus of food grains crops. Increasing farm size, market price of food grains leads to increasing the size of output. But retention for home consumption, inadequate credit supply for farming from institutional sources and low level of technology implementation in farm sector can create negative impact on size of output. Hence it is indirectly impacting negatively on the marketed surplus,. Apart from above factors, some other factors like institutional and non-institutional factors influencing at producers level, which are directly or indirectly influencing on marketed surplus of food grains. Therefore the study has analysed the impact of various factors on the marketed surplus of food grains of the study crops.

4.17.1. Sources of Market information:

Market information is needed to farmers to sale the product at the markets. Unless the farmers understand the market data indicating the demand, supply and price of the produce. Farmers face difficulty in deciding whether or not to sell their produce. So every farmer chooses the appropriate time and place to market their produce. The farmers have many sources to get upto date market information though local traders, mass media which disseminate the market information to the rural farmers. In addition the personal visit of farmers to the market is also important source of market information. Table 4.17.1 revealed that the most important source of market information was traders. But this source of information may not be accurate and reliable. Our data revealed that nearly 53.11 per cent of total average sample farmers had accessed to price information through traders, followed by Andhra Pradesh market committee (APMC) yard 13.11 per cent, print media 11.56 per cent, buyers in village 11.11 per cent and electronic media 5.11 per cent and the other sources like Radio, telephone and cooperative societies etc.

Table 4.17.1
Sources of price information for Sample Farm Households

Source (%)	Size of Farms					
	Marginal	Small	Semi-Medium	Medium	Large	All farms
Trader	62.07	68.54	54.35	51.92	25.64	53.11
Print media	6.90	10.11	11.96	9.62	20.51	11.56
Electronic Media	0.00	3.37	6.52	7.69	7.69	5.11
Radio	0.00	0.00	0.00	0.00	0.00	0.00
APMC Mandi	0.00	5.62	16.30	17.31	26.92	13.11
Telephone	0.00	0.00	0.00	0.00	0.00	0.00
Visit to Market	0.00	0.00	3.26	11.54	15.38	6.00
Buyers in Village	31.03	12.36	7.61	1.92	3.85	11.11
Cooperative Society	0.00	0.00	0.00	0.00	0.00	0.00
Others	0.00	0.00	0.00	0.00	0.00	0.00

Source: Field Survey

4.17.2 Source wise and purpose wise Borrowing:

Both institutional and non-institutional sources of credit (private) provide credit to the farmers. Most of the farmers depend on institutional finance, which can provide adequate finance to the farmers at low interest rate as well as easy to borrow from the banks. Institutional finance is an important element for development, if it utilizes for the production purpose that can strengthen the overall economic position of the borrowers. Further, credit availability either for purchasing various agricultural inputs or for own use of non-agricultural purposes may effect the marketed surplus of crops. Table 4.17.2 analyzed the borrowing status of the sample households in both institutional and non-institutional credit sources of sample farmers in selected districts of the state.

All the 450 sample farmers expressed that they have access to the credit. But private money access to credit is declining with increase in farm size. While only 12.0 per cent borrowed money from non-institutional sources, the rest 88.00 per cent had obtained credit from institutional sources. Of the total borrowers 60.39 per cent had obtained credit from commercial banks followed by co-operative banks with 26.67%. Category wise the sample farmers borrowing from private sources decreased with increase in farm size, whereas borrowing money from commercial banks and cooperative societies increased with increase in farm size. So the availability of institutional credit is the main source of the farmers when

Table 4.17.2
Credit

Factors	Size of Farms					
	Marginal	Small	Semi-Medium	Medium	Large	All farms
Access to Credit (%)	100	100	100	100	100	100
Source						
Private money lender	17.24	12.40	10.64	7.24	0.00	8.60
Commission Agent	0.00	0.00	0.00	0.00	0.00	0.00
Relatives and Friends	9.20	5.62	2.17	0.00	0.00	3.33
Commercial Bank	54.02	61.76	63.28	60.07	62.82	60.39
Miller	0.00	0.00	0.00	0.00	0.00	0.00
Co-operative Society	19.54	20.22	23.91	32.69	37.18	26.67
Others	0.00	0.00	0.00	0.00	0.00	0.00
Purpose						
Crop loan	77.01	80.90	81.52	89.42	92.31	84.22
Investment-loan	0.00	0.00	3.26	5.77	7.69	3.33
Consumption	22.99	19.10	15.22	4.81	0.00	12.44
Credit Amount	74161	113360	159457	204904	331256	174131
Total Outstanding Rs./borrowing HH's						
Problem in getting loan from bank (yes %)	-	-	-	-	-	-
Have Kisan Credit Card (%)	0.00	0.00	0.00	0.00	0.00	0.00
If yes, Limit of KCC	--	-	-	-	-	-

Source: Field Survey

compared to lending from private money lenders/traders friends and relatives. This is due to the extension of commercial banks in rural areas and the government involvement in easy access for agri loans from them.

Table 4.17.2 revealed that the total sample farmers had access to the credit. The access of credit has increased with increase in farm size. Of the total borrowers from institutional sources 60.39 per cent borrowed credit from commercial banks, and 26.67 per cent from co-operative societies. The commercial banks credit borrowings increased with increasing the land farm size. All this revealed that the institutional credit is easy to borrow of all farm size groups. Institutional credit revealed positive trend and non-institution credit shown negative trend if increase the farm sizes from marginal to large farmers groups.

The total farmers had taken loan mainly two purposes 1) crop loan and 2) domestic need for home. Highest 84.22 per cent of credit was taken by sample farmers for crop loan, followed by 12.44 oper cent for consumption and 3.33 per cent for investment purposes. The amount of crop loan borrowing has increased as increaseing in the farm size. The marginal farmer amount of loan taken 77.01 per cent followed by 80.90 per cent for SF, 81.52 per cent for SMF, 89.42 per cent for MF and 92.31 per cent for large farmers. Regarding credit taken

from household needs or consumption reported highest from marginal farmers (22.99%) followed by small farmers (19.10%), Semi medium farmers (15.22%) and (4.81%) for medium farmers. Overall credit taken per average household was Rs. 1,74,131 and it was lowest for MF at Rs.74161 and highest at Rs.331256 for large farmers. The credit outstanding has not reported, and there was no problem in getting loan from banks reported by the sample farmers. Finally no sample farmer was found to have Kisan Credit Card (KCC) facility.

4.17.3 Awareness of MSP and Impact of Increase in Price on sale:

The data reveals that, increases in food grain sale prices leads to increase in the marketed surplus of food grains. About 14.00 per cent sample households reported that they increased the marketed surplus by retaining less for home consumption seed, feed etc.

Table 4.17.3
Policy awareness

(% HHs)

Policy	Size of Farms					
	Marginal	Small	Semi-Medium	Medium	Large	All farms
Aware of MSP (%)	16.09	23.60	40.22	50.96	52.56	36.89
Aware of Futures Trading (%)	-	-	-	-	-	-
Used Futures (%)	-	-	-	-	-	-
Futures Helped in Price Risk Management (%)	-	-	-	-	-	-
Sale Possibilities (Qs.10 in Questionnaire.)						
Yes (%) Increase in sale (%HHs)	6.90	11.24	13.04	17.31	21.79	14.00
If Yes, Source						
a. Less Retention for seed and feed.	100.00	81.73	86.27	91.44	94.01	86.36
b. Less Retention for self-consumption.	0.00	18.27	13.73	8.56	5.99	13.64
c. Change in Consumption Pattern	-	-	-	-	-	-

Source: Field Survey

Category wise the average household reported 6.90, 11.24, 13.04, 17.31 and 21.79 per cent of MF, SF, SMF, MDF and large farmers respectively. Increase in marketed surplus also indicates the positive relation between rise in price and farm holding of our selected food grains crops. Therefore farmers make necessary changes in their consumption habits when prices rise significantly. Farmers get profits through increased marketed surplus by curtailing seed/feed and other requirements.

4.17.4 Distance and Type of Market:

In addition to size of output, price is the most important economic factor, which is influencing the marketed surplus to great extent of the household. Since food grain market prices always are influenced by various factors, the Government has been protecting the farmers production through the introduction of Minimum Support Price (MSP) whenever the prices declined. Moreover implementation of farm mechanization inputs subsidies and other programmes lead to increased output as wells as decrease the cost of cultivation. Here an attempt is made to know the level of awareness of our sample farmers about MSP, future trading, ware house and storage facilities etc. Therefore on the basis of farmers perception, we tried to analyse the farmers' behavior on marketed surplus when the market prices of food grains increases significantly. So there is a positive relation between price and marketed surplus. Table 4.16.4 reveals that the awareness of sample households on Minimum Support Prices (MSP) was at low level. On the whole only 38.19 per cent household holds were aware about MSP of selected crops (Rice, Maize and gram). For low level of awareness of MSP was due to low level of literacy and lack of adequate information possessed by them. None of the sampled households know about the future trading of agricultural output and availability of ware housing information. The ware house facilities in sample villages were not available and not used by any one hence this problem.

Table 4.17.4
Distance and type of market

Factors	Size of Farm					
	Marginal	Small	Semi-Medium	Medium	Large	All farms
Sale in Local Market (%)	89.66	84.27	81.52	79.81	75.64	82.22
Distant Market (%)	10.34	15.73	18.48	20.19	24.36	17.78
Avg. Transport Cost (Rs/Qtl.)	8.5	11.84	12.59	14.82	17.2	12.99
Type of market						
Primary %	0.00	12.40	10.25	19.23	21.79	12.73
Secondary %	100.00	87.60	89.75	80.77	78.21	87.27
Distance to market						
Connected with Pucca road (%)	94.00	90.00	92.00	90.00	94.00	92.00
Connected with Kutcha Road (%)	6.00	10.00	8.00	10.00	6.00	8.00

Source: Field Survey

4.17.5 Area Covered under Improved (HYV) seed:

Crop productivity depends on utilization of major inputs such as HYV seeds availability, irrigation, fertilizers, farm mechanization etc. Among all important inputs HYV or improved

seeds play a vital role in increasing crop productivity. The farmer has to purchase HYV seed from the market. Table 4.16.5 reveals the per centage of area covered under improved/HYV seeds to total area for selected crops (Paddy, Maize and gram).

Table 4.17.5
Per centage of Area covered under improved seed to Total Area under crop

Name of Crop	Size of Farm					
	Marginal	Small	Semi-Medium	Medium	Large	All farms
Rice	77.50	87.50	92.50	100.00	100.00	91.50
Maize	100	100	100	100	100	100
Gram	6.25	15.00	16.67	25.00	14.00	6.25

Source: Field Survey

The area under HYV seeds to total area under Rice crop was on the whole was 91.5 per cent. The category wise there was a positive relationship between the crop area and HYV seeds covered area from marginal farmer group to large farmers group (77.5 per cent to 100 per cent). In the case of Maize crop area covered under HYV seeds reported 100 per cent in all farm groups. Whereas the gram crop found under HYV seeds was lower. In this crop the marginal farmer area covered was only 6.25 per cent followed by small 15.00 per cent, semi-medium 16.67 per cent, medium 25 per cent and large farmers' 14 per cent only. Mainly the gram cultivated only on dry land and has no access to irrigation. The sample farmers told that they purchased the gram seed at markets and whether the seed is HYV or not is not known for them. Therefore most of the sample farmers are unable to express about the nature of Gram crop seed. Most of the farmers expressed that they purchased Maize seeds at the Market and for them it is difficult to distinguish the HYV seeds or the traditional seeds.

CHAPTER - V

ASSESSMENT OF MARKETABLE AND MARKETED SURPLUS OF MAJOR FOOD GRAINS IN ANDHRA PRADESH

SUMMARY AND CONCLUSIONS:

5.1 Agricultural Characteristics of Andhra Pradesh:

Population wise the state of Andhra Pradesh was the 5th largest one in India with a size of 8.46 crores. At the same time it was the 4th largest state in the Country's geographical area with about 275 Sq Kms. The state is composed of mainly with agrarian character and it is considered as one of the most progressive sate in respect of the agricultural development in the country maintaining high levels of crop production when compared with other states in the country. Of the total geographical area in the state the total Gross Cropped Area (GCA) during the year 2013, is about 137 lakh hectares (49.6%) and the Net Cropped Area (NCA) is about 112 lakh hectares (40.4%).

Agriculture is the main source of income and rapid agriculture growth is essential to maintain food security to the population in the state. Therefore an optimistic trend was observed in food grain production and accordingly the state was ranked 6th at the national level during 2003-04. Further it has attained 4th rank (2004-05) and 3rd during (2005-06, 2006-07 and 2008-09). However, the state food grain production has been fluctuating due to occurrence of severe climate changes like droughts and floods, in addition to problems like labour scarcity, high cost of cultivation, changing cropping pattern and prices fluctuation etc.

In Andhra Pradesh major area available for agriculture cultivated mostly conventional crops of Jowar, Castor, Ragi and Mesta before green revolution. But now in post green revolution period the cultivable area changed into Rice, Maize, and Cotton crops including horticultural crops. Rice is the major cereal crop production constituted 75.4 per cent of total food crops production followed by other cereal crops of Jowar (7.8%) and Maize (7.3%) during 1992-93. But the share of Rice production had been declined during the period 1992-93 to 2011-2012. Whereas production of Maize crop registered a massive increase from 2.3 per cent to 19.9 per cent in the same period. Among the Pulse crops Bengal gram production has been increasing in estimated periods. The main reason for all these is that the Central and state governments have been taking needful steps to increase the production and productivity of cereals as well as other food related crops.

5.2 Objectives of the study:

The main objectives of the study are:

1. Estimate marketable and marketed surplus for Paddy, Maize and Bengal gram crops in Andhra Pradesh.
2. To estimate farm retention for consumption seed, feed, wages and other payments in kind etc. for selected crops and
3. to examine role of various factors such as institutional, infrastructural, socio-economic etc. influencing household marketed surplus decision at household level.

5.3 Sampling Methodology:

The data used in this study has been collected both secondary and primary sources. The study is confined only to three major food grain crops namely Paddy, Maize and Bengal gram in the state of Andhra Pradesh. For primary survey (Household survey) at first stage three districts namely West Godavari, Guntur and Kurnool were selected on the basis of production shares of study crops in states total production.

The selected districts of West Godavari and Guntur which are growing more than one selected crop and their crop production share also above 8 per cent share in states production. At second stage two mandals were selected from each sample district purposively on the basis of their area and production of study crops. At third stage for conducting household survey, two sample villages from each selected mandal (total 18 villages)were selected on consultation with concerned agriculture officers in the district. The two sample villages were selected purposively considering the location, one village near the market yard/town (within 15 km) and the second village had taken at least above 15 km away from the market yard/town from the mandal headquarters. Finally from each selected village at least 12 farmer households which had grown at least one study crop in a reference year 2012-13 and representing in a different farm categories (marginal 0-1 ha, small 1-2 ha, semi-medium 2-4 ha, medium 4-10 ha and large more than 10 ha) were selected. In all a total 450 sample households comprising 88 marginal, 88 small, 92 semi medium, 104 medium and 78 large farmers selected for the survey. Out of 450 total sample HH from selected crops of paddy, maize and gram, 200 households grow paddy, 150 households had grown maize and 100 households grown bengal gram. Across these three districts 175 sample HH were selected from West Godavari district consisting of 100 HH which were paddy cultivators and 75 were maize cultivators. In Guntur district, 225 sample HH were selected consisting of 100 HH which were paddy cultivators and 75 were maize

cultivators and 50 HH under gram cultivators. Further from Kurnool district 50 households were selected for gram crop. The Primary data was collected by canvassing a pre-designed schedule for agricultural year 2012-13.

5.4 Major findings of the primary survey:

(1) On the whole, average size of the family was 3.69 persons consisting of 1.9 males and 1.79 females. Out of 450 sample households 99.33 per cent are male headed households and the average age of the head of the family was 47 years and the average year of schooling was 8.56 years with highest from large farmers 9.62 years. Overall 94 per cent of HH had agriculture as the main occupation and dairy is the least 1.11 per cent of HH. Majority of HH pursue more than one occupation. Of the total sample HH 70.62 per cent and 20.22 HH belonged to OBC and general category respectively.

(2) The average size of operational holding per HH for entire sample was 4.12 ha. comprising 3.20 ha. Irrigated and 0.92 ha. Un irrigated land. Across sample farmers non-cultivable land was absent and no farmer expressed about cultivable waste. Very few HHs involved in leased-in and leased out land. Canal is the major irrigation in West Godavari and Guntur districts, whereas tube well is the main source of irrigation in Kurnool district. Overall 34 households (7.56%) had taken land on lease (6.1%) and majority of sample farmers (76.47%) are paying fixed money as rent and the remaining (23.53%) are paying 50% share of crop production.

(3) Overall per sample HH, total livestock units were containing 0.40 cattle, 2.16 buffalo, and 1.83 others (goat, sheep etc.) Among farmer groups highest livestock reported per HH was 5.97 under small farmers and least 3.16 for large farmer.

(4) On the whole the average investment per hectare on farm machineries and related implements by sample HH was of Rs.39,984 of the total investment and the highest investment of Rs.32,044 was on tube wells/bore wells followed by tractors Rs.7144 and Rs.796 for threshing machines etc. Therefore use of farm technology is less lack of knowledge and investment of the farmers.

(5) In the selected districts of Guntur, West Godavari and Kurnool the average GCA per HH worked out at 5.49 ha. Category wise it was 0.92 for MF, 1.89 ha for SF, 3.66 for SMF,

7.96 ha. for medium farmers and 12.97 ha. for LF of the GCA. Of the total area (GCA) 2466.43 ha. of which 57.26 per cent and 42.74 per cent area cultivated under kharif and rabi crops respectively. Among kharif crops paddy was most important food grain crop which alone occupied 54.26 per cent of GCA followed by maize (2.22%) and jowar (0.78%). On the other hand under rabi crops paddy, bengalgram and maize were important food crops claiming 18.97, 12.68 and 11.09 per cent of GCA respectively. Moreover pulses and oilseed crops are also important crops of selected districts. Between kharif and rabi crops. Paddy crop area was the highest under selected districts of West Godavari and Guntur. Due to availability of more irrigated lands. The HH cropping intensity was 133.20 per cent and the highest was reported at 140.31 per cent from marginal and least 120.39 per cent from large farmer per household. It was found cropping intensity is changing across farm size of the farmers. Regarding paddy yield per hectare it was 34.71 quintals, and across farm sizes significant variations was not reported but the highest yield reported was from marginal farmers with 36.42 quintals. For jowar crop yield per hectare was 39.63 quintals under kharif and 36.66 quintals under rabi season. Further for Bengal gram yield per hectare was 21.74 quintals and significant variations was observed among the farm size. The gram crop yield varied between 22.56 qtl for MF and least 19.74 qtl for large farmers.

(6) Overall, on an average per household the total retention of paddy produce was 8.02 qtl, of which 7.49 qtl (96.86%) was for self-consumption and 0.25 qtl (3.14%) was meant for seed purposes. Paddy produce used for payment in kind and other purposes had not reported by the farmers. Since majority of farmers reported that they purchase rice for home consumption, the retention of paddy produce for self-consumption was small in quantity. On the other hand seed was also sold through A.P Seed Corporation at subsidized price. Therefore the retention pattern of the HH for paddy produce is negligible. The highest and least retention of paddy produce found to be in large and marginal farmers respectively.

(7) Overall the total retention maize quantity per household was 0.28 Qtl, which was negligible. Positive relationship was observed between the farm size and total retention of maize produce except large farmer per HH. Total retention of gram per household was 0.15 qtl and this retention of gram ment for only self-consumption per HH. No quantity of gram produce was retained for other uses like seed and payments.

(8) Producers performed different operations during crop harvesting. Majority of farmers used manual methods to carry out during harvesting, threshing and winnowing of selected crops.

Losses during Harvesting Stages (kg)

Crop	Manual Operation (Kg)	Mechanical operation (kg)	Total Losses (Kg)	% Losses to total production
Paddy	1.27	1.61	2.88	1.26
Maize	0.58	0.50	1.09	0.31
Gram	0.50	0.28	0.78	1.14

Regarding Paddy harvesting, threshing and winnowing operations performed by both manual and mechanical methods, majority of large farmers only performed mechanical and their per HH total losses was 2.88 kg (1.26%) of total produce. The harvesting losses as reported reveal inverse relation between land size and harvesting losses of crop per HH. In the case of maize crop, different harvesting operations loss was reported at 1.09 kg (0.31%). The losses reported in different harvesting operations per household was 0.51 kg (0.15%) for harvesting out of which 0.41 kg (0.14%) for threshing and 0.10 kg (0.03%) for winnowing. Further about gram crop per HH total harvesting losses was 0.78 kgs of which among different harvesting operations per HH losses were 0.45 kg (0.66%) of which harvesting 0.33 kg (0.48%) for threshing (0.12 kg) and no losses for winnowing under gram crop. Therefore non availability of mechanization for unsuitable lands and lack of awareness are the causes for majority of farmers depending on manual methods for harvesting of the study crops. Among study crops percentage losses at harvesting stage under Maize produce was less compared to other two crops (Paddy and Maize) due to majority of farmers sold the produce at their fields to the private buyers.

(9) Majority farmers used head load mode and buffalo cart transportation of produce from field to threshing floor. Further tractor trolly and trucks were the common mode of transportation used by sample HH to transport their produce from field/storage to market yards. The details of transportation losses occurred at the time of packing loading and unloading are given below:

Crop	Paddy	Maize	Gram
Total Transportation Losses Kg/hh.	0.044	0.046	0.026
% of production	0.02	0.01	0.04

Paddy crop produce per HH absolute quantity lost during transportation is increasing with farm sizes. The transportation losses varied from 0.07 kg (0.01%) for LF to 0.03 kg (0.06%) for marginal farmers per HH. But the percentage loss revealed declining trend with increase in farm size of sample HH under Paddy produce. In the case of maize average per HH transport loss was 0.046kg (0.01%) of which transportation loss occurred from field to threshing floor was 0.034 kg (0.01%) and from farm/field to market yard was 0.012 kg per HH and the mode of transport was gunny bags. Moreover about gram transportation used mainly head load and buffalo cart from field to threshing floor and loss was 0.026 kg per HH. Further transportation from farm to market yard tractors and Trucks were had the loss was 0.01kg (0.01%) per household. Therefore among study crops gram production loss in absolute terms was minimal 0.026 kg per HH.

(10) The details of Overall Production Losses during storage of produce of selected crops:

Crop	Quantity stored per HH	Quantity lost	% of storage loss to stored quantity	% of storage loss to production	Average storage cost Rs/month/Qtl
Paddy	14.66	0.02	0.12	0.003	2.00
Maize	8.17	0.09	1.58	0.002	3.41
Gram	128.25	0.18	0.14	0.12	5.35

Very few farmers used hired godowns and house storages. For in house storage, they used home godowns and for packing gunny bags. The storage losses occurred due to weight loss, poor packing, humidity, improper storage rodents and handling etc. The production losses during storage were 0.02, 0.09 and 0.18 percent of paddy, maize and gram respectively. Among selected crops less quantity of produce is stored under maize due to the fact that majority of farmers preferred to sold at their field or farm gate itself.

(11) Production losses under total post-harvest operations were 1.28, 0.35 and 1.62 per cent in harvesting, transportation and storage for paddy, maize and gram respectively. The highest production losses at harvesting stage followed by storage and transportation. Bengal gram crop reported the highest loss due to low market prices. So most of the farmers kept the largest produce at market yards during the survey period. Whereas about the Paddy farmers poor knowledge about the harvest time and low mechanization used at harvesting and natural calamities are also the reason under highest post harvest losses under Paddy crop.

(12) Marketed surplus means actual quantity of produce sells by producer irrespective of his needs, self-consumption and needful requirements.

So marketed surplus = Marketable surplus + distress sale.

(13) Paddy crop produce marketable and marketed surplus accounted for 95.24 and 96.27 per cent respectively. It has a gap between marketable and marketed surplus (1.03%) due to majority of small, marginal and semi-medium farmers are sold at the time of harvesting except some medium and large farmers. Category-wise, marketed surplus output ratio (MSR) of paddy found to be highest at 98.19 per cent for semi medium and lowest at 92.92 per cent for medium farmers. The average distance covered to sell paddy produce was 4.43 km. 83.84 per cent of paddy was sold to private traders/money lenders and village traders. On the other hand overall maize production marketable and marketed surplus accounted for 99.90 and 99.92 per cent respectively and the average distance covered to sold maize produce was 7.92 km. The total marketed surplus 88.14 per cent of maize produce sold to private traders and only 12 per cent sold to government agencies. In the case of gram produce marketable and marketed surplus accounted for 99.58 per cent and 12.70 per cent of production. The gram Marketed Surplus output Ratio was higher because gram is not regularly used in daily diet and the average distance covered was 4.70 km. Majority of farmers stored their Gram produce at market yards for higher price. Sometimes open market price per quintal for gram was higher than MSP of government agencies. Therefore gram producers sold the produce at 92.85 per cent of MSR to private agencies. So government participation to purchase the gram produce is nominal expressed by the farmers.

Majority of marginal and small farmers expressed that the percentage of marketed surplus of paddy and maize found to be higher than marketable surplus, due to their meet for urgent cash needs and repayment of debts to private traders etc. Regarding time of sale, it was found that marketed surplus of paddy and maize produce was immediately disposed after crop harvesting due to distress sale expressed by majority of marginal and small farmers and the sale of these two crops at their fields after harvesting. Some medium and large farmers kept some produce at their house storage or kept in market yards with gunny bags for sale at higher prices. On the other hand marketed surplus was less than marketable surplus due to low price at the time of harvesting under gram produce. The main reasons were both low government procurement price as well as low open market price prevailing at harvesting time.

So farmers kept the large scale produce in market yards for future remunerative price at the market expressed by the farmers.

Private traders and money lenders played a vital role to buy the food grain produce. Total quantity of marketed surplus was 83.84, 88.14 and 92.85 per cent respectively for paddy, maize and gram produce and they sold to the above mentioned agencies due to urgent cash need, and debt repayments. Moreover, food grain procurement operations by the government agencies are not in time and they purchase at less MSP than open market at the time of crop harvesting of the farmer. Therefore unregulated private marketing system exploited the farmers to a great extent through weighing, grading of produce at the time of sale. Across farm size the marginal and small farmers sale the produce at the time of harvesting mainly due to debts. Moreover other causes like transport costs to the markets and packing and loading/unloading costs are more expensive. So they could not prefer to sell the produce at the market yards.

(14) Regarding market information nearly 53.11 per cent of sample farmers had accessed to price through traders and village business men. Next important sources of information were market committee (APMC) yard 13.11 per cent, followed by 1.56 per cent are known through print media 11.11 per cent buyers at village level and 5.11 per cent electronic media.

(15) The study found that all sample farmers had access to the credit and the farm size increases the amount of Credit also increased. Across the credit sources 60.39 percent obtained credit from commercial banks followed by cooperative banks 26.67 per cent and 8.60 per cent from private money lenders. Category wise, across credit ranged from 17.24 per cent for MF to zero per cent from LF. So the private money lending is decreasing as increasing the land size. Therefore institutional credit is the main source, which is available at low rate of interest. Majority of farmers expressed that main purpose to borrow money for crop loans.

(16) Out of 450 sample farmers 36.89 per cent households knew about MSP of selected crops and the level of awareness and farm size found positively related due to literacy levels of sample HH. Very few farmers have responded about future trading and warehouse receipt programme. Contract farming was not there and storage and warehouse facilities were used only for gram and paddy produce as expressed by the sample farmers. Majority of farmers expressed that as price increases the marketed surplus also increases and farmers self-higher

proportion of produce instead of their self-consumption, seed and feed especially in paddy produce. Government of Andhra Pradesh is supplying the rice and seed at subsidized prices to the marginal, small and semi-medium farmers through Public Distribution System (PDS) and Seed supply Corporation.

Policy Implications:

- Adequate measures should be adopted by the government to increase the productivity levels of agricultural crops through the linkage of MGNREGS scheme, which not only reduces the cost of cultivation but also reduces farmers debt burden.
- Paddy and gram are important food grain crops. The department of agriculture is responsible to supply the farm machineries and related implements exclusively to marginal and small farmers at subsidy prices through government loans. Moreover scientific knowledge and improved methods can also help to reduce the post-harvest losses at farm level to all category farmers.
- Extension of institutional finance through banks and other government financial institutions at low interest rate can protect the rural farmer from the non-institutional finance and private traders which can also reduce the repayment of debt burden from traders and commission agents.
- The government should extend the marketing facilities to purchase all types of agricultural produce at the time of harvesting. There by it can also control the private traders and unregulated markets.
- The Department of Agriculture should extend the mechanization in agricultural production through supply of tractors, harvesters and other technical implements at subsidized prices to the farmers in order to reduce the production costs and losses.
- The Government has to extend and disseminate market information of agricultural commodities relating to provision of loans and advances, supply of seeds, agricultural implements and fertilizers to the farming community at village level through print and electronic media.
- Market committees may take necessary steps to minimize the problems like lack of minimum facilities, delay in disposal of produce, irregular behavior of committee employees and officials at marketing yards.
- Both central and state governments should extend the food grain exports through tax incentives and subsidies and reduce the imports from other nations.

- Extend the purchasing capacity of government agencies like Market Fed, F.C.I etc., to purchase the food grains in the state.
- Fix the Minimum Support Price (MSP) of all types of food grains before the crop season. It will benefit the farmer whether cultivation of the crop is beneficial or not.
- Department of Agriculture and other Governmental agencies should educate the farming community to adopt co-operative farming and corporate agriculture. It will reduce the cost of cultivation and lead to sustainable income to the farmers.
- Farmers can easily access the banking activities, if more number of nationalized bank branches and other government financial institutions at village level are established.

The institutional and infrastructural facilities can enhance the productivity and generate more production value of study crops for the farmers, reducing the losses from different activities involved from harvesting to marketed surplus.

ACTION TAKEN TO THE COORDINATOR COMMENTS

SPECIFIC COMMENTS:

4. Done

5. Explained in Page No. 13 in Chapter II

6. Estimated and presented Multiple Regression analysis was in Chapter – IV

7. Multiple Regression results are estimated and interpreted in well manner.

8. Changed.

9. Done

10. Explained in Chapter – IV

11. Estimation of Marketable Surplus has modified and explained

12. Explanation has given Page No. 72 in Chapter – IV

13. Changed

14. Table 4.15 modified in Chapter – IV. It shows complete accounting from production to Marketed Surplus

15. Done

16. Explained

17. Institutional and Infrastructural facilities can enhance the productivity and production value of study crops for the farmers. Moreover reduce the losses from different activities involved from harvesting to Marketed Surplus.

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