

*EVALUATION STUDY SERIES : ORISSA R O : NO – 15*

**COMMODITY SPECIFIC STUDY ON  
'PULSES' IN ORISSA**



**NATIONAL BANK FOR AGRICULTURE AND RURAL  
DEVELOPMENT  
ORISSA REGIONAL OFFICE  
BHUBANESWAR**

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## **FOREWORD**

India is the largest producer of pulses in the world accounting for around 27 to 28 per cent of the global pulses production. Though India harvests between 12 to 15 million tonnes of pulses each year, the yield has been pretty much static for the last 30 years averaging between 227 kg to 272 kg per acre. The per capita consumption of pulses has fallen over 53 per cent from 27.3 kg in a year in 1958-59 to 12.7 kg. per year in 2008-09 and is expected to fall to 10 kg. By 2010 due to decline in production and rising prices. The increasing demand for pulses has resulted in increase in import of about 20 lakh tonnes in 2007-08 from 4.6 lakh tonnes in 1998-99.

The area under various pulses in the state increased to 19.51 lakh ha. during 2006-07, which was around 23 per cent of the total cropped area of the state. Though the area under pulses in the state was around one fifth of the total area under foodgrains, its production was varying in the range of 8 to 10 per cent of the total foodgrains production. The over all productivity of pulses in the state showed a fluctuating trend and at 140 to 180 kg. per acre was much lower than the national average. The per capita availability of pulses in Orissa which was 32 gms per day in 1971-72 has slipped to 20 gms per day. The per capita consumption of the same has reduced from 25 gms per day in 2000-01 to 11 gms in 2007-08.

The present study makes an in depth analysis of the issues relating to the production, processing and marketing aspects of the pulses in Orissa with reference to the primary data collected from Kalahandi and Ganjam districts. It also attempts to put forth suggestions to improve the pulses sector in the state.

The net income derived by the sample farmers of Green Gram in Ganjam district was Rs. 2924/- and in Kalahandi district was Rs. 3254 per ha. The net income derived from the cultivation of Black Gram was Rs. 3342/- per ha. In Ganjam district and that of Arhar was Rs. 3896/- per ha. in Kalahandi district. The pulses were sold off to village traders or in the local haats immediately after the harvest.

Though the processing of pulses was carried out mostly at local level, the net proceeds of the sample the modern dal mills was Rs. 2814 per MT and the net value addition was Rs. 1702 per MT. Ten SHGs under the initiative of ORMAS were engaged in processing Arhar dal by operating the mini dal mill in Kalahandi district.

The low productivity of pulses caused by lack of proper package of practices, lower seed replacement rate, high rainfall and water logging in Kharif season and moisture stress in Rabi season keep the pulses productivity at a low level. ere under irrigated conditions. The seed intervention to supply right quality and quantity of seeds at the right time to the farmers, proper fertiliser and nutrient management, active extension mechanism at each stage of production are the major steps which would go a long way in improving the pulses scenario in the state.

I hope this report will be useful for all those concerned with the development of the pulses sector in the State of Orissa.

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## ABBREVIATIONS

AICRP	All India Coordinated Research Project
ATMA	Agriculture Technology Management Agency
APICOL	Agriculture Promotion and Investment Corporation Limited
DSMS	District Supply and Marketing Society
FAQ	Fair Average Quality
FAO	Food and Agriculture Organisation
FRR	Financial Rate of Return
FTTF	Farm Technology Transfer Fund
GCA	Gross Cropped Area
INM	Integrated Nutrient Management
IPM	Integrated Pest Management
IPDP	Integrated Pulses Development Programme
ISOPOM	Integrated Scheme on Pulses, Oilseeds and Maize
IMAGE	Institute For Management of Agriculture Extension
NAFED	National Agricultural Cooperative Marketing Federation of India Limited
NFSM	National Food Security Mission
NPDP	National Pulses Development Programme
NGO	Non Govt. Organisation
OAIC	Orissa Agro Industries Corporation
OSSC	Orissa State Seeds Corporation
OSSCA	Orissa State Seeds Certification Agency
ORMAS	Orissa Rural Development and Marketing Society
OSAM B	Orissa State Marketing Board
OUAT	Orissa University of Agriculture and Technology
OWDM	Orissa Watershed Development Mission
SOF	Scale Of Finance
RPRC	Regional Pulses Research Centre
WHO	World Health Organisation

## BASIC DATA SHEET

Sl. No.	Particulars	Details		
1	Name of the Districts	Ganjam and Kalahandi		
2	Reference Year	2007-08		
3	No. of Sample Farmers	70		
4	No. of Sample Processing Units	6		
5	No of Traders	10		
<b>6</b>	<b>Cultivation Aspects</b>	<b>Amount in Rs.per Ha.</b>		
<b>A</b>	<b>Green Gram</b>	<b>Ganjam (Unirrigated) Ganjam (Irrigated) Kalahandi (Unirrigated)</b>		
i	Cost of Cultivation (A 1)	2176.10	4990.00	2339.00
ii	Cost of Cultivation (B 1)	2896.10	5890.00	3297.00
iii	Yield (Qu.)	4.25	5.00	4.25
iv	Marketable Surplus (Qu.)	3.00	3.75	3.25
v	Gross Sales Proceeds	5100.00	6701.25	5593.25
vi	Profit at A 1	2923.90	1711.25	3254.25
vii.	Profit at B 1	2203.90	811.25	2296.25

<b>B</b>	<b>Black Gram</b>	<b>Ganjam (Unirrigated)</b>	<b>Ganjam (Irrigated)</b>
i	Cost of Cultivation (A 1)	2176.92	4945.50
ii	Cost of Cultivation (B 1)	3279.92	5868.50
iii	Yield (Qu.)	4.25	6.00
iv	Marketable Surplus (Qu.)	2.75	4.25
v	Gross Sales Proceeds	5293.75	8287.50
vi	Profit at A 1	3116.83	3342.00
vii.	Profit at B 1	2013.83	2419.00

<b>C</b>	<b>Arhar</b>	<b>Kalahandi (Unirrigated)</b>
i	Cost of Cultivation (A 1)	2467.00
ii	Cost of Cultivation (B 1)	3478.00
iii	Yield (Qu.)	5.05
iv	Marketable Surplus (Qu.)	3.03
v	Gross Sales Proceeds	6363.00
vi	Profit at A 1	3896.00
vii.	Profit at B 1	2885.00

<b>7</b>	<b>Economics of Pulses Processing</b>	<b>Amount in Rs.</b>
i	Investment Cost	28.05
ii	Operating Cost (per MT)	23586
iii	Sales Proceeds from Dehusked Pulses (per MT)	24600
iv	Sales Proceeds from Husk (per MT)	1800
v	Total Sales Proceeds (per MT)	26400
vi	Net Income (per MT)	2814
vii	FRR (%)	24

## **EXECUTIVE SUMMARY**

Pulses is the broad term used to describe the dried, edible seeds of legumes and contain Protein, abundant Complex Carbohydrates (including soluble fiber) but almost no fat. The Food and Agricultural Organization of the United Nations (FAO) defines Pulses as annual leguminous crops yielding from one to 12 seeds within the pod and harvested for the dry seeds.

India is the largest pulses growing nation in the world with around 30 to 35 per cent of area and 20 to 24 per cent of production of pulses in the world. The pulses are grown over an area of around 23 million ha. accounting for about 18 per cent of total area but the production of pulses is around 14 million tonnes, which is only 7 to 8 per cent of total food grains production during the recent years. The yield of pulses at around 500 - 600 kg/ha. is only about 35 to 40 per cent of the average yield of total foodgrains. The Pigeon peas (Arhar) and Chick peas (Gram or Desi Chana) are the major pulses grown in India, followed by Green and Black Gram and Lentil. The per capita (per day) availability of pulses in the country has hovered around 30 to 35 gms. in the recent years which is much lower than the 43 gm recommended by the Indian Council of Medical Research.

Madhya Pradesh, Maharashtra, Rajasthan and Uttar Pradesh are the major pulses growing states in the country contributing around 10 to 15 per cent of area and production of pulses in the country. Orissa with around 3 to 5 per cent of the area and production of pulses has very seldom been a force to reckon with in the overall pulses scenario of the country. However, the crop has specific importance for the simple reason of being the indispensable component of the diet of the people of the state.

### **Objectives of the study**

The present study was undertaken to analyse the area, production and profitability of pulses, forward and backward linkages in the production of pulses, the efficiency of different channels of marketing, post harvests management including grading, packaging, etc, identify the constraints in the production, marketing and processing of the pulses, with specific reference to the state of Orissa.

### **Sample Design and Methodology**

The study was conducted in Ganjam and Kalahandi districts of Orissa. The primary data of the study was collected from 70 farmers (35 in each district) cultivating pulses, 10 traders (5 in each district) engaged in trading of pulses and 6 pulses processing units (2 in Kalahandi and 4 in Ganjam) processing variety of pulses. Three pulses i.e. Green Gram, Black Gram and Arhar were selected for detailed study keeping in mind their importance in the overall area and production of pulses in the state. The secondary data was collected / interactions were held with the officials of Agriculture Department at the districts and the state level, Orissa State Marketing Board, NAFED, Orissa University of Agriculture and Technology, Central Pulses Research Centre, etc.

## Major Findings of the Study

- The area under pulses in Orissa increased by 34 per cent from 6.04 lakh ha. in 2000-01 to 8.09 lakh ha. in 2005-06, but an increase of 140 per cent was observed in the area under pulses in the state during 2006-07. The reason for the increase may be attributed to certain extent to the diversion of around 1.24 lakh ha. area from paddy to pulses, initiatives taken up by the Govt. under the ISOPOM during 2004-05 and also a tendency on the part of the farmers to take up pulses as a pure crop instead of an inter crop.
- The production of pulses in the state similarly increased by 57 per cent from 2.13 lakh tonnes to 3.36 lakh tonnes in 2005-06, after which it increased by 157 per cent during the year 2006-07. The productivity of pulses however showed an improvement of 26 per cent from 352 kg/ha. to 444 kg/ha, which is much lower than the all India productivity at 616 kg/ha.
- Both the two sample districts i.e. Ganjam and Kalahandi were having around 30 per cent of the area under pulses and Green Gram, Black Gram and Arhar were the major pulses grown in the districts, though the area and production of the same fluctuated over the years to a great extent. The sample farmers in Ganjam district were cultivating both Green and Black Gram under both irrigated and unirrigated conditions whereas the sample farmers in Kalahandi district were cultivating Green Gram and Arhar only under unirrigated conditions.
- The scientific package of practices covering proper land preparation and sowing method, application of nutrients, irrigation management, pest management, weed management, etc. was very seldom adopted by the sample farmers, which to a large extent affected the yield of the crops.
- The cost of cultivation of the Green Gram was estimated at Rs. 2176.10 and Rs. Rs. 4990.00 under unirrigated and irrigated condition respectively in Ganjam district whereas the cost of Green Gram under unirrigated condition was Rs. 2339.00. The yield was 4.25 qu. and 5 qu. for unirrigated and irrigated conditions in Ganjam and 4.25 qu. in Kalahandi. Keeping around one third for own requirements, the gross sales proceeds earned by the sample farmers were Rs. 5100. and Rs. 6701.25 under unirrigated and irrigated conditions in Ganjam districts and Rs. 5593.25 under unirrigated condition in Kalahandi district. The profitability per ha. was Rs. 2923.90 and Rs. 1711.25 under unirrigated and irrigated conditions in Ganjam district and Rs. 3254.25 under unirrigated conditions in Kalahandi district.
- The cost of cultivation of Black Gram was Rs. 2176.92 and Rs. 4945.50 under unirrigated and irrigated condition respectively in Ganjam district. Estimating the yield at 4.25 qu. and 6 qu. under the unirrigated and irrigated conditions, the gross sales proceeds was Rs. 5293.75 and Rs. 8287.50. The profit pr ha. was calculated to be Rs. 3116.83 and Rs. 3342.00.
- The pulses in coastal areas of the state are usually cultivated through the Paira method which is basically the sowing of seeds of Green and Black Gram at least one / two weeks before the harvest of the paddy crop by broadcasting them. The crops grow alongwith the moisture left in the paddy field and the harvesting of paddy is done in a very careful manner so as not to damage the pulses. The farmers usually adopt the method for its

convenience even if the quantity of seeds used by the sample farmers was around 40 - 45 kg. and the rate of yield was only 3.75 qu. per ha.

- The cost of cultivation was comparatively low at Rs. 2086.70 and netting the same from the gross sales proceeds, the profit per ha. was estimated to be Rs. 3000.80. Since there was not much difference in the profitability of the pulses under the Paira method and the traditional sowing method, the sample farmers adopted former for convenience and had the opinion that the pulses will grow well in the standing paddy crop.
- The Arhar was also cultivated by the sample farmers in Kalahandi district in the unirrigated conditions as a kharif crop by following the traditional farm practices. The cost of cultivation of Arhar was Rs. 2467.00 and the yield was 5.05 per ha. The gross sales proceeds of 3.03 qu. of the produce was Rs. 6363.00 and the profit was estimated to be Rs. 3896.00 per ha.
- The pulses were disposed off by the sample farmers in the most traditional way and were being sold to the village traders or in the nearby haat at whatever price available. There was a lot of fluctuation in the price eventhough the farmers had not reported facing distress sale in the reference year.
- The processing of dal was carried out mostly at the local level for home consumption with the help of grinding stone. The modern dal mills processed the pulses by following the dry milling technique. The average investment cost of the dal processing units was Rs. 28.05 lakh and the average processing capacity was estimated to be 1.6 MT per day. With the mills running for about 210 days in a year, the total processing capacity was calculated to be 336 MT. The cost of operation was Rs. 23586 per MT, with the cost of raw material accounting for almost 90 per cent of the cost. The average sale price of the processed pulses and husk taken together was Rs. 26400 per MT, with almost 93 per cent coming out the former and 7 per cent from the latter. The net proceeds amounted to Rs. 2814 per MT. The Benefit to Cost ratio of the units was higher than 1 and the FRR was around 24 per cent.
- However, the processing cost including the cost of capital and also the depreciation was calculated at Rs. 24697 and the net value addition was roughly Rs. 1702 per MT. Taking into account the fixed cost and the net value addition per MT, the break even output volume was estimated to be 1648 MT which was to be attained by the units after more than four years of operations.
- The initiative taken up by the ORMAS, an autonomous body under the Panchayati Raj Deptt. of Govt. of Orissa to facilitate the processing activity in the tribal areas of the state by involving the SHG members in the area, deserves special mention. The ORAMS in Kalahandi district through network of DSMS and in collaboration with the NGO, Banajat Trust had provided the training as well as infrastructure for processing of Arhar. Around 110 members of 10 SHGs at Vishwanathapur in Kalahandi district were engaged in the dal processing activity by procuring the raw materials from the local people as well as traders. The processed dal was in turn bought by the block level schools for being used in the Mid Day Meal Scheme. The SHGs had processed around 860 qu. of pulses during 2007-08 and had earned profit to the tune of Rs. 1.22 lakh which was distributed among all the 10 SHGs. The initiative provided an income earning opportunity for the group members, particularly the ladies.

- The credit aspects of the pulses sector was generally characterised by fixing the scale of finance and extending the crop loan for the cultivation purpose, apart from extending the block as well as working capital for the new / renovated / upgraded processing units. The commercial cultivation of pulses was totally neglected and hence the farmers used a very small part of the loan for pulses cultivation. The processing scenario in the state was also not very encouraging due to the limited availability of capital, shortage of good quality pulses and proximity of the area to major pulses processing centres in Chhattisgarh.

### **Constraints and Strategies**

- The major cause of worry for the stakeholders has been the low productivity of pulses which affects the production, availability of pulses for consumption and processing. The pulses are normally grown as a secondary crop in the marginal and sub marginal land with poor fertility and low moisture availability. The high rainfall and water logging during kharif season and moisture stress and low temperature during the rabi season further aggravates the problem. The seed replacement being quite low (varying between 1 to 3 per cent), lack of proper package of practices, inter-state and inter-district variation in the soil quality combine together to make the crop all the more vulnerable.
- As revealed by the scientists engaged in pulses research, eventhough, around 70 per cent of the pulses are sown by 'Paira' method in Orissa, mainly in coastal districts, no suitable variety has been developed for the same. Further, adequate quantity of seeds are not available at the required time at the govt. sales centres for which the farmers either purchase the low quality seeds or use their own seeds which ultimately affects the productivity.
- Several strategies have been introduced at the institutional level since 3rd Five Year Plan onwards to tide over the problems related to the sector. The prominent among them were the introduction of All India Coordinated Research Project (AICRP), Integrated Pulses Development Programme (IPDP), Integrated Pest Management (IPM), Integrated Nutrient Management (INM), National Pulses Development Programme (NPDP), Integrated Scheme for Pulses, Oilseeds and Maize (ISOPOM) and National Food Security Mission on Pulses (NFSM-Pulses).
- The major interventions in pulses sector in the state at present are being carried on under ISOPOM introduced since 2004-05 and NFSM introduced since 2007-08 in 10 districts of the state, including Ganjam and Kalahandi. The ISOPOM aims at the expansion of area under pulses and also the increase in production and productivity of pulses by providing quality seeds, introduction of better farm practices and capacity building of the farmers. A total of Rs. 233.86 lakh was spent on various components under ISOPOM during 2007-08 and an amount of Rs. 400.00 lakh allocated for the programme for the year 2008-09.
- The NFSM envisages to cover 9.74 lakh ha. area, production of 4.68 tonnes of pulses with productivity of 480 kg/ha. by the end of 11th Five Year Plan. Since the scheme was launched only during the Rabi 2007-08, a total of Rs. 153.24 lakh was spent during the year under the scheme.
- The New Agriculture Policy of Govt. of Orissa introduced in the year 2008 aims at taking the state agriculture from subsistence to commercial level and make it sustainable by

enhancing productivity and introducing diversification. Keeping in mind the importance of seeds in improving the productivity and also the low seed replacement rate of around 1 to 3 per cent for pulses in the state in comparison to the national average of more than 10 per cent, the policy reiterates to achieve the seed replacement rate of around 10 per cent for the pulses by 2011.

- The intensification of Seed Village Programme for production of quality seeds by the farmers and ensure timely availability of the same to the farmers at right time is the major thrust of the programme. The establishment / strengthening of seed processing plants, use of mobile seed processing vans, establishment / strengthening of seed processing laboratories, establishments of seed certification offices at block levels are some of the other initiatives taken up under the Policy to improve the seed replacement rate and hence improve the production and productivity.
- One small but important initiative has been taken by NABARD in improving the Seed Replacement Rate by launching a Pilot Project on Seed Village Programme in 9 coastal districts of the state, covering an area of 270 acres, involving 303 farmers for production of seeds of paddy and pulses. The pulses cover around 109 farmers in 3 seed villages producing three varieties of seeds by following proper seed treatment, fertiliser & pest management. The programme covers an area of 34 ha. and around 262 qu. of seeds are expected to be produced during the year 2009-10 by the farmers. NABARD provides assistance for the capacity building programmes for the farmers, supports the cost of foundation seeds and other inputs, pays the certification fees & the inspection charges of the officials of Orissa State Seeds Certification Agency, cost of processing of the seeds and also the facilitation cost to the NGO who has been the coordinator of the programme.

### **Suggestions to strengthen Pulses Sector**

Since the low productivity of pulses is the harbinger of most of the problems associated with the pulses sector, the major thrust need to be given to the following aspects :

- Seed intervention need to be undertaken in a vigorous way so as to supply right quality and quantity of seeds at the right time to the farmers. Since most of the sample farmers expressed their reservation about the availability of adequate amount of seeds at the time of their need, the seed production as well as the distribution network has to be stronger so as to cater to the demand of the farmers.
- According to the information given in the Publication i.e. 'Status of Agriculture in Orissa', 2008' of Deptt. of Agriculture, Govt. of Orissa, the seed replacement rate of Black Gram, Mung and Arhar varied in the range of 1 to 2 per cent as against more than 10 per cent at national level. Taking into consideration the fact that the good quality seeds can improve the productivity of pulses by 15 to 20 per cent, the seed replacement rates need to be improved. The Seed Village Programmes undertaken at various levels to encourage the farmers to produce good quality seeds of pulses in particular need to be encouraged still further.
- Since the soil quality and climatic conditions vary from place to place, the seeds suitable for one area may not be suitable for another area. There comes the need for the development and distribution of specific variety of seeds for specific areas. The sample farmers and other stakeholders during the course of interaction expressed the

opinion that the common variety of seeds being supplied by the institutional sources sometimes proved to be less productive and more susceptible to attack of pests and diseases. There were instances of whole of the crop being destroyed due to pest attack and also low germination rate of the seeds provided by the govt. sales centres. The seeds in turn were provided by the institutions outside the state and were not adaptable to the local conditions. In this case, the development and distribution of seeds suitable for local conditions through the Seed Village Programmes will go a long way in solving the problem.

- One major initiative undertaken to improve the seed replacement rate is the adoption of Seed Village Programmes at various districts for production of certified seeds. A group of farmers in a village devote a certain portion of their land for the production of seeds which are certified by the Orissa Seeds Certification Agency and finally distributed among the farmers through the local sales centres. These initiatives have been more prominent in paddy whereas the initiative is yet to take off on a larger scale in case of pulses. NABARD is also associated with the 'Pilot Project on Seed Village Programme' in 9 coastal districts, of which the interventions related to pulses are underway in 3 districts.
- Since majority of pulses are sown as rabi crops, the farmers need to be made aware about the fertiliser management of preceding kharif crop. The improper use of fertilisers in the paddy, which is predominantly cultivated in the Kharif season leads to the low yield of pulses in the Rabi season. Further, the irrigation management highlighting the need for irrigation at the flowering and pod formation stage are usually not given any attention by the farmers. There is on whole an attitude of negligence on the part of farmers for pulses and if the sector has to develop in a coordinated manner, the farmers' education need to be given more attention. The initiative of 'Farmer's Field School' undertaken as part of NFSM to make the farmers aware about the farm practices by bringing them to the demonstration farms is a commendable step in this regard. But very few progressive farmers get the opportunity of availing the same. The large number of small farmers, if given proper training on these aspects, can help in increasing the production and productivity of the crop.
- The Farmers Clubs formed under the auspices of NABARD act as an important change agent in the rural areas. The Farmers' Clubs, an informal forum of the farmers at the grass root level constituted to coordinate with banks to forge better bank-borrower relationship can serve as a media for dissemination of information on package practices for different pulses suitable for local areas. The training programmes may also be arranged in collaboration with agencies like ATMA to promote scientific method of cultivation of pulses. The collaboration with the research centres like OUAT to provide the technical inputs may also be thought of. The 1500 odd Farmers' Clubs formed in the state of Orissa can be prime movers in changing the mindset of the farmers with regard to pulses cultivation. The Farmers' Clubs in the 76 villages adopted by NABARD under the Village Development Programme are in an advantageous position to bring about the requisite change.
- The proper and more active extension mechanism is needed to teach and guide the farmers at all the stages of production as well as post harvest management. The traditional concept of extension being the prerogative of the public sector and the

perennial conflict between the public and private sector has lost its relevance and in the current scenario the public-private partnership in extension is the order of the day. A number of agencies such as APICOL, OWDM, etc have been associated with the Agriculture Department for the improvement of the pulses sector in the state by improving the cultivation, marketing and also the processing related activities. A coordinated effort on the part of all the agencies is needed to uplift the pulses sector of the state.

- The pulses form an integral part of the food security of the state and are cultivated in a routine manner on the marginal sub-marginal land of the farmers, thereby improving the soil fertility to a great extent. There can not be any question of 'Buy or Import' decision for the pulses in Orissa. Rather the need of the hour is to develop / implement a three pronged strategy to boost pulses production in the state :

☞ Orissa has an estimated area of 9.00 lakh ha. Rice fallow, of which 1.03 lakh ha. can be used for cultivation of oilseeds, maize, pulses under residual moisture conditions.

☞ Under the irrigated conditions oilseeds and pulses can be grown as second crop instead of taking up pulses on marginal land with minimum input support.

☞ Pulses and oilseeds can be promoted as substitute crops for paddy under Diversification Programme

- Since the marketing of pulses have always followed the traditional route with a number of middle men between the ultimate producers and ultimate consumers, the farmers very seldom get proper price for the crop whereas the consumer have to sell out higher price for the processed dal. There were instances of rapid price fluctuations in the pulses within one season affecting the income of the farmers. The weather conditions play a gamble with the crop and the yields become fluctuating and irregular. In the absence of system of marketing of pulses through the APMCs, the farmers sell the produce to the earliest available marketing channel which is usually the village / local haat level trader. The Cooperative marketing through PACS on a experimental basis may be introduced so as to insulate the farmers from price fluctuations by improving their bargaining power.
- The pulses processing scenario in the sample districts and the state as a whole was not very encouraging as reported by the agencies during the course of the field visit. The dal processing units at Kalahandi and the neighbouring Bolangir districts were being closed down due to a number of reasons, prominent among which were the unavailability of adequate and good quality raw materials, lack of proper infrastructure, the limited availability of finance for procuring raw materials, the competition from the neighbouring states such as Chattisgarh, etc. The credit related constraints can be addressed by the bankers by providing assistance for the establishment, expansion and modernization of dal mills by providing both working as well as block capital.

## CHAPTER - 1

### INTRODUCTION

Pulses belong to the family of leguminosae (legume). The fruit of the plant is a pod containing seeds, which are called legumes. By definition, legumes are dried seeds from a pod that develops from a simple carpel and opens up along its seams on two sides. The seeds of pulses are believed to be native to South Western Asia and Northern Syria. Archaeological evidence dates back the cultivation of pulses to 6000 BC. The seeds found in Egyptian tombs dates back to 2400 BC. During the Neolithic period, they spread to Greece and Bulgaria and during Bronze age spread to North East and Mediterranean.

**1.2** The Food and Agriculture Organisation (FAO) of United Nations defines pulses as an annual leguminous crop yielding from one to twelve seeds within the pod and harvested for dried seeds. The definition excludes seeds that can be used for extracting oils (soybean and peanuts). According to this definition, the green beans and green peas are vegetables, not pulses. The definition also excludes seeds for the sole purpose of sowing such as cloves and alfalfa. Basically, the term 'Pulses' cover all those legumes grown for their dried seeds. The use of pulses varies from their being used as staple diet to condiments for milk, cheese and snacks. Some of the pulses are used as fodder or green manure whereas some are used as silage.

**1.3** FAO recognises the following eleven primary pulses :

- i. Dry Beans which cover Kidney Beans, Lima Beans, Azuki Bean, Mung Bean, Black Gram, Scarlet Runner Bean, Rice Bean, Moth Bean, Lepary Bean
- ii. Dry Broad Beans including Horse Bean, Broad Bean, Field Bean
- iii. Dry Peas including Garden Pea, Protein Pea
- iv. Chick Pea / Bengal Gram
- v. Pigeon Pea / Toor / Arhar
- vi. Dry Cow pea
- vii. Earth Pea
- viii. Lentil / Masoor
- ix. Vetch
- x. Lupins
- xi. Minor Pulses including Lablab, Jack Beans, Winged Bean, Velvet Bean, Yam Bean

**1.4** Pulses are important food crops due to their high protein and amino acid content. Like many leguminous crops, pulses play a key role in crop rotation and nitrogen fixation. They contain protein, abundant complex carbohydrates including soluble fibre and almost no fat. They also contain calcium, phosphorus, niacin, thiamin, riboflavin, vitamin B 6, iron and folic acid. The seed coat legumes have eight flavonoids, six of which are particularly strong anti-oxidants.





**1.5** The pulses are valuable source of energy which is found to be between 300 to 540 Kcal/100 gm. The energy supply of pulses come from the nutrient supply of protein, fat and carbohydrate. The pulses are found to be 20 to 25 per cent protein by weight, which is double the content of wheat and three times that of rice. For this reason, the pulses are called 'Poor man's meat'. While pulses are generally high in protein and the digestibility of protein is quite






high, they are often poor in essential amino and methionine. Grains are usually consumed alongwith pulses to form a complete protein diet.

**1.6** India is both the largest producer and importer of pulses in the world. It occupies around 30 to 35 per cent of the world area and contributes around 20 to 24 per cent of the production of pulses in the world. However, the productivity of the pulses is relatively lower at around 70 per cent of the world productivity. India is also the largest importer of pulses in the world supplementing about 10 to 12 per cent to the domestic production.

**1.7** The Common varieties of pulses found in India alongwith their main use and major states producing the same is indicated in the Table 1.1.

**Table 1.1 : Common Varieties of Pulses in India**

Sl. No.	Pulses / Peas	Main forms of Consumption	Major States	Picture
1	Green Beans / Moong Beans	Popular in all forms i.e. whole, split as well as milled. Used as vegetables and making snacks	Eastern India, Maharashtra	
2	Bengal Gram / Desi Chick Pea / Desi Chana	Most common variety and used for making various snacks. The milled flour called besan is used to make sweets and snacks.	Eastern and Northern India	
3	Pigeon Peas / Arhar / Toor / Red Gram	Used as vegetables with meals.	Red variety popular in Central and Southern India and Yellow variety in North India	
4	Black Matpe / Urad / Mah / Black Gram	Popular in all forms, whole, split as well as milled. Used in making meals, papad, sweet / snack, etc.	Mah dal in Punjab & UP. Husked Dal in South India	

5	Chick Peas / Kabuli Chana	Used as vegetables with meals.	Popular in Punjab region	
6	Lentils / Masoor	Used as vegetables with meals	Consumed mainly in Northern and Eastern India	
7	White Peas / Matar	Used as vegetables with meals.	Most part of India	
8	Red Kidney Beans	Used as vegetables with meals.	Popular in Punjab region	
9	Black Eyed Peas / Lobiya	Used as vegetables with meals.	Popular in Punjab region	

### Strategies Adopted for Development of Pulses Sector During the Five Year Plans

**1.8** Unlike other foodgrains crops, there was no specific programmes for pulses development till the second five year plan. After noticing the continuous decline in pulses productivity, an All India Coordinated Pulses Research Project (AICRP) was initiated in 1965 to undertake a nation-wide research effort on pulses with Head Quarters at Indian Agricultural Research Centre (IARI) with regional centres and four sub centres. Thereafter, several programmes / initiatives / missions were launched to address the production and productivity of the pulses in the country, some of which are briefly mentioned in the Table 1.2.

**Table 1.2 : Major Strategies / Programmes introduced during Different Five Year Plans**

<b>3rd Plan (1961 to 1965)</b> <ul style="list-style-type: none"><li>&gt; AICRP was established</li><li>&gt; All India coordinated varietal trials were made</li><li>&gt; Breeding suitable varieties for multiple cropping</li><li>&gt; Breeding of uniformly ripening varieties</li><li>&gt; Breeding of disease resistant varieties</li></ul>	<b>4th Plan (1969 to 1974)</b> <ul style="list-style-type: none"><li>&gt; Intensive Pulse Development Programme (IPDP) was launched</li><li>&gt; Campaign launched about Package of Practices</li><li>&gt; Mini kit Programme for non IPDP areas</li><li>&gt; Extension of pulses areas by catch-cropping, inter-cropping and mixed-cropping</li></ul>
<b>5th Plan (1974-1979)</b> <ul style="list-style-type: none"><li>&gt; Continuation and Intensification of IPDP</li><li>&gt; AICRP stepped up</li><li>&gt; Suitable breeding varieties</li><li>&gt; Standardisation of technique for fertiliser application</li><li>&gt; Development of more effective agronomic practices</li><li>&gt; Special importance on processing of pulses and modernisation of Dal Milling industry</li></ul>	<b>6th Plan (1980 - 1985)</b> <ul style="list-style-type: none"><li>&gt; Introduction of pulses in irrigated farming</li><li>&gt; Bring additional area under pulses cultivation</li><li>&gt; Multiplication and use of improved pulses seeds</li><li>&gt; Improved Post Harvest technology</li><li>&gt; Organisation of 'Pulses Crop Village' in various blocks</li></ul>
<b>7th Plan (1985 - 1990)</b> <ul style="list-style-type: none"><li>&gt; Adoption of Plant Protection measures</li><li>&gt; Launching of Centrally Sponsored National Pulses Development Programme (NPDP).</li></ul>	<b>8th Plan (1992 - 1997)</b> <ul style="list-style-type: none"><li>&gt; Pulses brought under Technology Mission.</li><li>&gt; Intensification of NPDP by bringing in additional area, use of new variety seeds, technology, etc.</li></ul>
<b>9th Plan (1997 - 2002)</b> <ul style="list-style-type: none"><li>&gt; Continuation of strategies introduced in 8th plan</li><li>&gt; Continuation of NPDP</li></ul>	<b>10th Plan (2002- 2007)</b> <ul style="list-style-type: none"><li>&gt; More emphasis on NPDP by taking into consideration all the aspects of production and post harvest management</li><li>&gt; Launching of Integrated Scheme of Oil Seeds, Pulses and Maize (ISOPOM)</li></ul>
<b>11th Plan (2007-2012)</b> <ul style="list-style-type: none"><li>&gt; Launching of National Food Security Mission (NFSM) to ensure food security by producing adequate amount of pulses.</li></ul>	

A number of initiatives have been introduced for the development of the pulses sector in the country. Every year, the Govt. announces the Minimum Support Price (MSP) for five major pulses i.e. Bengal Gram, Black Gram, Green Gram, Arhar and Lentil so as to ensure remunerative price for the farmers.

**1.9** India has followed a liberal policy towards the import of pulses during the last two decades. The pulses import was placed under the Open General License in 1979, allowing anyone to import pulses into India without any approval or restrictions. The import duty on pulses was also quite low so as to facilitate the import. This reflects the importance of pulses in the Indian diet on one hand and the shortfall between the demand and supply of pulses on the other.

## **Need for the Study**

**1.10** Many of India's one billion odd inhabitants are vegetarians and pulses are a key source of dietary protein for them. Though the country has become self sufficient in rice and generating exportable surplus in wheat, the pulses production has not kept pace with the population growth. In order to meet the gap between the domestic demand and supply situation, the Govt. has resorted to imports. Apart from that, the Govt. tackles the problems in the pulses sector by taking measures to increase area and production of pulses in the country, improve the marketing of the pulses, provide the storage & the processing facilities, etc. It becomes necessary to delve into the pulses sector so as to understand the entire gamut of the problems / issues related to sector with specific reference to the state of Orissa.

## CHAPTER - II

### AREA, PRODUCTION AND PRODUCTIVITY OF PULSES

Pulses occupy an enviable position in the overall Indian foodgrains scenario. The present chapter a brief account of the area, production and productivity of the major pulses in the country and also the initiatives introduced during the plan period to bring about development of the sector.

#### Area under Foodgrains and Pulses in India

**2.2** The area and production of pulses in the country vis-a-vis the overall foodgrains is reflected in the Table 2.1.

**Table 2.1 : Area and Production of Pulses vis-a-vis Foodgrains in India**  
(Area : Million ha. and Production : million tonnes)

Sl. No.	Year	Area (Million ha.)		Production (Million Tonnes)	
		Foodgrains	Pulses	Foodgrains	Pulses
1	1960-61	115.6	23.6 (20)	82.5	12.7 (15)
2	1970-71	124.3	22.6 (18)	108.4	11.8 (11)
3	1980-81	126.7	22.5 (18)	129.6	10.6 (8)
4	1990-91	127.8	24.7 (19)	176.4	14.3 (8)
5	2000-01	121.0	20.3 (17)	196.8	11.0 (6)
6	2001-02	122.8	22.0 (18)	212.9	13.3 (6)
7	2002-03	113.9	20.5 (17)	174.8	11.1 (6)
8	2003-04	123.4	23.5 (19)	213.2	14.9 (7)
9	2004-05	120.1	22.8 (19)	198.4	13.1 (7)
10	2005-06	121.6	22.4 (18)	208.6	13.4 (6)
11	2006-07	123.5	23.1 (19)	216.1	14.2 (7)

Figures in the parentheses indicate the percentage of pulses to foodgrains

The area under pulses as a percentage of area under foodgrains has remained stagnant around 17 to 20 per cent over the years. The production of the pulses as a percentage of foodgrains production has however shown a declining trend over the years, with the share coming down from 15 per cent in 1960-61 to 7 per cent in 2006-07. This raises a serious concern about the productivity of pulses in the country as can be inferred from Table 2.2.

**Table 2.2 : Productivity of Pulses vis-a-vis Foodgrains**

(kg/ha.)

Sl. No.	Year	Foodgrains	Pulses	Pulses as % of Foodgrains
1	1960-61	710	539	76
2	1970-71	842	524	60
3	1980-81	1023	473	46
4	1990-91	1380	578	42
5	2000-01	1626	544	33
6	2001-02	1734	607	35
7	2002-03	1535	543	35
8	2003-04	1727	635	37

9	2004-05	1652	577	35
10	2005-06	1715	598	35
11	2006-07	1750	616	35

**2.3** The Table 2.2 shows a fluctuating trend in the productivity of pulses since the 1970s or more appropriately since Green Revolution. The productivity of pulses decreased more sharply during 1980-81 as compared to 1970-71 i.e. by 10 per cent. The productivity improved by almost 44 per cent in 1990-91 as compared to the same in 1980-81. The productivity of pulses vis-vis the foodgrains has however reduced drastically over the years. From a healthy 76 per cent during 1960-61, the share of pulses in overall foodgrains production has remained stagnant around 35 to 37 per cent during the period from 2000-01 to 2006-07. This reflects the fact that the Indian pulses sector has a long way to go in terms of productivity as the green revolution has not been able to make any impact on the sector. However, since

### Season-wise cultivation of Pulses in India

**2.4** The pulses are cultivated both during the Kharif and Rabi season in India and season-wise the area and production of pulses in the country given in Annexure - I indicates almost equal percentage of area under pulses during the Kharif and Rabi season over the years. However, the productivity of Rabi pulses are much higher than that of the former. During the period from 2000-01 to 2006-07, the productivity of Kharif pulses varied between 400 kg to 530 kg. per ha. whereas the productivity for the Rabi pulses was in the range of 600 kg. to 770 kg per ha. This reflects the status of pulses in the country as a residual crop, mainly grown during the Rabi season.

**2.5** The low productivity of the pulses can be explained better in terms of its low irrigation coverage. The Table 2.3 shows the irrigated area under pulses vis-a-vis that of total foodgrains and cereals.

**Table 2.3 : Share of Irrigated Area under Pulses vis-a-vis Foodgrains and Cereals**

(in % age)

Sl. No.	Year	Total Cereals	Total Pulses	Total Foodgrains
1	1970-71	27.6	8.8	24.1
2	1980-81	34.1	9.0	29.7
3	1990-91	41.0	10.5	35.1
4	2000-01	50.4	12.5	43.8
5	2001-02	50.4	13.4	43.5
6	2002-03	50.4	14.1	43.4
7	2003-04	49.7	13.7	42.6
8	2004-05	51.4	14.0	44.1
9	2005-06	52.3	15.0	45.5

The percentage of irrigated area to the total area under pulses cultivation has shown a marginal improvement from 8.8 per cent during 1970-71 to 15 per cent during 2005-06 in comparison to improvement from 27.6 per cent to 52.3 per cent for cereals and improvement from 24.1 per cent to 45.5 per cent for total foodgrains. This reiterates the fact that pulses are cultivated mainly in the rainfed areas whereas in the irrigated areas, the farmers prefer to cultivate cereals and other commercial crops.

## Net Availability of Pulses

**2.6** The fluctuating production has cast an impact on the net availability of pulses in the country as can be observed from Table 2.4.

**Table 2.4 : Net Availability of Pulses and Cereals in India**

(gm/day)

Sl. No.	Year	Cereals	Pulses	Total Foodgrains
1	1950-51	334.2	60.7	394.9
2	1960-61	399.7	69.0	468.7
3	1970-71	417.6	51.2	468.8
4	1980-81	417.3	37.5	454.8
5	1990-91	468.5	41.6	510.1
6	2000-01	386.2	30.0	416.2
7	2001-02	458.7	35.4	494.1
8	2002-03	408.5	29.1	437.6
9	2003-04	426.9	35.8	462.7
10	2004-05	390.9	31.5	422.4
11	2005-06	412.1	32.5	444.5

According to the FAO and WHO estimates, human body requires 1 gm. of protein per day for each kilogram body weight for proper growth. Normally an average person needs 47 gms of pulses per day. However, the per capita availability pulses has been reducing over the years in India mainly due to stagnant production and increasing population. The net availability of pulses declined from 60.7 gm/day in 1950-51 to 29.1 gm/day in 2002-03, after which it showed a marginal improvement. It is evident from the Table 2.4 that the availability of pulses in India has never reached the level of 80 gm/day as recommended by the FAO and WHO.. If we take into consideration the recommendation of Indian Council of Medical Research at 43 gm/day the results does not seem encouraging.

## Area under major Pulses in India

**2.7** The major pulses cultivated in India include the following :

I. Kharif Pulses, usually harvested in September / October include

- i. Green Beans / Mung Beans
- ii. Black Matpe / Urad / Black Gram
- iii. Pigeon Peas / Arhar / Tur

II. Rabi pulses, usually harvested in March / April include the following :

- i. Chick Peas / Bengal Gram
- ii. Green Peas
- iii. Lentil / Masoor

2.8 The area under the major pulses during 2000-01 to 2005-06 is indicated in the Table 2.5. and in Figure - 1.

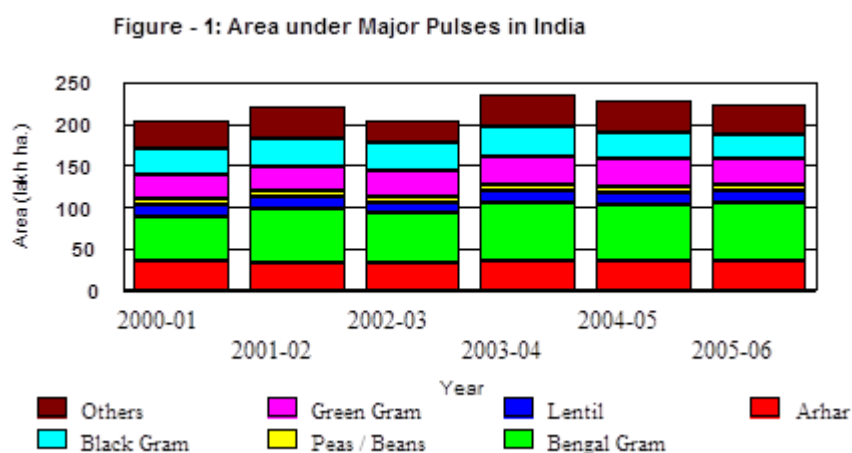


Table 2.5 : Area under the major pulses during 2000-01 to 2005-06 in India

(Lakh ha.)

Sl. No.	Pulse	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06
1	Pigeon Pea / Arhar	36.32	33.28	35.59	35.16	35.19	35.09
2	Bengal Gram / Chick Pea	51.85	64.16	59.06	70.48	67.146	69.26
3	Lentil / Masoor	14.78	14.66	13.77	13.69	14.73	15.05
4	Peas / Beans	6.55	6.7	6.64	7.09	7.91	7.93
5	Green Gram / Mung	30.08	30.87	30.15	35.48	33.41	31.09
6	Black Gram / Urad	30.11	33.03	35.5	34.24	31.69	29.69
7	Others*	33.78	37.38	26.26	38.44	37.55	35.81
	Total	203.48	220.08	206.96	234.58	160.48	223.91

Source : Directorate of Economics and Statistics, M/A, GoI

\* Others include Moth, Lathyrus, Kulthi

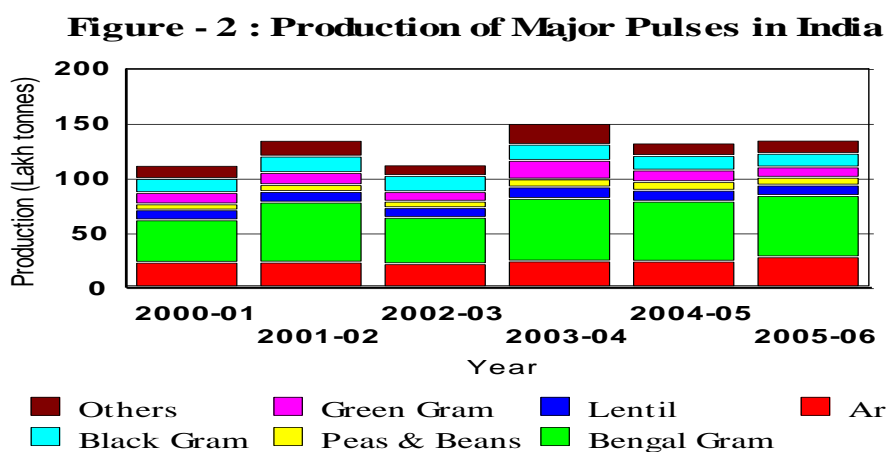
Bengal Gram / Chick Pea is the most widely cultivated pulses in India with almost 30 per cent of total area under pulses, followed by Arhar, Green Gram and Black Gram at around 13 to 16 per cent., lentil (7 per cent) and Peas & Beans (4 per cent).

## Production of Major Pulses in India

**2.9** The production of major pulses in India over the period from 2000-01 to 2005-06 is indicated in Table 2.6 and Figure - 2.

**Table 2.6 : Production of Major Pulses in India from 2000-01 to 2005-06**  
(lakh tonnes)

Sl. No.	Pulse	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06
1	Pigeon Pea / Arhar	22.65 (618)	22.6 (679)	21.06 (651)	23.56 (670)	23.47 (667)	27.38 (765)



2	Bengal Gram / Chick Pea	38.55 (744)	54.73 (853)	42.37 (717)	57.17 (811)	54.69 (815)	56.00 (808)
3	Lentil / Masoor	9.15 (619)	9.74 (664)	8.73 (634)	10.38 (743)	9.94 (675)	9.46 (629)
4	Peas / Beans	5.36 (819)	6.08 (906)	5.92 (891)	7.25 (1022)	7.86 (993)	7.1 (896)
5	Green Gram / Mung	10.23 (340)	11.11 (360)	8.67 (288)	17.02 (480)	10.58 (317)	9.46 (304)
6	Black Gram / Urad	12.96 (431)	14.99 (454)	14.73 (415)	14.71 (430)	13.27 (419)	12.45 (419)
7	Others*	12.03	14.44	9.77	18.95	11.49	11.99
	Total	98.73 (544)	119.25 (607)	101.48 (543)	130.1 (635)	119.81 (577)	121.85 (598)

Source : Directorate of Economics and Statistics, M/A, GoI

\* Others include Moth, Lathyrus, Kulthi

Figures in the Parentheses indicates the Productivity of Pulses

The production of Bengal Gram constitutes around 40 per cent of the total pulses, followed by Arhar (20 per cent), Black Gram, Green Gram, Lentil, Peas / Beans (5 to 7 per cent each). The productivity of major pulses has shown a fluctuating trend, with that of Green Gram and Black Gram being lowest and Peas / Beans being highest.

### Major Pulses Producing states in India

**2.10** The four dominant states in terms of area under pulses in India are Madhya Pradesh, Maharashtra, Rajasthan and Uttar Pradesh, each contributing around 10 to 15 per cent of the total area under pulses. Karnataka and Andhra Pradesh are two other important states contributing around 5 to 10 per cent of the total area of pulses in the country. The states like Orissa and Chattisgarh contribute around 3 to 5 per cent to the area of pulses in the country. In terms of production, Madhya Pradesh contributed more than 20 per cent of the total production of pulses of the country followed by Uttar Pradesh and Maharashtra at 15 to 20 per cent, Rajasthan at 10 to 15 per cent, Karnataka and Andhra Pradesh at 5 to 10 per cent of the total production. The share of Orissa varies in the range of 3 to 5 per cent of the total pulses production in the country. The productivity of pulses however, was highest in Uttar Pradesh, followed by Madhya Pradesh, Maharashtra and Rajasthan. The productivity of pulses in Orissa and Chhattisgarh were at a lower level as compared to other states.

### Pulses in Orissa

**2.11** Pulses are an indispensable part of the diet of the people of the state of Orissa. The position of pulses in the state over the years can be analysed by taking into account the cropping pattern of the major crops in the state. The same in percentage terms is indicated in Table 2.7.

**Table 2.7 : Cropping Pattern of Principal Crops in Orissa**

		(Area in %)						
Sl. No.	Crops	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08
1	Cereals	79.45	80.83	79.32	79.79	78.30	78.50	77.77
2	Pulses	11.43	10.93	12.16	11.16	13.60	13.40	14.26
3	Total Foodgrains	90.88	91.76	91.48	90.98	91.90	91.90	92.03
4	Oilseeds	5.52	4.87	5.25	5.56	4.57	4.37	4.43
5	Fibres	1.79	1.28	1.29	1.44	1.55	1.63	1.46
6	Other Crops	1.81	2.09	1.98	2.02	1.94	2.11	2.08
7	<b>Grand Total</b>	<b>100.00</b>	<b>100.00</b>	<b>100.00</b>	<b>100.00</b>	<b>100.00</b>	<b>100.00</b>	<b>100.00</b>

Source : Various Issues of Orissa Agriculture Statistics

The share of pulses in the overall cropping pattern has varied around 11 to 14 per cent during the period from 2001-02 to 2007-08. In fact, the data reveals marginal variations in the area under major crops in the state. The similar trend is reflected in the share production of major crops in the overall agricultural during these period as indicated in the Table 2.8.

**Table 2.8 : Production of Major Crops in Orissa**

(Production in %)

Sl. No.	Crops	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08
1	Cereals	85	73	80	79	77	76	79
2	Pulses	3	4	3	3	4	4	4
3	Total Foodgrains	88	77	83	82	82	80	83
4	Oilseeds	2	2	2	2	2	2	2
5	Fibres	1	1	3	3	3	3	3
6	Other Crops	9	20	12	13	13	15	12
7	<b>Grand Total</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>

Source : Various Issues of Orissa Agriculture Statistics

The share of other crops comprising of vegetables and spices, etc. has exhibited more pronounced trend in comparison to other crops. However, the importance of pulses has not reflected any substantial change.

**2.12** Since cereals and pulses are dominant both in terms of area and production of major crops, it would be beneficial to throw more light on the position of pulses in the overall foodgrains scenario of the state. The same is indicated in Table 2.9 in the area and production of pulses vis-a-vis the foodgrains during the period from 2001-02 to 2007-08.

**Table 2.9 : Area and Production of Pulses vis-a-vis Foodgrains in Orissa**

(Area : Lakh ha, Production : Lakh Tonnes )

Sl. No.	Year	Area		Production	
		Foodgrains	Pulses	Foodgrains	Pulses
1	1960-61	44.47	4.94 (11)	40.29	2.19 (5)
2	1970-71	57.41	8.45 (15)	48.63	4.67 (10)
3	1980-81	69.09	17.26 (25)	59.77	8.86 (15)
4	1990-91	70.89	21.31 (30)	70.31	11.75 (17)
5	2000-01	62.63	13.90 (22)	55.35	5.07 (9)
6	2001-02	66.83	17.44 (26)	82.33	6.97 (8)
7	2002-03	59.92	13.15 (22)	40.45	4.58 (11)
8	2003-04	65.68	16.43 (25)	77.37	6.23 (8)
9	2004-05	65.76	16.51 (25)	75.88	6.24 (8)
10	2005-06	67.90	18.80 (28)	82.21	7.94 (10)
11	2006-07	68.40	19.51 (29)	82.98	8.66 (10)
12	2007-08	68.84	19.81 (29)	92.54	9.08 (10)

Figures in the parentheses indicate the percentage of pulses to foodgrains

**2.13** Though the area under pulses was around one fifth of the total area under foodgrains, its production was varying in the range of 8 to 10 per cent of the total foodgrains production in the state since the year 2000-01. The position of the pulses can better be analysed by taking into account the productivity of pulses vis-a-vis cereals and total foodgrains in the state. The same is indicated in Table 2.10.

**Table 2.10 : Productivity of Cereals and Pulses in Orissa**

(kg/ha.)

Sl. No.	Year	Cereals	Pulses	Total Foodgrains
1	2001-02	1526	400	1232
2	2002-03	767	349	675
3	2003-04	1444	379	1178
4	2004-05	1414	378	1154
5	2005-06	1513	422	1211
6	2006-07	1520	444	1213
7	2007-08	1695	458	1344

Source : Various Issues of Orissa Agriculture Statistics

The productivity of both the cereals and pulses decreased substantially in the year 2002-03 because of the severe drought condition prevailing in the state. After that the situation improved and the productivity of both cereals and pulses showed an increasing trend. However, the productivity of cereals is much higher in comparison to that of the pulses.

**2.14** The area and production of major pulses cultivated in Orissa during the period from 2000-01 to 2006-07 is indicated in Annexure II and III respectively. The same are indicated in Figures-3, Figure-4 respectively. The composition of pulses basket in Orissa in terms of area is indicated in the Table 2.11.

**Table 2.11 : Composition of Pulses Basket in Orissa in terms of Area**

( in % age terms)

Sl. No.	Name of the Pulses	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07
1	Pigeon Pea / Tur / Arhar	11 (19)	7 (12)	8 (16)	9 (15)	8 (14)	7 (12)	7 (12)
2	Bengal Gram	1 (3)	2 (3)	2 (3)	2 (3)	2 (3)	2 (3)	2 (3)
3	Green Gram / Mung	34 (31)	39 (34)	37 (33)	37 (32)	39 (34)	38 (34)	38 (34)
4	Black Gram / Urad	31 (28)	32 (32)	33 (29)	32 (30)	32 (30)	30 (28)	31 (28)
5	Kulthi	19 (14)	16 (14)	16 (13)	16 (12)	15 (12)	15 (10)	13 (11)
6	Others*	4 (5)	4 (5)	4 (6)	4 (7)	4 (7)	8 (13)	9 (12)
	Total	100 (100)	100 (100)	100 (100)	100 (100)	100 (100)	100 (100)	100 (100)

Figures in the Parentheses indicate percentage to total Pulses Production in the state

Source : Various issues of Orissa Agricultural Statistics

\* Others include Cowpea, Field pea, lentil, etc

As can be inferred from the Table 2.11, Green Gram/ Mung, Black Gram / Urad, Kulthi and Pigeon Pea / Tur / Arhar are the three major pulses grown in Orissa. The area under these four types of pulses constitute more than 80 per cent of the total area under pulses. The Bengal Gram, Chick Pea, Field Pea, Lentil, etc. are cultivated in the remaining 15 per cent of the area under pulses.

**2.15** As far as the production of major pulses are concerned, the Green Gram and Black Gram are the major pulses produced in the state, followed by Arhar and Kulthi. The share of major pulses in the overall pulses basket has remained almost unchanged over the years,

except in case of Arhar where the share has gradually declined since the year 2002-03. The share of other pulses such as Cowpea, Lentil and Fieldpea, etc. has shown continuous improvement over the years, though for all these years their share has remained below 10 per cent of the total production. This indicates the diversification of pulses basket of the state.

**2.16** The productivity of the major pulses in the state is indicated in Table 2.12 and the same is indicated in Figure - 5.

**Table 2.12 : Productivity of major Pulses in Orissa**

Sl. No.	Name of the Pulses	(kg/ha)						
		2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07
1	Pigeon Pea / Tur / Arhar	652	645	643	700	683	744	803
2	Bengal Gram	619	650	619	619	607	571	651
3	Green Gram / Mung	328	354	314	327	332	298	396
4	Black Gram / Urad	334	403	310	347	347	323	407
5	Kulthi	270	335	276	327	315	295	359
6	Others	519	530	519	559	581	677	575
	<b>Total</b>	<b>365</b>	<b>400</b>	<b>349</b>	<b>379</b>	<b>378</b>	<b>422</b>	<b>444</b>

The productivity of Arhar has been at a higher level in comparison to other pulses throughout the period. But the major cause of worry has been the low productivity of Green and Black Gram which combined together constitute more than 60 per cent of the area under pulses in the state. The productivity of Mung varied in the range of 290 kg to 354 kg. Per ha. During the period from 2000-01 to 2005-06. But in the year 2006-07, the productivity of Green Gram increased to 396 kg per ha. Kulthi is also lower in comparison to other pulses. These brings down the overall productivity of pulses in the state. The over all productivity of pulses in the state shows a fluctuating trend and at 350 to 450 kg. per ha. was much lower than the national average of 540 to 600 kg. during the same period. The fluctuation in area and production of pulses was attributed mainly to the variations in the climatic conditions and the other related factors.

**2.17** The Annexure - IV shows the district-wise area under pulses as a percentage of GCA in the state during the period from 2004-05. The pulses as a percentage of GCA has increased marginally from 18.93 per cent during 2004-05 to 21.06 per cent during 2005-06 to 21.78 per cent during 2006-07 whereas the share of cereals has remained stagnant around 55 per cent during the same period. The paddy accounts for almost 90 per cent of the cereals, with maize, ragi, jowar and bajra contributing very limited amount to the total cereal basket of the state.

#### **Estimates of Marketable Surplus of Pulses in Orissa**

**2.18** The Directorate of Agriculture & Food Production, Govt. Of Orissa has made an attempt to estimate the marketable surplus in the state for cereals, pulses and oilseeds. The marketable surplus for the pulses for the five years i.e. 2001-02 to 2005-06 is indicated in Table 2.11.

**Table 2.13 : Estimates of Marketable Surplus of Pulses in Orissa**

(in lakh tonnes)

Sl. No.	Year	Projected Population (Lakh)	Adult Equivalent @88% (Lakh)	Total Consumption Requirement @ 50 gms per day per adult	Total Requirement (including seed, feed and wastage)	Production	Surplus / Deficit
1	2001-02	371.03	326.51	8.46	9.67	6.97	-2.70
2	2002-03	377.06	331.81	8.60	9.83	4.58	-5.25
3	2003-04	383.19	337.21	8.74	9.90	6.23	-3.76
4	2004-05	389.41	342.68	8.88	10.15	6.25	-3.90
5	2005-06	395.74	348.25	9.02	10.31	7.94	-2.37

Source : Orissa Agricultural Statistics-2006-07, Directorate of Agriculture & Food Production, Orissa

From the Table 2.10 it becomes clear that Orissa is a deficit state as far as the pulses production of pulses is concerned. The state was not able to meet its total requirement for the pulses during the period. This makes the pulses more vulnerable for the state food security.

## CHAPTER - III

### OBJECTIVES AND METHODOLOGY

Orissa with 8.09 lakh ha. area under pulses during the year 2005-06 occupied around 4 per cent of the total area under pulses in the country. The area under various pulses in the state increased to 19.51 lakh ha. during 2006-07, which was around 23 per cent of the total cropped area of the state. The present chapter outlines briefly the objectives, sample design, methodology adopted for the study.

#### Objectives of the Study

**3.1** The present study was undertaken with the following objectives pertaining to the state of Orissa :

- 0 analyse the trend in area, production and productivity of selected pulses
- 1 look into the issues and constraints in the farm management of the pulses
- 2 analyse the forward and backward linkages in the production of pulses
- 3 assess the efficiency of different channels of marketing and the role of MSP
- 4 explore the post harvest management including grading, processing, packing, value addition, branding, etc.
- 5 identify the constraints in the production , marketing and processing
- 6 evaluate the role of institutional credit and extension mechanism in the pulses

#### Selection of Pulses

**3.2** The state of Orissa is divided into four agro-climatic zones i.e.

- i. Coastal Plains comprising of Balasore, Bhadrak, Cuttack, Jagatsinghpur, Jajpur, Kendrapara, Khurda, Nayagarh, Puri and part of Ganjam districts
- ii. Eastern Ghats consisting of Kandhamal, Boudh, Gajapati, part of Ganjam, Kalahandi, Nuapada, Koraput, Malkangiri, Nabarangpur and Rayagada districts
- iii. Central Table Land comprising of Bargarh, Sambalpur, Deogarh, Jharsuguda, Sonapur, Bolangir, Angul and Dhenkanal districts
- iv. Northern Plateau Region covering Mayurbhanj, Keonjhar and Sundargarh districts

**3.3** The analysis of cropping pattern of the state shows the following :

- > Red Gram / Arhar / Tur / Pigeon Pea is cultivated mainly as an inter-crop with Paddy, Groundnut and Maize throughout the state.
- > Black Gram / Urad / Biri is cultivated mostly in the coastal plains and central table land, mainly as rabi crop.
- Green Gram / Mung is widely grown in Rabi season both as a pure crop and also as an inter-crop throughout the state.
- > Bengal Gram / Chick Pea is grown on a limited scale in Northern plateau region as pre-Rabi or Rabi crop.
- > Horse Gram / White Pea is cultivated on a limited scale as a late Kharif or early Rabi crop in most of the districts of the state.

Keeping in mind the importance of Arhar, Mung and Urad in the overall pulses basket of Orissa, the present study was confined to the various aspects of these three types of pulses. However, most of the observations / issues are also applicable to the pulses sector of the state in general.

### Selection of the Districts

**3.4** The district-wise / season-wise area under pulses in Orissa during the period from 2004-05 to 2006-07 as indicated in the Annexure - V. The Table 3.1 identifies the five dominant districts in terms of percentage of area under pulses in the state.

**Table 3.1 : Major Pulses Growing Districts in Orissa**

(% age of total pulses growing area)

Sl. No.	District	Kharif	Rabi	Total	Rank
1	Ganjam	5.57	14.10	11.00	1
2	Kalahandi	14.50	6.14	9.18	2
3	Bolangir	10.25	4.64	6.68	3
4	Cuttack	0.46	8.70	5.71	4
5	Nuapara	7.46	2.53	4.32	5
6	Orissa	100.00	100.00	100.00	

Figures based on the information provided in various issues of Orissa Agricultural Statistics

As indicated in the Table 3.1, Ganjam, Kalahandi, Bolangir, Cuttack and Nuapara were the five major districts in terms of area under pulses during the period from 2004-05 to 2006-07. Larger area in Kalahandi, Bolangir and Nuapara districts are devoted to Kharif pulses whereas in Ganjam and Cuttack districts, larger area is devoted for the Rabi pulses.

**3.5** The district-wise area under cultivation of three selected pulses i.e. Arhar, Mung and Urad in Orissa are indicated in Annexure VI, VII and VIII. The district-wise production of Arhar, Mung and Urad in the state are indicated in Annexure IX, X and XI. The area devoted for the cultivation of these three pulses as a percentage of the total area and also the production of these pulses as a percentage of the total production in the above five districts in percentage terms is indicated in Table 3.2.

**Table 3.2 : Area devoted for selected pulses (Arhar, Mung and Urad) in the major Districts during 2004-05 to 2006-07**

(% age of total area and % age of total production)

Sl. No.	District	Arhar		Mung		Urad	
		Area	Production	Area	Production	Area	Production
1	Ganjam	8.45	8.68	16.75	18.18	9.09	11.28
2	Kalahandi	9.86	10.28	9.34	16.00	8.22	12.74
3	Bolangir	6.79	6.13	7.03	4.54	4.05	3.04
4	Cuttack	0.70	0.82	5.59	6.23	8.21	9.81
5	Nuapara	5.33	3.33	4.14	2.92	3.77	2.32
	Orissa	100.00	100.00	100.00	100.00	100.00	100.00

In view of the dominance of Ganjam and Kalahandi districts in area and production of selected pulses in the state, the study was confined to these two districts.

**3.6** In addition to the criteria of share in area and production of pulses, the sample districts were selected keeping in mind the following points :

- 0 Ten districts of Orissa have been covered under National Food Security Mission (NFSM) on Pulses introduced by Govt. of India in the year 2007-08. Since both Ganjam and Kalahandi districts are covered under the Mission, the study would provide insight into the working of the same in the districts.
- 0 Ganjam is considered to be a developed district with a good agricultural, industrial and infrastructural base whereas Kalahandi is a predominantly tribal district having comparatively poor infrastructure base. The study in these two districts will give a holistic picture of the pulses sector in the state.

### Collection of Data

**3.7** Both the primary and secondary data were used for drawing the inferences of the study. The field study was undertaken in the month of November 2008 to collect information on plantation from the farmers, marketing from the traders both wholesalers & retailers and processing from the dal processing units. The information on different aspects were collected on the basis of pre-drawn questionnaire. The sample design covering all the elements is indicated in Table 3.3.

**Table 3.3 : Sample Design for the Study**

				(Number)
Sl. No.	Particulars	Kalahandi	Ganjam	Total
1	Farmers	35	35	70
2	Traders	5	5	10
3	Dal Processing Units	2	4	6

**3.9** Apart from the above, the secondary data were collected / interactions were held with the following :

- Joint Director (Pulses), Govt. of Orissa
- Deputy Director, Agriculture, Ganjam and Kalahandi Districts
- Scientists at Orissa University of Agriculture & Technology, Bhubaneswar
- Coordinator, National Food Security Mission on Pulses, Ganjam and Kalahandi
- Officials of Krishi Vigyan Kendra, Kalahandi
- Regional Pulses Research Centre, Ganjam
- Non Govt. Organisations, Banajat Trust, Kalahandi
- Officials of Utkal Gramya Bank, Rushikulya Gramya Bank & State Bank of India

### Methodology of the Study

- 0 The secondary data on the area, production and productivity was analysed. The economics of pulses cultivation was analysed on the basis of the primary information obtained from the field surveys. The results / output relating to the cost, output, gross and net profit were inferred from the feedback recorded from the sample farmers in the questionnaire.

- 1 The estimation of cost of cultivation was based on the cost concepts adopted by the Comprehensive Scheme for calculation of costs of agricultural operations. The items of cost included the out of pocket expenses and the imputed cost of owned labour. The paid out cost was denoted as A and had two variations A 1 and A 2. The A 1 component included the Hired labour human, bullock and machine, Material inputs like seeds, fertilisers and manure, pesticides and irrigation, Land revenue and taxes and Interest on borrowed capital / working capital, etc. The imputed cost of family labour was calculated and included in A 1 to find out the cost of B1. Cost A 2 included cost A 1 and rent paid for leased in land and Cost B 2 was calculated by adding A 2 and imputed value of family labour.
- 2 The inputs like fertiliser, chemicals, seeds etc. were valued on the basis of their purchase prices. The value of land was taken as per the market price. The cost of the farm manure, seeds was calculated on the basis of the prices prevailing in the locality. Farm yard manure was valued at the price prevailing in the locality. Hired labour was valued at the hired charges for the same. Machine labour was calculated on the basis of the operational expenditure per ha. Interest on working capital was determined on the basis of the prevailing bank rate.
- 3 Estimating that the sample farmers on an average kept around one third of the produce for consumption and use for seeds and sold rest of the produce i.e. two third of the produce. The Gross value of output sold was calculated by multiplying the average sale price with the quantity. The profitability was estimated by deducting the various cost components out of the gross value of the output sold.
- 0 Interactions were held with the operators engaged in the supply chain including traders, wholesalers so as to get an insight into the intricacies of the operations in each stage, including the rough margins involved therein.
- 0 The data on various aspects of operations of the pulses processing units was collected and analysed to ascertain their investment pattern, cost of operations, gross and net income, etc. as per their reference year price. The cost of operation was calculated per Metric Tonne basis. The simple statistical / mathematical / financial techniques like average, percentage, Net Present Value, Financial Rate of Return, Benefit to Cost Ratio, Break Even Analysis were used to arrive at various conclusions about the viability of the units.
- 1 The interaction was held with the SHG members engaged in the community processing of pulses so as to get an insight into their operations vis-a-vis the private processing units, though on a limited scale.
- 2 The information regarding the initiatives taken in the state under the current programmes such as Integrated Scheme on Oilseeds, Pulses and Maize (ISOPOM) and National Food Security Mission (NFSM) were collected from officials of the Agriculture Deptt. so as have an idea about their progress.
- 3 The interaction with the officials of the regional Pulses Research Centre gave an indication of the developments in the field of research, particularly in variety development, with regard to the pulses.

- 4 The reference year of the study was taken as 2007-08. All the costs and benefits / returns were calculated at 2007-08 year prices so as to derive desired results.

### **Limitations**

**3.10** The inferences of the study were drawn on the basis of primary data collected from a very limited sample. Though all efforts were made to collect the correct or near to correct information through the pre-designed questionnaire, the bias in revealing certain information may have affected the data collection and inference drawn from such data.

**3.11** The selection of sample districts was made on the basis of data on area, production and productivity of pulses in the state as provided by the Directorate of Agriculture and Food Production, Govt. of Orissa. There may in some cases deviate from the data available with the Ministry of Agriculture, Govt. of India.

These limitations notwithstanding, the study team has done its best to arrive at conclusions by ensuring correct interpretation of available information.

## CHAPTER - IV

### CULTIVATION ASPECTS OF PULSES

The present chapter gives a brief account of the characteristics of the sample districts, i.e. Ganjam and Kalahandi, the cultivation aspects of pulses as prevalent among the sample farmers and also the issues related to the same.

#### Characteristics of the selected districts

**4.2** A part of Ganjam district comes under the Coastal Plains whereas another part comes under the Eastern Ghats and the whole of Kalahandi district comes under the Eastern Ghats.

#### Rainfall

**4.3** The district-wise average annual rainfall in Ganjam district varied in the range of 979 mm in 2004 to 1482 mm in 2006, whereas the same in Kalahandi district varied within the range of 1744 mm in 2004 to 2244 in 2006. The average rain fall for the state during the same period was in the range of 1274 mm to 1683 mm.

#### Irrigation Status

**4.4** The irrigation status of Ganjam and Kalahandi districts vis-a-vis the state as a whole is indicated in Table 4.1.

**Table 4.1 : Irrigation Potential created upto 2006-07 and Actual Area Irrigated during 2006-07**  
(in 000' ha.)

Sl. No.	Sources	Ganjam	Kalahandi	Orissa
1	Major & Medium	143.62	139.21	1813.73
2	Minor (Flow)	110.24	30.94	590.37
3	Minor (Lift)	39.80	23.16	655.47
4	Other Sources	58.62	45.44	980.45
5	Total Potential	351.92	238.75	4040.02
6	Actual Irrigated Area in 2006-07	288.32	222.39	3149.45
7	Irrigated Area as % of Total Potential Created	82	93	80

Source : Orissa Agricultural Statistics - 2006-07

The major & medium irrigation sources accounted for highest proportion of the irrigation potential created in both the districts, followed by minor flow irrigation in Ganjam district and other sources in Kalahandi district. The lift irrigation accounted for the least proportion of irrigation potential created in both the districts. The proportion of irrigation potential created by major & medium irrigation accounts for the highest proportion, followed by other sources, lift irrigation and minor irrigation in the state. The actual area irrigated during 2006-07 as a proportion to the potential created upto the year 2006-07 was 82 per cent for Ganjam, 93 per cent for Kalahandi and 80 per cent for the state as a whole.

## Cropping Pattern

**4.5** The cropping pattern with reference to the area under selective pulses in the two selected districts vis-a-vis the state as a whole is indicated in Table 4.2.

**Table 4.2 : Cropping Pattern in the Sample Districts**

(Average for the triennium ending 2006-07)

(Area in 000' ha.)

Sl. No.	District	Area under Selected Pulses	Total Area under Pulses	Total Area under Cereals	Gross Cropped Area	Pulses Area as % age of GCA	Cereals Area as a % age of GCA
1	Ganjam	179.15	201.05	319.87	666.45	30.17	47.99
2	Kalahandi	124.60	167.76	289.00	564.40	29.72	51.20
	Orissa	1394.49	1827.37	4307.85	8668.89	20.60	56.61

Source : Various Issues of Orissa Agriculture Statistics

The area under selected pulses was 89 per cent in Ganjam district whereas in Kalahandi it was 74 per cent and for the state as whole it was 76 per cent of the average area under all pulses for the triennium ending 2006-07. More than 50 per cent of the area was devoted for cultivation of foodgrains in Kalahandi district and the state as a whole, whereas in Ganjam district around 48 per cent of the gross cropped area was devoted for cereals. The pulses cultivation as percentage of GCA was around 30 per cent for both Ganjam and Kalahandi districts and 21 per cent for the state as a whole.

## Size of Land holding

**4.6** The average size of land holding in the selected districts during 2000-01 are given in the Table 4.3.

**Table 4.3 : Land Holding Pattern in the Sample Districts**

(No. of farmers in % and size of holding in ha.)

Sl. No.	Particulars / District	Ganjam	Kalahandi	Orissa
1	Small & Marginal Farmers	86	76	83
2	Medium Farmers	13	23	16
3	Large Farmers	1	1	1
4	Average size of Land Holding	1.06	1.62	1.25

Source : Orissa Agriculture Statistics 2006-07

The figures have been rounded off to the nearest whole number

The proportion of small and marginal farmers is higher in Ganjam district at 86 per cent as compared to 79 per cent in Kalahandi district and 83 per cent for the state as a whole. The proportion of medium farmers in Ganjam is lesser at 13 per cent in comparison to 23 per cent in Kalahandi and 16 per cent for the state as a whole. The percentage of large farmers in both

the sample districts and also the state hovers around 1 per cent. The average size of land holding was 1.06 ha. in Ganjam district, 1.62 ha. in Kalahandi district and 1.25 ha. for the state as a whole.

### Area, Production and Yield of Pulses

**4.7** The graphical presentation of area, production and productivity in selected pulses over the period from 1997-98 to 2006-07 in both Ganjam and Kalahandi districts is indicated in the Figure - 6 to 11. The area and production of Green Gram in the district has shown a lot of fluctuations in comparison to Black Gram and Arhar in Ganjam district. In Kalahandi district however the fluctuations in area and production appears to be lesser. During the years 2001-02 and 2002-03, the area and production of the pulses in both the districts have dipped to a much lower level. Both the years were bad years characterised by drought conditions. One interesting point that catches the attention is the importance of other pulses comprising of cow pea, horse pea, field pea and Kulthi which taken together have in some years been as important or more important than the Arhar.

### Characteristics of Sample Farmers

**4.8** Thirty five farmers each from Ganjam and Kalahandi districts were selected for the study and the land holding and cropping pattern of the sample farmers / cultivators is indicated in the Table 4.4 and Table 4.5 respectively.

**Table 4.4 : Land Holding Pattern of the Sample Farmers**

(in ha.)

Sl. No.	Particulars	Ganjam	Kalahandi	Total Sample
1	Owned Land	1.76	1.94	1.85
2	Leased -in-Land	0.75	0.6	0.68
3	Leased-out Land	0	0	0
4	Operated Area	2.51	2.54	2.53
5	Irrigated Area as % to the Operated Area	49	12	37

The operated area of the sample farmers was calculated to be 2.51 ha. in Ganjam and 2.54 ha. in Kalahandi district and for the sample as a whole the operational holding was 2.53 ha. Forty nine per cent of operated area in Ganjam and only 12 per cent of the same in Kalahandi district were irrigated. For the sample farmers as a whole the irrigation percentage was 37 per cent.

**Table 4.5 : Cropping Pattern of the Sample Farmers**

(in % age)

Sl. No.	Crop	Ganjam	Kalahandi	Total Sample
A	Kharif			
i	Paddy	51.90	57.23	54.58
ii	Cotton	0.00	4.18	2.10
iii	Cotton & Arhar	0.00	4.25	2.14
iv	Groundnut	2.00	0.00	0.99
v	Ground Nut & Arhar	0.00	1.34	0.67

vi	Paddy & Arhar	0.00	5.04	2.53
vii	Black Gram & Arhar	0.00	0.00	0.63
viii	Arhar	3.10	16.11	9.64
ix	Green Gram	0.00	0.00	0.00
x	Black Gram	0.00	0.00	0.00
B	Rabi			
i	Ground Nut	3.00	0.00	1.49
ii	Green Gram	27.00	4.57	16.21
iii	Black Gram	12.00	4.11	8.03
iv	Vegetables	1.00	1.00	1.00
C	Total (A+B)	100.00	100.00	100.00

**4.10** The cropping pattern followed by the sample households in Ganjam and Kalahandi districts in percentage terms during the period from 2006-07 to 2007-08 were collected and found to be unchanged. The cropping pattern in percentage terms reveals that in Ganjam district, green gram with 27 per cent and black gram with 12 per cent occupied major portion of cropped area and Arhar occupied only 3 per cent of total cropped area of the sample farmers. In Kalahandi district, the Arhar occupied nearly 28 per cent of the cropped area either as a mixed crop or as an inter crop with cotton, black gram or groundnut. The coverage of green gram and black gram was roughly 5 to 7 per cent of cropped area. For the sample as a whole, the Arhar occupied around 17 per cent, green gram 16 per cent and black gram 8 per cent of the cropped area.

A brief account of the cultivation practices, cost of cultivation, profitability of the three selected pulses are indicated in the following paragraphs.

#### **Green Gram / Mung and Black Gram / Urad**

**4.11** Both the Green Gram (Mung) and Black Gram (Urad) were cultivated by the sample farmers in Ganjam district under both unirrigated and irrigated land. The sample farmers in Kalahandi district cultivated Green Gram only under the unirrigated land.

#### **Soil Preparation**

**4.12** There was no specific soil preparation for the cultivation of Green and Black Gram in the unirrigated conditions. The animal / bullock labour was used to plough the field before sowing. The sample farmers used machine labour / tractor for preparing the soil for the pulses under irrigated conditions.

#### **Season**

**4.13** Both the Green and Black Gram were sown during the Rabi season, in the month of November / December and harvested in the month of February / March under the unirrigated conditions. The Kharif Green Gram and Black Gram were sown in the month of March and harvested in the month of June.

#### **Method of Sowing**

**4.14** The sample farmers normally sowed the seeds in lines, eventhough the distance between lines and the plants was not strictly adhered to. The norm of sowing 50 plants in one sq. mt. was not followed and the usual number per sq. mt. was around 72. Before the sowing the seeds, the farmers usually soaked, dried the same and mixed them with thiram. One

popular method of sowing was the 'Paira' method adopted by the majority of farmers for Green Gram and Black Gram in Ganjam district. The pulses seeds are broadcasted 15/20 days before the harvest of paddy.

#### **Use of Seeds**

**4.15** Around 90 per cent of the sample farmers preferred to use their own seeds / bought from fellow farmers whereas only 10 per cent had used the seeds purchased from the Govt. Seeds Outlets established at the block headquarters. The unavailability of seeds at the outlets at the time of need was the main reason for not using the same. Some of the sample farmers also expressed opinion about the low germination rate of the seeds purchased from the outlets. Eventhough the recommended use of seeds for one ha. of land was 25 kg. for both Green and Black Gram, the sample farmers used around 37 to 38 kg. of seeds per h. The use of seeds in case of sowing by Paira method was still higher at 45 kg per ha. The rate of seeds varied in the range of Rs. 20 to Rs. 25 per kg.

#### **Use of Fertilisers and Manure**

**4.16** The sample farmers used very less / almost nil chemical fertilisers and this made the produce organic by default. Very limited amount of potash was used by the sample farmers but the use of farm yard manure quite liberal. The manure was valued at Rs. 0.30 per kg whereas fertiliser was valued at Rs. 30 per kg.

#### **Inter-cultural Operations**

**4.17** The sample farmers were undertaking the weeding operations once in three / four weeks and that too in an irregular manner. Apart from that, no specific inter-cultural operations were done by them.

#### **Use of Pesticides / Insecticides**

**4.18** The insects such as Aphids, white fly, leaf eating caterpillars & pod borer and pests such as Leaf spot, powdery mildew, yellow mosaic virus affected the Green Gram and Black Gram. The sample farmers were using Endosulphan as insecticides and other pesticides to protect the crop.

#### **Irrigation**

**4.19** Since most of the sample farmers were growing the crop on the residual soil moisture, no irrigation was given. But for the irrigated land the sample farmers were irrigating three times, first before sowing, second 20 / 25 days after the sowing and third at the time of flowering. The rate of irrigation varied in the range of Rs. 470 to Rs. 520 per time.

#### **Harvesting**

**4.20** The sample farmers either plucked or cut the plants after the beans were ripe. After the harvesting, the threshing was done to take out the seeds. The seeds were dried and stored when the moisture content was around 10 per cent.

#### **Post Harvest Management**

**4.21** The sample farmers had not followed any scientific method for the post harvest operations, leading to wastage amounting to 5 to 10 per cent of the produce. The threshing and winnowing operations wherever carried out on the kuttcha floors were resulting in losses. Some of the produce were lost during the transportation from fields to the storage houses. Similarly, the storage in gunny bags in closed and unclean rooms was making the produce susceptible to attack of pests and insects.

## Cost of Cultivation

**4.22** The estimation of cost of cultivation was based on the cost concepts adopted by the Comprehensive Scheme for calculation of costs of agricultural operations. The items of cost included the out of pocket expenses and the imputed cost of owned labour. The paid out cost was denoted as A and had two variations A 1 and A 2. The A 1 component included the following

- 0 Hired labour human, bullock and machine
- 1 Material inputs like seeds, fertilisers and manure, pesticides and irrigation
- 2 Land revenue and taxes
- 3 Interest on borrowed capital / working capital

The imputed cost of family labour was calculated and included in A 1 to find out the cost of B1. Cost A 2 included cost A 1 and rent paid for leased in land and Cost B 2 was calculated by adding A 2 and imputed value of family labour.

## Farm Business Income

**4.23** The sample farmers on an average kept around one third of the produce for consumption and use for seeds and sold rest of the produce i.e. two third of the produce. The Gross value of output sold was calculated by multiplying the average sale price with the quantity. The profitability was estimated by deducting the various cost components out of the gross value of the output sold.

## Cost and Profitability of Green Gram

**4.24** The cost of cultivation of Green Gram in unirrigated and irrigated conditions in Ganjam district and in unirrigated condition in Kalahandi districts as reported by the sample farmers is indicated in the Table 4.6.

**Table 4.6 : Cost of Cultivation of Green Gram in Ganjam and Kalahandi Districts**

(Amount in Rs./ha.)

Sl. No.	Particulars	Ganjam		Kalahandi
		Unirrigated	Irrigated	Unirrigated
1	Seeds	950.00	925.00	875.00
2	Fertilisers and Manure	74.10	215.00	79.00
3	Insecticides & Pesticides	85.00	128.00	150.00
4	Human Labour	800.00	920.00	720.00
5	Animal Labour	180.00	0.00	250.00
6	Machine Labour	0.00	1200.00	0.00
7	Irrigation	0.00	1500.00	0.00
8	Interest on Working Capital	77.00	88.00	56.00
9	Land Tax /Cess/	10.00	12.00	9.00

	Water Charges, etc			
I	Cost A 1 (Sum of 1-9)	2176.10	4990.00	2339.00
10	Rent paid for Leased-in-Land	0.00	0.00	0.00
II	Cost A 2 (A 1 + 10)	2176.10	4990.00	2339.00
11	Imputed Value of Family Labour	720.00	900.00	958.00
III	Cost B 1 (A 1 + 11)	2896.10	5890.00	3297.00
IV	Cost B 2 (A 2 + 11)	2896.10	5890.00	3297.00

The cost of seeds and hired labour constituted around 30 to 40 per cent of the paid out cost (A1) in case of unirrigated condition whereas under the irrigated conditions, the irrigation cost constituted around 40 per cent and seeds and labour around 18 to 20 per cent of A 1. The other costs such as fertilisers & manure, pesticides & insecticides, interest on working capital, land taxes, cess & water taxes etc. constituted less than 10 per cent of A 1. Since none of the sample farmers had cultivated Green Gram on the leased-in-land, no lease rent was paid for the same. The A 2 thus was same as A 1. The imputed value of family labour was included in the A 1 to estimate the B 1 and since the no lease rent was paid by the sample farmers for pulses, the cost B 1 was same as Cost B 2. The A 1 per ha. were Rs. 2896.10 and Rs. 4990.00 for the unirrigated and irrigated land respectively in Ganjam district and Rs. 2339.00 in Kalahandi district. The B 1 per ha. were Rs. 2896.10 and Rs. 5890.00 in Ganjam district for unirrigated and irrigated land respectively and Rs. 3297.00 for the unirrigated land in Kalahandi district.

### Profitability of Green Gram

**4.25** The profitability of the Green Gram under both unirrigated and irrigated conditions in Ganjam district and unirrigated conditions in Kalahandi district is indicated in Table 4.7.

**Table 4.7 : Profitability of Green Gram in Ganjam and Kalahandi Districts**

(Amount in Rs./ha.)

Sl. No.	Particulars	Ganjam		Kalahandi
		Unirrigated	Irrigated	Unirrigated
1	Average Yield (qu.)	4.25	5.00	4.25
2	Yield Retained (qu.)	1.25	1.25	1.65
3	Marketable Surplus (qu)	3.00	3.75	3.25
4	Sale Price (Rs.)	1700.00	1787.00	1721.00
5	Gross Sales Proceeds of Output sold (Rs.)	5100.00	6701.25	5593.25
6	Profit at A 1	2923.90	1711.25	3254.25
7	Profit ar A 2	2923.90	1711.25	3254.25
8	Profit at B 1	2203.90	811.25	2296.25
9	Profit at B 2	2203.90	811.25	2296.25

As can be noted from the Table 4.7, there was a difference of around 15 per cent between the yield of Green Gram under the irrigated and unirrigated conditions. Similarly, the difference between the average sale price of Green Gram under the irrigated and unirrigated

condition was only 6 per cent. Retaining around one third of the produce for home consumption and seed requirement, the sample farmers sold rest of the produce. The gross value of output sold were Rs. 5100.00, Rs. 6701.25 for unirrigated and irrigated conditions in Ganjam and Rs. 5593.25 for unirrigated land in Kalahandi district. The profit both at A 1 and A 2 were Rs. 2923.90 and Rs. 1711.25 for unirrigated and irrigated conditions in Ganjam district whereas it was Rs. 3254.25 under unirrigated condition in Kalahandi district. The profit at B 1 and B 2 were Rs. 2203.90 and Rs. 811.25 for unirrigated and irrigated conditions in Ganjam district and Rs. 2296.25 under unirrigated condition in Kalahandi district.

### Cost and Profitability of Black Gram

**4.26** The Black Gram was cultivated under unirrigated and irrigated conditions in Ganjam district only. The sample farmers in Kalahandi district were not cultivating the Black Gram either in Kharif or in Rabi season. The cost of cultivation of the Black Gram under the unirrigated and irrigated conditions in Ganjam district is indicated in Table 4.8.

**Table 4.8 : Cost of Cultivation of Black Gram in Ganjam District**

(Amount in Rs./ha.)

Sl. No.	Particulars	Ganjam	
		Unirrigated	Irrigated
1	Seeds	925.00	750.00
2	Fertilisers and Manure	73.92	219.50
3	Insecticides & Pesticides	125.00	133.00
4	Human Labour	770.00	938.00
5	Animal Labour	185.00	0.00
6	Machine Labour	0.00	1287.00
7	Irrigation	0.00	1517.00
8	Interest on Working Capital	86.00	89.00
9	Land Tax /Cess/ Water Charges, etc	12.00	12.00
I	Cost A 1 (Sum of 1-9)	2176.92	4945.50
10	Rent paid for Leased-in-Land	0.00	0.00
II	Cost A 2 (A 1 + 10)	2176.92	4945.00
11	Imputed Value of Family Labour	1103.00	923.00
III	Cost B 1 (A 1 + 11)	3279.92	5868.50
IV	Cost B 2 (A 2 + 11)	3279.92	5868.50

The percentage of different components in the over all cost of cultivation in case of Black Gram under the unirrigated and irrigated conditions were not very much different from those of the Green Gram under the same conditions. The cost of seeds and hired labour were most important components under unirrigated conditions whereas the cost of labour and irrigation were more important under the irrigated conditions. The cost both at A 1 and A 2 were Rs. 2179.92 under unirrigated condition and Rs. 4945.00 under the irrigated conditions. Similarly, the cost at B1 and B2 were Rs. 3279.92 and Rs. 5868.50 under the above mentioned conditions.

**4.27** The profitability of the Black Gram is indicated in Table 4.9.

**Table 4.9 : Profitability of Black Gram in Ganjam District**

(Amount Rs./ha.)

Sl. No.	Particulars	Ganjam	
		Unirrigated	Irrigated
1	Average Yield (qu.)	4.25	6.00
2	Yield Retained (qu.)	1.50	1.75
3	Marketable Surplus (qu)	2.75	4.25
4	Sale Price (Rs.)	1925.00	1950.00
5	Gross Sales Proceeds of Output sold (Rs.)	5293.75	8287.50
6	Profit at A 1	3116.83	3342.00
7	Profit at A 2	3116.83	3342.00
8	Profit at B 1	2013.83	2419.00
9	Profit at B 2	2013.83	2419.00

A significant variation was noticed in the yield rate of the Green Gram under the irrigated and unirrigated conditions. There was a difference of Rs. 25 between the price of Green Gram produced under irrigated and unirrigated conditions. The Gross Sales proceeds was Rs. 5293.75 and Rs. 8287.50 for the unirrigated and irrigated Black Gram. The profit at A 1 and A 2 were Rs. 3116.83 and Rs. 3342.00 respectively whereas the profit at B 1 and B 2 were Rs. 2013.83 and Rs. 2419.00 respectively for the unirrigated and irrigated Black Gram. The cultivation under irrigated conditions with proper farm practices gave rise to higher yields.

#### **Cost of Cultivation and Profitability of Green and Black Gram under Paira Method of Sowing in Ganjam District**

**4.28** The Paira Method of sowing is usually followed by the farmers mostly in coastal districts of the state, including certain parts of Ganjam. Some of the sample farmers had used the Paira method for sowing the Green and Black Gram. The seeds under this method were sown by the broadcasting method at least one / two weeks before the harvesting of paddy, so as to gain the moisture from the paddy field. The paddy was cut carefully so as not to cause any damage to the pulses. The seeds used by this method were approximately around 45 kg. per ha. and the sample farmers were not undertaking any particular culture operations for the crop. The cost of cultivation per ha. for Green and Black Gram was almost similar. The Table 4.10 calculates the cost of cultivation of Green and Black Gram as reported by sample farmers in Ganjam district.

**Table 4.10 : Cost of Cultivation for Green and Black Gram under Paira Method of Sowing in Ganjam District**

(Amount Rs./ha.)

Sl. No.	Particulars	Ganjam
1	Seeds	1125.00
2	Fertilisers and Manure	79.70
3	Insecticides & Pesticides	127.00
4	Human Labour	700.00
5	Animal Labour	0.00
6	Machine Labour	0.00
7	Irrigation	0.00

8	Interest on Working Capital	46.00
9	Land Tax /Cess/ Water Charges, etc	9.00
I	Cost A 1 (Sum of 1-9)	2086.70
10	Rent paid for Leased-in-Land	0.00
II	Cost A 2 (A 1 + 10)	2086.70
11	Imputed Value of Family Labour	1000.00
III	Cost B 1 (A 1 + 11)	3086.70
IV	Cost B 2 (A 2 + 11)	3086.70

The cost of seeds accounted for almost 54 per cent of the cost of cultivation. The involvement of owned family labour was more in this type of cultivation. The cost at A 1 & A 2 was estimated to be Rs. 2086.70 and at B 1 & B 2 was estimated to be Rs. 3086.70.

**4.30** The Table 4.11 shows the profitability of the Green and Black Gram under Paira method.

**Table 4.11 : Profitability of Green and Black Gram under Paira Method**

Sl. No.	Particulars	Ganjam
1	Average Yield (qu.)	0.00
2	Yield Retained (qu.)	1.00
3	Marketable Surplus (qu)	2.75
4	Sale Price (Rs.)	1850.00
5	Gross Sales Proceeds of Output sold (Rs.)	5087.50
6	Profit at A 1	3000.80
7	Profit at A 2	3000.80
8	Profit at B 1	2000.80
9	Profit at B 2	2000.80

The Paira method of sowing resulted in comparatively lower yield of the crop at 3.75 qu. per ha. and retaining one third for self consumption, the Gross value of output sold was calculated to be Rs. 5087.50. The profit at A 1 & A 2 was Rs. 3000.80 and at B 1 & B2 was Rs. 2000.80. The sample farmers were never very particular about the profitability aspects of Green and Black Gram and considered them always as residual crop.

#### **Cost and Profitability of Arhar**

**4.31** The sample farmers in Kalahandi district had undertaken the cultivation of Arhar whereas none of the sample farmers had taken up the same in Ganjam district. The local variety of Arhar, popularly known as 'Kandul' was more dominant in the district. The soil for the sowing of Arhar was ploughed to fine tilth normally during the month of June. The farmers adopted the line sowing method using their own seeds or seeds of local variety. The dry sowing of seeds with pre-monsoon shower or just before the onset of monsoon was usually followed by the sample farmers. Though the recommended quantity of seeds varied in the range of 15-20 depending upon the time of sowing, the sample farmers had used around 25 kg. of seeds per ha. The cultivation was done mostly in a traditional manner applying very less / almost negligible amount of chemical fertilisers but good amount of farm yard manure. The involvement of labour was required for activities like weeding, harvesting and threshing., etc. The pesticides & insecticides were used in a limited quantity to get rid of insects like

Aphids, white fly, leaf eating caterpillars & pod borer and diseases like Seed rot & seedling damage, powdery mildew, wilt, collar rot, leaf spot, yellow mosaic virus, etc. The animal labour was used for ploughing and no irrigation was used by the sample farmers for the crop.

**4.32** The per ha. cost of cultivation of the Arhar in Kalahandi district is indicated in Table 4.12.

**Table 4.12 : Cost of Cultivation of Arhar in Kalahandi District**

(Amount in Rs/ha.)

Sl. No.	Particulars	Kalahandi
1	Seeds	500.00
2	Fertilisers and Manure	67.00
3	Insecticides & Pesticides	122.00
4	Human Labour	910.00
5	Animal Labour	400.00
6	Machine Labour	0.00
7	Irrigation	0.00
8	Interest on Working Capital	45.00
9	Land Tax /Cess/ Water Charges, etc	12.00
I	Cost A 1 (Sum of 1-9)	2467.00
10	Rent paid for Leased-in-Land	0.00
II	Cost A 2 (A 1 + 10)	2467.00
11	Imputed Value of Family Labour	1011.00
III	Cost B 1 (A 1 + 11)	3478.00
IV	Cost B 2 (A 2 + 11)	3478.00

The cost of cultivation at A 1 & A 2 was Rs. 2467.00 and at B 1 & B 2 was Rs. 3478.00 as the farmers had not cultivated Arhar on the lease land.

**4.33** The profitability of the Arhar cultivation is indicated in Table 4.13.

**Table 4.13 : Profitability of Arhar in Kalahandi District**

(Amount Rs./ha.)

Sl. No.	Particulars	Ganjam
1	Average Yield (qu.)	5.05
2	Yield Retained (qu.)	2.02
3	Marketable Surplus (qu)	3.03
4	Sale Price (Rs.)	2100.00
5	Gross Sales Proceeds of Output sold (Rs.)	6363.00
6	Profit at A 1	3896.00
7	Profit ar A 2	3896.00
8	Profit at B 1	2885.00
9	Profit at B 2	2885.00

The sample farmers had retained around 40 per cent of the produce for consumption and seed purposes and sold the rest 60 per cent of the produce, the Gross Sales proceeds for which was

Rs. 6363.00 per ha.. The per ha. profit at A 1 & A 2 cost was Rs. 3896.00 whereas it was Rs. 2885.00 at B 1 & B 2 cost.

**4.34** The sample farmers reposed their faith in the better taste of the pulses sown during the rabi season. The pulses have received a secondary status by the sample farmers as none of them had taken it up for commercial purpose. The general opinion of the farmers was to sale whatever is available after consumption. That is why none of the sample farmers had cultivated pulses in the leased in land and had instead grown commercial crops like cotton, groundnut and sunflower on them.

**4.35** Further, though the sample farmers had not reported any distress sale during the recent times, they had showed concern about the fluctuating prices. They were rather very much content in selling the produce at whatever price available to the local / village trader. The improper method of storage adopted by most of the sample farmers had brought reduced their sale price. The difference between the better and inferior quality of pulses could be observed by the study team also. All these reflected the relatively less important status given to the pulses by the sample farmers.

### **Risks associated with Pulses Cultivation**

**4.36** The sample faced several risks in the pulses cultivation some which are highlighted below :

- 0 Since the pulses were cultivated mostly as a Rabi crop under rainfed conditions, the land was deficient in nutrition and resulted in low yield.
- 1 The unfavourable weather conditions like erratic rainfall, temperature variations and moisture stress at various stages affects the growth.
- 2 The rapid and continuous attack of pests and insects also poses risk for the pulses sector.
- 3 The monkey, elephant and also the cattle menace expose the pulses to risks and discourages the farmers from taking up any serious care of the crop.
- 4 The wide fluctuations in the selling prices of pulses also makes the crop a risky proposition as the farmers do not have the guarantee to receive better prices.

### **Main Impact Points of Pulses Cultivation**

**4.37** The general strategy to pulses are very exact in their requirements like liming acid soils, phosphates & sulphur, manuring, use of rhizobium culture & molybdenum for seed treatment for better nodule activity so as to achieve maximum yield. The general approach to boost pulses production and productivity include line sowing & weeding within 2-3 weeks, liming of acid soils, adequate use of phosphatic fertiliser, seed treatment with rhizobium culture. The pulses are very exact in their requirements like liming acid soils, phosphates & sulphur manuring, use of rhizobium for seed treatment for better nodule activity so as to achieve maximum yield.

**4.38** The sample farmers were very seldom following the exact and systematic package of practices as recommended by the experts. The importance of liming of acid soils, line sowing, rhizobium culture, adequate use of phosphatic fertilisers etc. have not yet received the requisite attention of the farmers which had resulted in low productivity of the pulses.

**4.39** Another point of concern as far as productivity of pulses is concerned, was related to the type of seeds used by the farmers. A few of the improved varieties of seeds of pulses as available in the state are indicated in the Table 4.14.

**Table 4.14 : Pulses Varieties Recommended for the State**

<b>Green Gram</b>	<b>Black Gram</b>	<b>Arhar</b>
TARM - 1, TARM - 2, Pusa 9531, Pusa - 9072, Pusa Bold -1, Sujata, Jagruti, Jyoti, Kedar, Dhauri, PDM - 11, Durga, Samrat, Pragyan	Sarala, TP-9, LBG - 17, PU - 30, TU -94 -2, PU-35, WBG - 26, TU - 94.2, Prasad	Mahak, UPAS - 120, Jagruti, Laxmi, Maruti

Under the National Food Security Mission (NFSM), subsidies are given to the farmers using the improved varieties of pulses that were recommended in the state during the last 10 years. A few of the farmers, specifically those covered under the NFSM in Ganjam district had shown inclination to use TARM-1 and TARM-2, Durga, Jyoti varieties of Green Gram, Sarala, Prasad for Black Gram and Durga and Mahak for the Arhar cultivation. The other farmers were using the local varieties of seeds, mostly their own. Since the seeds were used over a longer period of time, their productivity was lesser in comparison to the improved / new seeds.

## CHAPTER - V

### PROCESSING ASPECTS OF PULSES

Since pulses are consumed in dehusked and split form, the processing of pulses assumes a lot of importance. The processing units help in transforming the raw grain legumes into edible form. The present chapter looks into the processing aspects of the pulses in the sample districts.

**5.2** The processing of pulses are undertaken at three levels i.e. Primary, Secondary and Tertiary.

- i. Primary Processing : consists mainly of production of cleaned, graded and packaged pulses.
- ii. Secondary Processing : consists of dehusking, splitting, polishing, turmeric coating and also the powdered besan and packaged dal.
- iii. Tertiary Processing : consists mainly of preparation of roasted, fried dal and other associated dal products.

**5.3** The two types of conventional pulses milling methods include

- i. Wet Milling operations consisting of  
Cleaning of chaffs, dirt, etc. > Soaking > Mixing with red soil > Conditioning > Dehusking and Splitting > Separation and Grading > Dehusked & Split Pulses > Bagging
- ii. Dry Milling operations consisting of  
Cleaning of Chaffs & dirt > Pitting > Pre-treatment with Oil > Conditioning > Dehusking and Splitting the mixture of husk, broken & Powder > Grading > Polishing > Grade I Pulses

**5.4** The description of various operations involved in the pulses processing is given in a nutshell.

**a. Cleaning & Grading**

Cleaning helps in removing the husk, dust, etc. from the pulses and grading is done to segregate the grain legumes of desired shape and size on a rotative type cleaner.

**b. Pitting**

An empty roller machine is used for cracking the husk layer and for scratching the clean pulses passing through it. This is done for loosening the husk from sticking to the cotyledons in order to facilitate subsequent oil penetration. Cracking and scratching of husk takes place mainly by friction between pulses as material is passed through narrowing clearance. During the operations, some of the pulses are dehusked and split and are separated by sieving.

**c. Pre treatment with oil**

The scratched or pitted material is passed through a screw conveyor and mixing of some edible oil like linseed is done in it. Pulses coming out of the screw conveyor are kept out about 8 to 10 hours to diffuse oil.

**d. Conditioning**

Pulses are conditioned by ultimate soaking / wetting, drying and temporary moisture of 3.5 per cent added after about 8 hours and grain is dried in sun again until all the pulses are sufficiently conditioned. The whole process of alternate wetting and drying is continued for two to four days. Pulses are finally dried to about 10 to 12 per cent moisture content prior to dehusking and splitting.

#### e. Dehusking & Splitting

For dehusking of conditioned pulses carborundum coated emery rollers are used. In one pass 50 per cent of the pulses are dehusked. The dehusked split pulses are separated by sieving and husk is aspirated off. Unsplit pulses and tail pulses are again dehusked and milled in a similar way. For complete dehusking and splitting, the whole process is repeated two to three times.

#### f. Polishing

Polishing is completed by treating dehusked and split pulses with small quantity of oil.

### Investment Component / Cost of Cultivation of Sample Dal Mills

**5.5** The sample dal mills / processing units made investment on various components, important of which include the following :

#### i. Land and Site Development

The land required for the dal milling depends upon the type of milling operations, wet / dry milling for conditioning the pulses prior to dehusking and splitting operations. Generally, 1.00 acre of land is required for establishing a dal mill having a processing capacity of 480 MT / annum. Additional area is required for sun drying of soaked grain legume. The sample dal mills involved a cost of Rs. 1.75 lakh which included Rs. 1.00 lakh for the land and Rs. 0.75 lakh for site development including fencing, internal road and drainage system.

#### ii. Civil Constructions

The components of civil construction included the items like Raw Material Store, Finished Goods Store, Processing Area, Office Space, Machine Spare Store, Gunny Bag Storage Space, Panel Board Room, etc. The cost of investment in the components of civil constructions are indicated in the Table 5.1.

**Table 5.1 : Item-wise cost of Investment of the sample processing units in Civil Construction**

Sl. No.	Item	Size (sq. ft.)	Total Cost (Amount in Rs. Lakh @ Rs. 250/- per sq.ft.)
1	Raw Material Store	800	2.00
2	Finished Goods Store	800	2.00
3	Processing Area	1000	2.50
4	Office Space	400	1.00
5	Machine Spare Store	500	1.25
6	Gunny Bag Storage Space	500	1.25
7	Panel Board Room	400	1.00
8	Misc. Space (incl. Toilet and Others)	600	1.50
	<b>Total</b>	<b>5000</b>	<b>12.50</b>

The total cost of the sample dal processing units was calculated to be Rs. 12.50 lakh for the sample units.

### iii. Plant and Machinery

The plants and machinery for the sample processing units included Pre-Cleaner, Dehusker, Grader, Elevators, Aspirators and Blowers, Control Panels, Destoner, Mixer, etc. The total cost of machinery plant at the reference year is indicated in the Table 5.2.

**Table 5.2 : Cost of Plant and Machinery of the Sample Processing Units**

Sl. No.	Item	Number	Cost (Rs. in Lakh)
1	Pre-Cleaner	1	0.50
2	Dehusker	2	1.00
3	Grader	1	0.50
4	Elevators	4	3.00
5	Aspirators and Blowers	3	1.50
6	Destoner	1	0.50
7	Control Panel	2	0.50
8	Mixer	2	1.00
	<b>Total</b>	<b>16</b>	<b>8.50</b>

The cost of investment of the sample processing units on plants and machinery thus amounted to Rs. 8.50 lakh.

### iv. Electrical and Other Items

The various machines were to be connected to the electrical motors of suitable power ratings for supplying power to them. The cost of electrical wiring and other items like generator set, etc. amounted to Rs. 3.00 lakh.

### v. Miscellaneous Fixed Assets

The miscellaneous fixed assets such as office furniture, weighing balance / scale, gunny bags, sealing machine, office equipment, fixture, steel ladders, platforms for clearing of machines and equipment was calculated to be Rs. 1.80 lakh.

### vi. Miscellaneous Expenses

The miscellaneous expenses include pre-milling / operating expenses which are usually unforeseen in nature and amounted to Rs. 0.50 lakh for the sample units.

**5.6** The item-wise overall cost of investment of the sample processing units is indicated in Table 5.3.

**Table 5.3 : Cost of Investment of the Sample Processing Units**

(Rs. in Lakh)

Sl. No.	Item of Investment	Amount	% to Total
1	Land & Site Development	1.75	6
2	Civil Works	12.50	45
3	Plant and Machinery	8.50	30
4	Electrical & Other Items	3.00	11
5	Misc. Fixed Assets	1.50	5
6	Misc. Expenses	0.50	2

7	Insurance	0.30	1
	<b>Total</b>	<b>28.05</b>	<b>100</b>

The civil constructions accounted for the highest proportion of overall cost of investment (45 per cent), followed by plant and machinery (30 per cent), Electrical and other items (11 per cent), land & site development (6 per cent), Misc. fixed assets (5 per cent), misc. expenditure (2 per cent) and Insurance (1 per cent).

### Processed parameters

#### Products (Main Product and By-Products)

**5.7** The products of the pulses processing units, both main and by-product along with their share in percentage terms is indicated in Table 5.4.

**Table 5.4 : Main and By- Products of Sample Processing Units**

Sl. No.	Main Product / By Product	Share in % age
1	Dehusked & Split Pulses	80-82
2	Fine Dust Powder	0.5 - 1
3	Brokens	0.5 - 1
4	Husk	13-15
5	Unhusked Pulses	1
6	Dehusked Whole Pulses	1
	<b>Total</b>	<b>100</b>

The main products of the pulses processing units consisted of dehusked & split pulses and husk which constituted around 80-82 per cent and 13-14 per cent of the total respectively. The by-products like fine dust powder, brokens, unhusked pulses and dehusked whole pulses which constituted around 1 per cent each of the total. The processing units were selling the main products i.e. dehusked & split pulses and the husk only and the by-products were taken away by the labourers working in the unit.

### Cost of Operations

**5.8** The processing capacity of the sample units was calculated to be 1.6 MT per day. The units were operating for approximately 210 days / seven months in a year as the processing activity taken up during the three to four months of rainy season was almost nil. Besides that, the work was suspended in some cases due to the non availability of workers during the festive seasons and other operational difficulties. The overall working period was thus estimated to be 210 days and the processing capacity of the units was estimated to be 336 MT per annum. The units were having facilities for processing of a variety of pulses like Arhar, Mung / Urad, Field Peas, etc.

**5.9** The cost of operation was initially estimated per MT and the same is indicated in Table 5.5.

**Table 5.5 : Cost of Operations of the Sample Processing Units**

(Rs/ MT)

Sl. No.	Particulars	Value / Amount
1	Purchase Price of the Raw Materials	21000
2	Electricity, water and other Utilities	225
3	Cost of Gunny Bags and Handling Charges	250
4	Sales and Misc. expenses	200
5	Salaries / Wages	500
6	Sales Tax	580
7	Oil Charges	250
8	Administrative and Other Expenses	200
9	Repair and Maintenance	381
	Total Expenses	23586

**i. Purchase price of raw materials**

The major item of operation cost was the purchase price of the raw materials i.e. pulses. Since the units were processing different types of pulses, the cost / purchase price of those were different. Apart from that, the price differed from time to time, depending upon the availability. The price immediately after the harvesting was lower in comparison to price after a considerable time gap. Further, the units were sometimes procuring pulses from outside their respective districts so as to avail the same at a lower rate. As admitted by some of the sample entrepreneurs, the stock of local pulses was sufficient for around 5 months of processing activity, after which the units had to depend either on the pulses from outside the district or the state. One sample entrepreneur was importing pulses, especially Mung and Urad, through his agent stationed at Vishakhapatnam (Andhra Pradesh). The average purchase price of the pulses was estimated to be Rs. 21000/- per MT, even though the actual purchase price varied in the range of Rs. 20000/- to Rs. 30000/- as reported by the sample entrepreneurs. Around 90 per cent of the cost of operation of the units was accounted for by the raw materials.

**ii. Electricity, Water and Other Utilities**

The cost of electricity and the utilities like water used in the processing activity was calculated to be Rs. 225/- per MT.

**iii. Cost of Gunny Bags and Handling Charges**

The price of gunny bags of 50 kg was reported to be Rs. 10/ per piece and the handling charges included all the expenses incurred by the units from the time of purchase of the raw materials till the actual processing. The major component of the same was the cost of transportation. The overall cost for the gunny bags and handling charges taken together was estimated to be Rs. 250 per MT.

**iv. Sales and misc. expenses**

The expenses on sales and other miscellaneous items included all the expenditure incurred for effecting the sales and a major portion of the same included packing, sealing, etc. The average cost for the same was calculated to be Rs. 200/- per MT.

**v. Salaries / Wages**

The sample processing units were employing 5 permanent employees on an average. These included 2 operators, 1 accountant, 1 store keeper and 1 watch man. The salary of the

operators, accountant and store keeper varied in the range of 2000/- to Rs. 3000/- per month whereas that of watchman varied in the range of Rs. 1500 to Rs. 2000. The entrepreneurs themselves were actively involved in the overall management, more so in maintaining the liaison with the private parties for purchase of raw materials and the delivery of the processed items. Apart from that, on any given working day two skilled and around 10 to 12 unskilled labour were working in the units. The skilled ones were getting wage of Rs. 125/- per day and unskilled ones Rs. 100/- (male) and Rs. 60 (female) per day as wage. The cost of salaries and wages taken together was calculated to be Rs. 500 per MT.

#### **vi. Sales Tax**

The sales tax was calculated at around 2.8 per cent of the cost of raw materials @ 2 per cent for materials from outside and 4 per cent from inside the state and was estimated to be Rs. 580/- per MT.

#### **vii. Oil Charges**

The oil charges included the expenses incurred for the running of motors and diesel engines for various activities and the charges for the same amounted to Rs. 250/- per MT.

#### **viii. Administrative and Other Expenses**

The administrative expenses included the miscellaneous expenditure on liaison, telephone, advertisement, etc. and the same amounted to Rs. 200 per MT.

#### **ix. Repair and maintenance**

The repair and maintenance of civil structure, plant & machinery and other miscellaneous fixed assets was calculated at 5 per cent of their cost and the amount per MT was estimated to be Rs. 381/-.

**5.10** The total expenses for processing per MT of pulses thus amounted to Rs. 23586/-.

#### **Sales Proceeds**

**5.11** The processing units were generating proceeds out of the sale of dehusked pulses and also the husk. The sales proceeds from 1 MT of raw pulses is calculated in the Table 5.6.

**Table 5.6 : Sales Proceeds of Sample Processing Units**

(Rs/MT)					
<b>Sl. No.</b>	<b>Particulars</b>	<b>Out-turn (%)</b>	<b>Rate</b>	<b>Value</b>	<b>% to Total</b>
1	Dehusked Pulses	82	30000	24600	93
2	Husk	15	12000	1800	7
	<b>Total</b>			26400	100

The total sales proceeds from 1 MT of raw pulses was calculated to be Rs. 26400/-, of which Rs. 24600/- (93 per cent) was sales proceeds out of dehusked pulses and Rs. 1800/- (7 per cent) was the sale of husk.

## Net Returns / Proceeds

**5.12** The net returns / proceeds per MT of the sample processing units is presented in the Table 5.7.

**Table 5.7 : Net Proceeds of the Sample Processing Units**

(Rs/MT)

Sl. No.	Particulars	Value
1	Cost of Operations	23586
2	Gross Sales Proceeds	26400
3	Net Proceeds	2814

Taking into account the cost of operations and the gross sales proceeds at Rs. 23586/- and Rs. 26400/- respectively, the net sales proceeds of the sample processing units was estimated to be Rs 2814 per MT.

## Economics of Sample Processing Units

**5.13** The sample processing units were utilising 60 per cent and 65 per cent of their installed capacity during the first and second year and 70 per cent of the installed capacity from 3rd year onwards. The average cost of investment of the sample processing units at Rs. 28.05 lakh was taken as the capital cost. The per annum costs / expenses and benefits / income / sales proceeds were calculated on the basis of the costs and benefits per MT. The per annum operation cost of the sample units was taken as the recurring cost. The economics of the units were estimated keeping the working life of the unit at 10 years. The economics of the sample units is indicated in the Table 5.8.

**Table 5.8 : Economics of Sample Processing Units**

(Rs. Lakh)

Sl. No.	Particulars	1st Yr (60%)	2nd Yr (65 %)	3rd onwards (70 %)
1	Capital Cost	28.05	0	0
2	Recurring Cost	47.83	51.71	55.59
3	Total Cost	75.88	51.71	55.59
4	Total Benefits	53.22	57.66	62.09
5	Net Benefits	-22.66	5.95	6.50
6	Benefit : Cost	> 1		
7	IRR (%)	24.14		

The sample processing units were found to be viable with the BCR being greater than 1 and IRR being 24 per cent.

## Break Even Analysis

**5.14** An attempt was made to arrive at the break even point of operation of the sample processing units. The total cost of processing was taken into consideration for this purpose. The total cost of processing included the interest on working and fixed capital and also the depreciation of plants and buildings and the cost of operation of the unit. The total processing cost alongwith the income / proceeds is indicated in the Table 5.9.

**Table 5.6 : Processing Cost for one MT of pulses**

(In Rs.)

Sl. No.	Cost Components	Amount
1	Total Operating Cost	23586
2	Interest on Working Capital @ 12 %	536
3	Interest on Term Loan @ 12.5 %	263
4	Depreciation of Plant & Machinery @ 5 %	313
5	Total Processing cost (1-4)	24698
6	Sale Proceeds from dehusked pulses	24600
7	Sales Proceeds from husk	1800
8	Total Sales Proceeds	26400
9	Net Value Addition	1702

From Table 5.7, it may be observed that the operating cost of the processing units amounted to Rs. 23586 per MT for the sample units. Taking the cost of depreciation at the rate of 5 per cent of plant and machinery, cost of working capital at 12 per cent and term loan at 12.5 per cent, into consideration, the total cost of processing one MT of pulses was estimated to be Rs. 24698. The total sales proceeds was Rs. 26400, which included the sales proceeds from dehusked pulses and the husk at Rs. 24600 and Rs. 1800 respectively. The net value addition per one MT of raw pulses was thus Rs. 1702, which was around 7 per cent of the operating cost. The input-output ratio comes to 1 : 1.06.

**5.15** On the basis of the estimated net profit from processing units at Rs. 1702 per MT, the Break Even volume for the sample processing units was calculated by using the following formula :

$$\begin{aligned} \text{Break Even Volume} &= \text{Total Fixed Cost} / \text{Net Profit per MT} \\ &= 28,05,000 / 1702 = 1648 \text{ MT} \end{aligned}$$

No. of Working days required to achieve the Break Even Volume of output =

$$\begin{aligned} \text{Break Even Volume} / \text{No. of MT processed per day} \\ &= 1648 / 1.6 = 1030 \text{ days} \end{aligned}$$

Thus, the sample dal processing units could break even by processing on an average 1648 MT of raw pulses in 1030 days. Since the units operate on an average for 210 days in a year, the units can break even only in the fourth year. The longer break-even period was in fact one of the major reasons for the lack of interest on the part of the entrepreneurs to establish the processing units in the sample districts.

### **General Observations on the Processing Aspects in the sample districts**

## **A. Kalahandi District**

i. Processing activities are not so strong in the district as most of the small and marginal producers process the pulses at home with the help of grinding stones (chakki) or in the atta chakki and rice mills. A bulk of the Arhar produced in Kalahandi district goes to the two dal mills situated in adjoining Rayagada district and also dal mills at Raipur in Chattisgarh.

ii. Though Kesinga is the major trading center having a substantial number of registered traders who regularly deal with pulses, the processing activities have not picked up as desired in the district. The sample mill owner was basically a trader, who had established the unit after a prolonged experience in the activity and having a good network. The interaction with the sample mill owner revealed that he was more comfortable in trading of the pulses rather than to pursue the milling activity.

iii. The lack of proper infrastructure and also the low availability of marketable surplus were the main reasons for the non existence of the major dal processing units in the district. The lone modern dal mill at Kesinga processed Arhar and field peas. The raw materials were procured from local markets, neighbouring districts like Bolangir and also Andhra Pradesh. The finished products were sold to local wholesalers, neighbouring districts like Bolangir, Koraput, Nabrangpur and states like Andhra Pradesh.

iv. At Vishwanathpur in Lanjigarh block, initiative was taken by the Banajat Trust, an NGO to facilitate the SHG members in augmenting their income by processing the Arhar dal. The DSMS (District Cooperative Marketing Society) had provided a mini dal mill unit consisting of a building, a grader and a mixer to the NGO, who in turn had provided training to the SHG members on processing activity. The SHG members in turn were procuring the dal from the nearby villages and processed dal was supplied to the block office to be used for Mid Day Meal for school children and destitutes.

## **B. Ganjam District**

i. Network between the processors was strong in Ganjam district though most of the small and marginal producers processed the pulses at home with the help of grinding stones (chakki) or in the atta and rice mills.

ii. The four sample dal mills were engaged in the processing of Mung, Urad and Arhar dal apart from the field peas. The raw materials were procured from local markets, districts like Gajapati, Kandhamal and Nabrangpur also Andhra Pradesh. The limited as well as seasonal availability of pulses at the local, state and also the national level, had prompted the entrepreneurs to import both Mung and Urad through the agents stationed at Vizag, in Andhra Pradesh. The finished dal were sold at the local market and other places inside the state.

The machinery used in the dal mills were either manufactured / assembled locally or brought from states like Bihar and Andhra Pradesh, Uttar Pradesh.

iii. The large volume of stocking of raw material for the smooth operation of the mills throughout the year / better capacity utilisation required additional working capital and term loan for storage godown as well. However, the entrepreneurs were adopting a cautious approach in this regard. One entrepreneur was having the machinery for both rice and pulses

mill in the same plant and balancing the milling of both paddy and pulses so as to run the unit throughout the year.

iv. The unavailability of labour was cited as one of the main reasons for the frequent suspension of work in the units. The work almost came to standstill during the festive seasons and also on other days due to unavailability of labour.

On the whole the pulses processing scenario in the sample districts could not be termed as very encouraging in Kalahandi district, though it has enough potential in Ganjam district.

### **Women SHGs creating success with Dal Milling**

**5.16** Orissa Rural Development and Marketing Society (ORMAS), an autonomous body under the Panchayati Raj Department, Govt. of Orissa facilitates the sustainable livelihood for the rural producers through its network of District Supply & Marketing Societies (DSMS). The ORMAS has intervened in this regard by entering into the dal processing activity through the DSMS in collaboration with the CFTRI, Mysore under UNDP project. Women SHGs were provided mini dal mills with all the accessories and basic training on other aspects of the processing of dal.

**5.17** Vanabhumi Mini Dal Mill situated at Vishwanathpur village in the tribal pocket of Lanjigarh block in Kalahandi district presents an example of successful local venture in processing of pulses. The mill promoted by the Vanabhumi, a federation of 10 SHGs having 110 members, was established in the year 2003 with active guidance / cooperation from DSMS, Kalahandi in terms of training as well as providing infrastructure and machinery.

**5.18** The SHGs mostly the women groups were procuring the arhar from the local people (80 per cent) & the traders (20 per cent) and were selling the processed dal to the Govt. run schools for being used in the mid day meal scheme for children and destitute. The SHGs had availed credit to the tune of Rs. 9.97 lakh from the State Bank of India, Vishwanathpur branch for procuring the pulses.

**5.19** The interaction with the members of the groups revealed that the average procurement price of arhar (locally known as kandul) was Rs. 1800/- per qu. during 2007-08 and the groups had purchased / procured 1417 qu. of the same. The total amount of dal produced out of the raw pulses was 860 qu. which indicated 61 per cent out-turn. The members however were of the opinion that the usual out-turn was 75 per cent.

**5.20** Nearly 150 qu. of the processed dal was sold at Rs. 2360/- per qu. whereas 710 qu. was sold at Rs. 3500/- per qu. The sales proceeds from processed dal was Rs. 28.39 lakh. The dust which was used as cattle feed was sold at Rs. 250/- per qu. and with the out-turn of the same at 25 per cent, the sales proceeds was calculated to be Rs. 0.89 lakh. The total sales proceeds for the year thus amounted to Rs. 29.28 lakh. The net profit accruing to the groups was Rs. 1.22 lakh and the same was distributed among all the 11 groups.

**5.21** The intervention had helped the groups in many ways :

0 Since the members were procuring the pulses, processing and selling the dal, they were getting a better price.

- 1 The mill was creating employment opportunity for the rural women as the prevailing wage rate was Rs. 50/- per day.
- 2 Since the area was rich in forest based produce, the members were also processing the produce such as Amla, Harida, etc. They were also producing amla juice which was sold at the outlet of the NGO at Kalahandi and various exhibitions.

**5.22** Eventhough the mill was a successful venture, certain issues needed to be answered :

- 0 The processing out-turn was quite low and also fluctuating from year to year (from 75 per cent during 2006-07 to 61 per cent during 2007-08)
- 1 The storage facilities for the raw and the processed pulses were also not proper as the same was kept in a worn out building.
- 2 The quality of processing also needs a lot of improvement with proper dehsuking and polishing.
- 3 However, keeping in mind the expertise and also the available infrastructure, the mill seems to have set a very good example of involvement of SHGs in processing activities.

### **Comparison between the Private and Community Processing units**

**5.23** Though it may not be possible to make a detailed comparison between the private and community run processing units, the major points about the has been attempted in the following paragraphs.

- 0 The investment cost of the community processing unit including land, building and machinery was borne by the District Supply and Marketing Society (DSMS) and the SHG members were running the unit. The unit was being run from the old Block Office Building for which no rent was paid by the members. The private units on the other hand made substantial investment on the plant and machinery and also land and building.
- 0 The community run processing unit was procuring pulses from the local producers and also the local traders. Moreover, the pulses processing was confined to Kandul (local variety of Arhar). The unit was processing the spices and medicinal items. But the private units were procuring different kinds of pulses such as Green and Black Gram, Arhar, Horse Pea, etc. The sources of raw materials for them were much varied which included local, domestic and also imported pulses. The scale of operation of the private processing units was much higher than that of the community unit. The automation was more prevalent and quality parameters much more stringent in the former in comparison to the latter.
- 0 The credit requirement of the private processing unit was much higher than that of the community processing unit as the former needed credit to meet the block as well as the working capital requirement whereas the latter needed the same for only for the working capital. The block capital was needed for the setting up / upgradation / renovation / modernisation of the units.
- 0 The community processing unit had a captive market for selling their produce as the whole of the same was purchased by the Block Authorities for distribution among the Govt. Schools for using them in the Mid Day Meal Scheme. The private units on the other hand were selling the produce to a number of wholesalers stationed at different places both inside and outside the district.

On the whole, it can be concluded that the private processing units were running on a purely commercial basis whereas the community based unit still depended on the institutional support.

## CHAPTER - VI

### MARKETING ASPECTS OF PULSES

The marketing of pulses encompass the wholesale and retail markets existing throughout the country. Numerous layers exist in the marketing chain between farmers and consumers, as many as 6 to 7 levels, including brokers, wholesalers, millers, and retailers. The present chapter analyses the marketing dynamics of the pulses in the sample districts and also the state and to a limited extent in the country.

#### Marketing Channels

The important channels existing in the marketing of pulses exist both in Private and Institutional level.

#### A. Private Marketing Channel :

**6.2** This is a traditional channel and the most common marketing channel operating throughout the country. The main marketing channels for the pulses are as under :

Producer > Dal Miller > Consumer

Producer > Village Trader > Dal Miller > Wholesaler > Retailer > Consumer

Producer > Dal Miller > Retailer > Consumer

Producer > Wholesaler > Dal Miller > Retailer > Consumer

Producer > Wholesaler > Dal Miller > Wholesaler > Retailer > Consumer

Producer > Wholesaler > Retailer > Consumer

Producer > Commission Agent > Dal Miller > Wholesaler > Retailer > Consumer

#### B. Institutional Marketing Channel :

**6.3** The institutional arrangement for marketing activities include provision for procuring the pulses by providing minimum support prices to the farmers through agencies like NAFED. The main institutional marketing channels for the pulses as prevailing in most parts of the country include the following :

Producer > Procuring Agency > Dal Miller > Consumer

Producer > Procuring Agency > Dal Miller > Wholesaler > Retailer > Consumer

Producer > Procuring Agency > Dal Miller > Retailer > Consumer

**6.4** The village traders are the initial link in the whole marketing chain for pulses, specifically in Orissa, as the marketing through regulated markets is virtually non existent. The govt. Agencies had almost no role to play in the procurement of pulses as there was no

trading in the markets. The bulk of the produce were sold by the farmers at the village level. The village trader acted as agent for the dal miller or the wholesaler, who in turn acted on behalf of the dal miller. The farmers sometimes sold their produce at the local haats, which again was frequented by the traders / dal millers / wholesalers. The wholesalers had arrangement with the dal millers for providing the raw pulses for milling. There was no specific / fixed channel for the marketing of pulses. The arrangements varied from situation to situation and time to time. The network among the traders was quite strong and the flow of information was quite faster. Eventhough, the pulses were not traded in any of the APMCs in Orissa, the traders had latest information about the prices prevailing in other markets outside the state.

**6.5** The interaction with the sample traders in both Kalahandi and Ganjam districts threw light on various aspects of trading in pulses. Most of the trading in Kalahandi district was done with the traders stationed at Raipur and Bhattapara in Chattisgarh and Nagpur in Maharashtra and was confined to trading in Arhar. The traders in Ganjam were dealing mainly in Mung and Urad and had liaison with the traders stationed at Vishakhapatnam and Vijayanagaram in Andhra Pradesh and Kolkata in West Bengal. Some of the traders also had liaison with dal millers in Jatni and trading in Mung and Urad. But the dal mills at Jatni in Khurda district mainly depended upon the imported pulses. The bulk of trading was done in Mung, Urad, Arhar, chick pea. The margins involved in trading was not clearly revealed by the traders. However, according to their admission the trading activity had gone down in the year 2007- 08 mainly because of

- i. comparatively inferior quality of the local produce
- ii. prevalence of the dust particles and damaged seeds in the produce
- iii. lack of processing activity in the state and hence lesser demand for the produce

**6.6** The pulses are usually decorticated (hulls are removed) and split. Mills process the pulses using a multi-step procedure involving cleaning, scratching, mixing in oil, splitting and polishing. If the end product is flour / beasn, the decorticated pulses (such as desi chickpeas) are ground. The milling extraction rate is about 85 percent, but varies by variety and for the sample processing units it was 81 to 82 per cent. Operating machinery, bagging, and hauling were labour intensive activities in most of the processing units. Wholesale price differences imply milling costs and margins of about 3-4 rupees/kg. Milling charges are levied on the amount delivered to the plant. Millers discount their fees if they retain the byproducts, which can be sold as feed.

**6.7** The milling sector in the state consists almost entirely of small-scale enterprises, with plant machinery often custom designed and built by the owners or local mechanics. With a few exceptions, the mills are old. However, they are reported to be technically and economically efficient at producing high-quality products. Hence, there is no incentive from either a quality or cost standpoint to import milled pulses. Mills are typically independently operated. In addition, vertical integration is not evident in the milling industry. In part, industry structure stems from regulations that historically limited pulse processing to small-scale firms. This industry structure may also be due to frequent weather-induced fluctuations in production, which increase the cost and uncertainty of sourcing raw materials.

**6.8** The Wholesale markets exist throughout the country and channelise the domestic and imported pulses to retailers. Delhi's Naya Bazaar is the largest wholesale pulse market in India. Other major wholesale markets are located in Mumbai, Kolkata and Chennai. The most

important wholesale pulses market in Orissa is situated in Cuttack and is popularly known as ‘Mal Godown’. The market comprise of around 50 to 60 wholesale pulses traders. Each of the traders operates independently and eventhough the market as a whole does not maintain any record of sales, each trader maintains his own sale details. There is no official price reporting or regulation at the markets. Unlike at the retail level, pulses are generally not branded. However, wholesalers pass origin information on to buyers informally.

**6.9** The frequency of transactions is highest at the wholesale level, since commodities change hands several times with the assistance of brokers. Vertical integration, whether between importers and wholesalers, producers and wholesalers, or wholesalers and retailers, is not evident. The key factors preventing integration within the wholesale level include historical fragmentation in business transactions due to multiple layers of agents, family owned businesses. Another factor that may inhibit vertical integration is the small-scale nature of pulse processing. Approximately 80 percent of traded pulses are classified as ‘average quality’. The grading is usually done by visual inspection. The absence of more stringent quality standards reflects the relatively low incomes and high price sensitivity of most consumers.

**6.10** Domestic pulse prices often vary on a daily basis, with most fluctuations attributable to market supply conditions rather than quality differences. Domestic prices also fluctuate widely on an annual or seasonal basis due to changes in production. There were reports of the prices of mung falling to Rs. 1100 and urad to Rs. 1200 per qu. at the beginning of 2005-06 and rising to Rs. 3200 per qu. during the year 2005-06. Despite the fragmented market structure, regional markets in India appear to be well integrated with respect to price. Pulse traders have close ties to those in other areas, keeping abreast of relative prices and opportunities for arbitrage. Among the domestic and imported pulses, kabuli chickpeas, desi chickpeas, and mung beans tend to be the costliest while dry peas (including yellow and green) are the cheapest.

**6.11** The revenues accruing to commission agents, brokers and wholesalers are based on a percentage of sales value. Each agent typically charges a margin of 1-1.5 percent above transportation, handling, storage, and processing costs. Although the reported margins were small, significant revenue can be earned since inventories usually turn over 18-24 times annually. With many actors in the marketing chain, there may be potential to increase efficiency by integrating marketing (import, wholesale, and retail) and processing activities. If the potential efficiency gains are large, future changes in market structure could significantly affect domestic producer and consumer prices, as well as the competitiveness of imports with local varieties.

**6.12** Most consumers purchase pulses from small, independent retail establishments where they are sold loose directly from gunny sacks supplied by wholesalers. In some cases, pulses are sorted and cleaned by the retailer, thus commanding a premium. Prepackaged pulses in bags of 0.5-5 kilograms (kg.) are typically available in urban areas at government stores as well as middle- and high-end retail shops. Prepackaged pulses are only about 20-30 per cent of total consumption. a small portion of total consumption— 10-20 percent of urban consumption and a negligible share of rural consumption. Compared with other segments of the marketing chain, retail-level margins are large, ranging from 30 percent at government owned stores to upto 30 percent in upscale supermarkets.

## **International Trade in Pulses**

## Import of Pulses

**6.13** India continued to be one of the largest importers of pulses in the world. The Table 6.1 shows the data on the quantity, value and unit value of the import of pulses in India during the period from 1999-00 to 2005-06.

**Table 6.1 : Import of Pulses by India**  
(Quantity in 000 tonnes, Value in Rs. Crore, Unit Value in Rs. per kg.)

Sl. No.	Year	Quantity	Value	Unit Value
1	1999-00	252.82	358.25	14.17
2	2000-01	350.57	500.06	14.26
3	2001-02	2232.29	3163.72	14.17
4	2002-03	1995.33	2741.05	13.74
5	2003-04	1725.51	2288.28	13.26
6	2004-05	1212.17	1741.72	13.27
7	2005-06	1696.52	2477.29	14.60

Source : Ministry of Agriculture, GoI.

The pulses imports increased from 2.53 lakh MT with value of Rs. 358.25 cr. in 1999-00 to 16.96 MT valuing Rs. 2477 cr. in 2005-06. The unit value of imports has remained in the range of Rs. 13 to Rs. 15 during all these years.

**6.14** The country-wise data on import of pulses into India during the period from 2002-03 to 2006-07 was also collected from the website of Indiatats.com and the information about the five dominant countries in terms of pulses imports is indicated in the Table 6.2.

**Table 6.2 : Country-wise Import of Pulses into India**  
(Value in Rs. crore)

Country	2002-03	2003-04	2004-05	2005-06	2006-07	Total (2002-03 to 2006- 07)	% of the Total
Myanmar	1044.62	956.99	679.04	913.29	1594.58	5188.52	38
Canada	486.08	499.96	518.55	673.43	1063.96	3241.98	25
Australia	164.01	170.12	95.67	141.88	363.76	935.94	8
France	294.39	144.78	84.26	31.25	122.05	676.73	5
China	137.44	83.11	49.58	81.88	182.28	534.29	4
Others	610.54	429.90	365.03	635.40	565.28	2606.15	20
Total	2737.08	2284.86	1792.13	2477.13	3891.91	13183.11	100

Source : Indiatats.com

From the total value of imports of pulses as indicated in Table 6.2, it can be inferred that largest value of imports was coming from Myanmar (38 per cent), followed by Canada (25 per cent), Australia (8 per cent), France (5 per cent) and China (4 per cent). The others include around 65 countries whose share taken together amounts to 20 per cent of the total pulses imports.

**6.15** A large share of imports of chickpeas, pigeon peas, mung, urad and rajmash was obtained from Myanmar. The same was also admitted by the sample mill owners in Ganjam district. The importers favour Myanmar because it offers many varieties with qualities similar to those produced in India as well as reasonable prices and relatively fast delivery. Canada and Australia are major suppliers of dry peas and kabuli chickpeas to the Indian market. Historically, Canada had shipped green and yellow peas. Australia is a supplier of chickpeas and low-priced dun peas, which are marketed primarily in Kolkata and eastern India. Most kabuli chickpeas come from Mexico, Australia, Canada, Turkey, and Iran. As for desi chickpeas, importers indicated that, historically, there have been some problems with Canadian product, including high moisture content and inferior milling quality. As a result, Australia's chickpea variety is preferred because its uniform size is well suited for milling. Nepal and Syria account for the largest shares of Indian lentil imports, followed by Canada and Turkey.

**6.16** The major import centers are Mumbai (60-70 percent of total volume), Chennai (15-20 percent) and Kolkata (15-20 percent). Trading and pricing activities occur in Delhi and Mumbai. Mumbai and Kolkata are destinations for bulk shipments, while Delhi and Chennai are container markets. Large importers prefer to ship commodities in bulk because of the lower per unit cost compared with containerized shipments. The remaining importers transport pulses in containers. Bulk shipments can have as many as 10 buyers, with only the largest importers individually contracting for an entire vessel.

**6.17** India has about 15-20 major pulse importers, with the largest concentration located in Mumbai, followed by Kolkata and Delhi. These players reportedly account for 60-70 percent of total pulse imports. Importers rely primarily on personal networks and contacts with brokers in supplying countries for market information, obtaining price quotes, and making purchases. Many traders remain with a given exporter when they are able to obtain good market information, a guaranteed supply, and first choice of quality. Due to the limited incomes and price sensitivity of most Indian consumers, a large percentage (about 80 percent) of imported pulses are rated as FAQ. While quality is a consideration, importers are only willing to pay small premiums for better quality. Traders look for the lowest prices at acceptable qualities. The most important quality attributes are cleanliness, uniform size, color, and shape (important for milling). Lower quality levels receive price discounts. Indian importers prefer to have pulses sorted, graded, and milled in India because the cost of such activities is significantly lower in India than in the exporting countries. Another reason for not importing decorticated and split pulses is that moisture from soaking (prior to milling) may affect quality during shipping. Since pulses are generally consumed quickly in India, moisture is not a concern when pulses are milled domestically.

**6.18** The importers are not involved in domestic marketing. They sell their product to wholesalers, either directly or more commonly, through brokers. Pulses are typically marketed to wholesalers by quality attributes and origin. Significant price competition exists among importers when selling product to domestic wholesalers.

## CHAPTER - VII

### CREDIT ASPECTS OF PULSES SECTOR

Credit plays a crucial role in the overall development of any sector in the economy. The agricultural sector is no exception to this. The credit needs of the agricultural sector has changed over the years from the requirement for production to marketing and processing. The challenge of meeting the credit needs of the sector has been taken up by the institutional sources. The credit aspects of the pulses sector, with particular reference to the sample districts is analysed in the present chapter.

#### Credit for Pulses Cultivation

**7.1** Availability of production credit for seasonal agricultural operations is the major pre-condition for the agricultural development. The production credit enables the farmers to purchase various inputs like seeds, fertilisers, pesticides and to meet the current farm expenses like irrigation and hired labour. The institutional credit for meeting the cultivation related activities generally are given to all categories of farmers through the several schemes, prominent of which were the Crop Loan and Kisan Credit Cards.

#### Crop Loans

**7.2** The crop loans are usually extended in the form of direct finance to the farmers with a repayment period not exceeding 18 months to meet the cultivation expenses of various crops, including pulses. In order to enable the cultivator to have access to adequate institutional credit to meet the input cost requirements of the crops grown by him, the scale of finance of each crop is fixed. The scale of finance is fixed in terms of two components i.e. (A) Cash and (B) Kind. The cash component helps to meet the cost of labour, compost, water charges and other misc. items whereas kind components include the cost of seeds, fertilisers, pesticides, micro-nutrients.

**7.3** According to the procedure laid down for the fixation of scale of finance ( SOF ) in the Crop Loan Manual of RBI, a District Level Technical Consultancy Committee ( DLTC ) under the auspices of the DCCB, is to be constituted to fix the SOF for each crop. The SOF is to be annually reviewed and revised by taking into account its cost of cultivation and repaying capacity of the borrowers. The scale of finance for pulses as fixed by the DLTC for the year 2007-08 in both Kalahandi and Ganjam districts is indicated in Table 7.1.

**Table 7.1 : Scale of Finance per Acre for Pulses in Kalahandi and Ganjam Districts for 2007-08**

(Amount in Rs.)

Sl. No.	Components	Kalahandi		Ganjam (Mung and Urad)	
		Kharif	Rabi	Kharif	Rabi
A	Cash	940	940	1000	750
B	Kind	1400	1400	2400	1250
C	Insurance	60	60	0	0
	Total	2400	2400	3400	2000

The scale of finance is however indicative in nature and the bankers are free to assess the actual credit requirement as per the needs of the farmers. In Kalahandi district the scale of

finance for the pulses remain same in both Kharif and Rabi season whereas in Ganjam district, there is variation between that of the two. The Kharif pulses require more fertilisers, pesticides and other micro-nutrients in comparison to the Rabi pulses and this increases the scale of finance for this component.

**7.4** The crop loan was extended by all the three agencies i.e. Commercial Banks, Cooperative Banks and Regional Rural Banks operating in the sample districts. However, none of the sample branches had separate record on the crop loans disbursed for pulses. The branch managers in Kalahandi district had expressed the opinion that the majority of crop loan in Kharif season went towards the paddy, cotton and sugarcane whereas in Rabi season the maximum amount went for maize and sunflower cultivation. In Ganjam district, the bulk of crop loans in the Kharif season was disbursed for paddy cultivation and the other major crops were ground nuts and during the Rabi season the hybrid paddy, pulses were the major crops for which the farmers had availed the assistance from the banks. The banks maintained separate record of disbursement under the Oil Seeds Production Programmes (OPP), Development of Tribal Population (DTP) and Other Crops (OC). All the crops including Paddy, Wheat, Pulses, etc. were covered under the Other Crops. However, there was no further bifurcation of records with regard to crop-wise disbursement.

**7.5** The sample farmers had not maintained any record of crop-wise utilisation of the loan availed for agricultural operations. Since the pulses were viewed as secondary crop, next only to paddy and other commercial crops like sunflower, groundnut, sugarcane and cotton, they were not paying much attention to the improvements in the pulses cultivation. The commercial cultivation of pulses were yet to take off in the sample districts and there was a slim chance of achieving that, keeping in mind the meager average land holding of the farmers, susceptibility of pulses to vagaries of weather and also the lack of assured marketing of pulses. However, the adoption of scientific / proper package of practices would improve the yield of the crops and call for more expenses on various items like seeds, fertilisers, irrigation, organic manure, etc. All these would give opportunity to the banks to extend larger amount of crop loans.

**7.6** The cultivation of pulses was taken up in a routine manner as a secondary crop by the sample farmers. This casual approach had not prompted them to take any specific initiative with regard to adoption of new varieties, adoption of proper package practices, etc. Moreover, paddy has always assumed greater importance for the food security of the state. As and when the farmers had got opportunity, they had gone for the commercial crops like ground nut and sun flower. The pulses have till now confined to the domestic consumption for a major part. The general vagaries of whether, attack of pests and insects, lack of proper marketing facilities have forced the farmers to go for alternative crops but not to venture for large scale pulses cultivation. The basic attitude of farmers for pulses production has to change / orient towards commercial pulses cultivation and after that the large scale cultivation with specific credit line may be thought of.

### **Kisan Credit Card**

**7.7** The Kisan Credit Card (KCC) scheme provides running account facilities to farmers having good track record to meet their production credit and contingency needs. The scheme follows simplified procedures to enable the farmers to avail the crop loans as and when needed. The credit limit is usually based on the operational land holding, cropping pattern

and scale of finance. The card is valid for 3 three years with provision for the annual review and covers personal insurance against death or permanent disability.

### **Credit for Processing of Pulses**

**7.8** Though a bulk of pulses produced by the sample farmers were processed at home or in the neighbouring mini dal/rice mills, the modern dal mills require substantial amount of capital. The establishment of dal mills involves quite a huge investment or block capital and the running of the unit involve requirement for working capital. The requirement for both block and working capital depends upon the capacity of the unit. The units may approach the banks for the block as well as the working capital. The average loan availed by the sample processing units was Rs. 22.08 lakh, out of which, Rs. 7.08 lakh was availed as block capital and Rs. 15 lakh as working capital.

**7.9** Though the average cost of investment was Rs. 28.05 lakh at the reference year price, the entrepreneurs had installed the plant and machinery in several stages, depending upon the availability of finance. Since most of machinery were locally assembled / purchased from places like Patna and Kolkata, the entrepreneurs had to wait for the opportune time to install the same. Keeping in mind the need for modernisation / renovation / upgradation of dal mills, the bankers have an opportunity to extend finance to the sector.

**7.10** The working capital was the most important component of finance for the sample processing units as it constituted around 85 to 90 per cent of their overall cost of operations. The sample units had availed assistance from informal sources like friends and relatives and also the private money lenders to procure the pulses during the harvesting time. The rate of interest on those informal borrowing was as high as 15 to 20 per cent per month. The sample entrepreneurs were of the view that the banks should increase the working capital limits so as to enable them to optimise the utilisation of the units.

## CHAPTER - VIII

### CONSTRAINTS AND STRATEGIES FOR DEVELOPMENT OF PULSES SECTOR

The pulses sector in Orissa encounters a lot of problems from several angles including cultivation, marketing and processing. A number of initiatives have been undertaken by both Govt. and private sector to overcome them. The present chapter narrates in brief the major constraints faced by the sector and highlights the initiatives both institutional and non institutional to tackle the same.

#### I. Cultivation Aspects

**8.2** The major cause of worry for the policy makers, scientists and also the farmers in the state has been the low productivity of pulses. This has led to the low supply, which in turn has reduced the availability of pulses for consumption. The major constraints affecting the pulses sector in the sample districts and the state as a whole can be divided into two broad categories i.e. Abiotic and Biotic.

##### A. Abiotic constraints

- i. Pulses are generally grown on rainfed conditions on marginal and sub marginal land with poor fertility and low moisture availability.
- ii. High rainfall and water logging in Kharif season and moisture stress and low temperature in Rabi season creates problems for the pulses crop.
- iii. Imbalance in the use of fertilisers in the previous Kharif crop virtually no fertiliser and nutrients in the Rabi pulse creates nutritional deficiency which ultimately affects the productivity of pulses.
- iv. Most of the farmers prefer to use their own seeds for which the Seed Replacement Rate (SRR) is quite low, varying between 1 to 3 per cent. The low SRR which ultimately affects the productivity of the crop may to a large extent be attributed to the unavailability of suitable variety, especially the short duration variety.
- v. Heavy cattle / monkey menace is another reason for the lack of interest / adoption of proper method of cultivation of pulses by the sample farmers.
- vi. The pulses are very much susceptible to the weather fluctuations. Untimely rain and bad weather conditions affect the yield to a large extent. Lack of insurance facilities for the crops was another reason for the neglect on the part of the farmers to go for proper plantation techniques.

##### B. Biotic constraints

- i. Heavy infestation of weeds, pests and insects due to absence of adoption of proper plant protection measures mainly during the flowering stage affects the productivity of the crop.
- ii. Agronomic constraints such as improper time and method of sowing, low seed rate, lack of inter-cultural operations, lack of irrigation at the time of drought conditions, lack of proper weeding operations are some of the major contributors to low productivity of pulses.
- iii. Adverse weather conditions such as untimely rainfall, high humidity, cloudy weather at the flowering stage are some of the barriers for the improved pulses production.
- iv. The inter-state and inter-district variations in the soil quality is another reason for the low productivity of the pulses in the state. As per the statistics, soil of Orissa vary widely from highly acidic to slightly alkaline. About 65 per cent of the cultivable land in the state are

acidic, around 7 per cent are affected by salinity, 6 per cent are exposed to flooding and 2 per cent are subject to water logging. The cultivation in these land without proper soil treatment will not yield better results.

### **Strategies to Improve Production and Productivity of Pulses**

**8.3** A number of initiatives have been initiated by the Govt. Agencies to bolster the production and productivity of pulses in the country during the plan period. A brief outline about the same has already been given in the Chapter - II and the status / impact of the same in the sample districts and the state as a whole in analysed briefly.

### **Integrated Scheme on Pulses, Oilseeds and Maize (ISOPOM)**

**8.4** The Integrated Scheme on Pulses, Oilseeds and Maize (ISOPOM) is being implemented in the state since the year 2004-05 with the funding pattern of 75 : 25 between the centre and the state, having the aim of increasing the production and productivity of the pulses, oilseeds and maize in order to meet the growing demand of the population. Concrete efforts have been made during these years to bring more area under cultivation of the pulses in the state, particularly by including the rice fallows.

**8.5** Under the Diversification programme, the pulses are promoted as a substitute crop for paddy. During the year 2006-07 and 2007-08, 35,741 ha and 56,585 ha. were brought under pulses.

The major strategies for achieving the same included the following :

- i. Area expansion for Green Gram and Black Gram and Arhar
- ii. Introduction of new cultivars, cultivation of Green Gram, Black Gram and Chick pea under assured irrigation
- iii. Mixed inter cropping of Pigeon Pea, Green Gram, Black Gram, Cow Pea with maize, cotton, ground nut, sugarcane and upland rice.

**8.6** The interventions taken up under the ISOPOM programme included

- i. Seed Related Interventions including purchase of breeder seeds, production of foundation / certified seeds, distribution of certified seeds
- ii. Technology transfer including block demonstration, farmers' training, Rhizobium culture, Farmer Field School, etc.
- iii. Farm Mechanisation including the supply of sprinkler sets and PP equipment
- iv. General activities including contingencies
- v. New initiatives including supply of micro nutrients, storage bins and vermi-compost.

**8.7** A total of Rs. 233.86 lakh was spent on various components under ISOPOM in the state during 2007-08 and an amount of Rs. 400.00 lakh was allocated for the programme for the year 2008-09. The component-wise bifurcation of the same is indicated in the Table 8.1.

**Table 8.1 : Achievements under ISOPOM -Pulses in Orissa during 2007-08 and Programme for 2008-09**

(Rs. Lakh)

Sl. No.	Particulars	2007-08	2008-09
1	Seeds Related	72.44	124.05
2	Technology Transfer	92.90	138.42
3	Farm Mechanisation	46.54	103.75
4	General (contingencies)	9.48	9.32
5	New Initiatives	12.50	24.46
6	Total (1-5)	233.86	400.00
7	Share of Centre (75%)	175.40	300.00
8	Share of State (25%)	58.46	100.00

With the introduction of National Food Security Mission (NFSM) in 10 districts, including the sample districts of Kalahandi and Ganjam, the ISOPOM is now in operation in rest of the 20 non-NFSM districts of the state.

#### **National Food Security Mission (NFSM)**

**8.8** The National Food Security Mission (NFSM) was launched in the country in the year 2007 as a centrally sponsored scheme to increase the production and productivity of the wheat, rice and pulses so as to ensure food security of the country. The NFSM has three components i.e.

- i. NFSM - Rice
- ii. NFSM - Wheat
- iii. NFSM - Pulses

In Orissa, the first two components i.e. NFSM-Rice and NFSM-Wheat are being implemented since the year 2007-08.

**8.9** The major objectives of NFSM - Pulses include the following :

- i. Increase in production of pulses through area expansion and productivity enhancement in a sustainable manner in the identified districts
- ii. Restoring soil fertility and productivity at individual farm level
- iii. Creation of employment opportunities
- iv. Enhancing farm profits

**8.10** The strategies for the implementation of programme include the following :

- i. involvement of all the stakeholders including those of the farmers
- ii. promotion and extension of improved technologies
- iii. close monitoring of flow of funds
- iv. fixing targets for all the identified districts
- v. constant monitoring and concurrent evaluation

## **Coverage of NFSM-Pulses in Orissa**

**8.11** Ten districts, i.e. Bolangir, Bargarh, Cuttack, Ganjam, Kalahandi, Keonjhar, Khurda, Nayagarh, Puri and Rayagada are covered under the NFSM-Pulses. The programme envisages to cover 9.74 lakh. ha. area and produce 4.68 tonnes of pulses with productivity of 480 kg/ha. by the end of 11th five year plan.

### **Mission Structure**

**8.12** The State Food Security Mission Executive Committee (SFSMEC) has been constituted by the state Govt. under the Chairmanship of the Chief Secretary to oversee the implementation of the Mission in the state and IMAGE has been identified as the Nodal Agency to implement the Mission programme. The IMAGE in turn will provide the funds to ATMA who will implement the scheme at district and block level. The ATMA in its turn is responsible for project formulation, implementation and monitoring of the components under NFSM through District Agriculture Officer. The Farmers' Societies, NGOs, Growers' Associations, Self Help Groups and other similar agencies are associated in the implementation of the programme.

**8.13** The interventions under the programme can be divided into the following groups :

### **Seeds Related Interventions**

#### **i. Production and Distribution of Breeder Seeds**

The ICAR is the nodal agency for the production and supply of breeder seeds and all those varieties to be released within 10 years will be produced by ICAR/SAU. The entire cost of the seeds are to be reimbursed to the seed producing agencies in the private and public sector out of the NFSM funds.

#### **ii. Production of Foundation and Certified seeds**

Foundation and certified seeds are to be produced by the National Seeds Corporation, State Seeds Corporation, Seed producing Farms of the State Govt., National Marketing Federation, Seed Producing Agencies in the Cooperative and Private sector. All the seed producing agencies are required to undertake the seed production as per the approved plan of the Central Seeds Committee.

#### **iii. Distribution of Certified Seeds**

Provision for financial assistance for distribution of certified seeds has been made to popularise / promote / spread the promising / newly released pulse varieties within 10 years at subsidised cost.

#### **iv. Integrated Nutrient Management**

Assistance for micro-nutrients / lime / gypsum are to be provided as INM package to the farmers through the Orissa Agro Industries Corporation (OAIC).

#### **v. Distribution of Sprinkler Sets**

The sprinkler sets are to be provided to the farmers having permanent source of irrigation and pump set and the nodal agency of the supply of the same will once again be the OAIC.

#### **vi. Integrated Pest Management**

Subsidies are to available to for IPM kit, use of bio-pesticides to be strictly in accordance with the recommendation of OUAT/ICAR.

#### vii. Training and Capacity Building

The training are to be provided to the farmers for capacity building. Instead of bringing the farmers to the agencies, the programme aims at taking the technology to the Farmers' Fields through the Farmers' Field Schools.

#### viii. Local Initiatives

To support the important location specific activities which are otherwise not covered under the normal mission activities but can boost the production of pulses, the districts are provided assistance to the extent of Rs. 1 crore for the entire period of 11th plan.

### Status of NFSM-Pulses in Orissa

**8.14** An amount of Rs. 456.76 lakh was allocated to the state for NFSM-Pulses during the year 2007-08. The achievement under the programmes for the year was only Rs. 153.24 lakh. The component-wise achievement vis-a-vis the target for the state as a whole is indicated in the Table 8.2.

**Table 8.2 : Achievements vis-a-vis the target under NFSM during 2007-08**

(Rs. Lakh)

Sl. No.	Interventions	Target	Achievement
1	Seeds		
a	Production of Foundation seeds	1.92	1.92
b	Distribution Assistance on Certified Seeds	46.22	3.19
c	Strengthening of State Seeds Certification Agency	10.00	10.00
2	Integrated Nutrient Management		
a	Supply of Gypsum	60.00	45.50
b	Supply of Micro Nutrients	20.00	10.32
3	Integrated Pest Management	60.00	45.00
4	Distribution of Sprinkler Sets	158.62	16.88
5	Extension of Mass Media Campaign	50.00	0.00
6	Misc. Expenditure	50.00	20.43
7	Local Initiatives	0.00	0.00
	<b>Total ( 1-7)</b>	<b>456.76</b>	<b>153.24</b>

Source : Report on NFSM-Pulses, prepared by NFSM Cell, IMAGE, Bhubaneswar

The achievement vis-vis the target for the state as a whole was only around 34 per cent of the target fixed for the year. The reason for the low achievement was attributed to the late introduction of the scheme and the officials expressed confidence of increasing the achievements during 2008-09.

## **Agriculture Policy 2008**

**8.15** The Govt of Orissa announced the new Agriculture Policy in the year 2008 with the objectives to shift the agriculture of the state from subsistence to commercial level and make it sustainable and diversified. The input management, extension, research & development were given the major thrust in the policy in order to bring about the changes in agriculture. Apart from putting emphasis on the foodgrains production, the niche areas like horticulture, organic farming were given due recognition in the policy.

**8.16** The major interventions as far as the pulses sector were concerned included the following strategies :

- 0 Increase the Seed Replacement Rate from 1-2 per cent to around 10 per cent by strengthening the Seed Village network for production of quality seeds
- 1 Augmenting the capacity of the existing seed processing plants and also establishing new plants
- 2 Introducing mobile seed processing plants
- 3 Establishing more number of seed testing laboratories
- 4 Strengthening the capacity of the Orissa State Seeds Corporation
- 5 Expanding the seed distribution network through private dealers
- 6 Emphasis on Integrated Pest and Nutrient Management
- 7 Improvement of soil Health and soil fertility
- 8 Focus on Agri-extension

**8.17** The discussion with the officials of the Agriculture Deptt. of both the sample districts highlighted the specific initiatives introduced in the districts to overcome the constraints in improving the pulses production and productivity. Some of them are summed up in the following paragraphs.

i. Around 68 per cent of the soil in Ganjam district is acidic, 2 per cent are alkaline and only 30 per cent are normal. Pulses do not grow well in the acidic soil and hence the management of acid soil through the application of paper mill sludge has been taken up by the Agricultural Deptt. The farmers are supplied with the paper mill sludge to the tune of 50 kg. @ Rs. 10 per kg.

ii. Each of the two agro climatic zones in Ganjam district i.e. coastal area and hilly area requires a different type / variety of seed which was yet to be developed.

iii. Seed Replacement Rate in Ganjam district for the pulses was only 1 per cent during 2007-08 and the Deptt. plans to increase it to 5 to 10 per cent by the end of 11th plan.

iv. Analysis have shown that use of good quality seeds can improve the productivity by 15 to 20 per cent, bio-fertilisers can improve the same by 48 per cent, irrigation by 26 per cent and pest management by 100 per cent. Keeping in mind the importance of pest management in the overall production and productivity improvement, the Deptt. aims at providing Rs. 750/- per ha. for the same.

v. Seed treating chemicals like endosulphon and eco-friendly pesticides like azadirachtin were also provided to the farmers at subsidised rate.

vi. Farmer Field Schools are another initiatives which was actively promoted for improving the production and productivity of the pulses. Around 40 farmers assemble at one place covering 100 ha. of land and getting trained on different stages of crop production for 20 days. The expenditure per such a school varied in the range of Rs. 17,000/- to Rs. 18,000/-.

vii. For management of soil health/improvement gypsum are supplied and plant protection equipment were also supplied to the farmers at subsidised rate.

viii. No storage bin had not been provided but the Agricultural Deptt. envisages to install a mega bin at a central place of Ganjam district to give facility to Framers' Groups/Self Help Groups/Producers' Groups, etc.

ix. To improve the germination, new micro-nutrients like trecousligon, etc. are supplied at subsidised rate to the farmers and calcium, boron and some other micro nutrients also provided to the farmers.

x. The Seed Village Programme was mainly done by the Orissa State Seed Corporation who supplied foundation seeds to the Deptt. and collected the certified seeds from the Deptt. The Orissa Seeds Certification Agency (OSCA) on the other hand certified the seeds produced by the farmers. The Agriculture Deptt. mainly intervened by providing training to the farmers in the production of seeds.

### **Orissa State Seeds Corporation (OSSC)**

**8.18** The Orissa State Seeds Corporation (OSSC) was incorporated in 1978 with the main objective of production of certified seeds and marketing it at a reasonable price to the farmers. The OSSC is popularly known by its brand name 'ORISEED'.

The seed development process cover the following stages :

- i. Procurement of Breeder Seeds from the Govt. of India
- ii. Multiplication of Breeder seeds to Foundation Seeds through growers and in own farms
- iii. Distribution of Foundation Seeds to growers for multiplication to raw seeds
- iv. Receipt of raw seeds from the farm growers
- v. Processing the raw seeds in Seed processing plants
- vi. Certification of processed seeds for sale to farmers
- vii. Marketing of Certified Seeds

**8.19** The seeds produced and procured by OSSC are marketed by the Director of Agriculture & Food Production, Orissa through Departmental Sale Centres located at block levels. Though OSSC had created a dealers' network for selling the seeds through the counters, sale was discontinued for some years in between. Further, the interaction with the sample farmers revealed that very few of them were purchasing the seeds from the counters. Most of the farmers preferred to use their own seeds.

### **Regional Pulses Research Centre, Ganjam**

**8.20** The All India Coordinated Project on MULLARP (Mungbean, Uradbean, Lentil, Lathyrus, Rajmash, Pigeon Pea) is being implemented at the Regional Pulses Research

Centre, Ganjam with 75 per cent assistance from the centre and 25 per cent assistance from the state. The centre is also the designated breeder seeds producer under the NFSM - Pulses programme.

**8.21** The major activity of the project relates to the variety development and the varieties developed by the centre include the following :

Mung : OBGG 52 (Durga), OUM 11-5 (Kamdev), Dhauli, Jyoti, Ratila selection, Nayagarh selection, Sujata

Urad : Sarala, Ujjwala, Prasad

Arhar : Rupa

**8.22** Another objective of the centre is to expand the area under the Breeder Seeds Programme and the area under the same both for Kharif and Rabi during the year 2008-09 is indicated as below :

Kharif : Mung and Urad - 5 ha. , Arhar - 1 ha.

Rabi : Mung and Urad - 6 ha., Pigeon Pea - 2.5 ha.

**8.23** The summation of opinions of the scientists, policy makers and farmers regarding the production and productivity of pulses in the sample districts bring out the following observations :

i. A majority of farmers in the sample districts specifically in Ganjam district, followed the paira / broadcasting method for sowing the mung and urad beans. But they were not getting suitable varieties of seeds for the same. Such varieties were not being developed at the centre. The stock of seeds sometimes come from the centres at Delhi & Kanpur and in most of the cases were not suitable for the local conditions.

ii. As per admission of some officials, the Term - I variety was suitable for Rabi season whereas the same was available for sowing during Kharif season, which was more suitable for Term -II variety. Further, though the Rachna variety field pea was needed for Ganjam district, Archana variety was supplied which resulted in low yield.

iii. Due to several constraints, the Seed Realisation rate i.e. transformation of Breeder to Foundation to Certified Seeds was quite low. This affected the availability of the seeds for the farmers and finally the seed replacement rate.

iv. Apart from the varietal constraints, there were certain operational constraints as well. The diesel motor sets were not sufficient and in the event of non-availability of the same, the sprinkler sets are not distributed, thus affecting the mechanisation of operations.

v. The extension network, which has the most dominant role for making a programme successful could not be fruitful due to the unavailability of functionaries in most of the districts. For example at the time of field visit in Ganjam district, against the provision for 176 staff in the District Agriculture Deptt., only 60 were appointed and out of them, 13 were in executive cadre, having restrictions on their field movement. In the absence of dedicated field staff, the new benefits of latest developments could not percolate to the common farmers.

## **Initiative of NABARD**

**8.24** In order to improve the Seed Replacement Rate of paddy and pulses, a Pilot Programme on Seed Villages is being implemented by NABARD in Orissa since the Rabi 2008. The nodal agency, an NGO named Live And Let Live (LALL) and eight other NGOs have been identified for implementing the programme in nine villages covering 7 districts. The programme aims at covering 270 acres of land and 303 farmers engaged in producing the seeds of paddy and Mung.

**8.25** The project components include the following :

- 0 Capacity building programme for farmers
- 1 Support for foundation seeds and other inputs
- 2 Fee of Orissa State Seeds Certification Agency for inspection and seeds certification
- 3 Cost of Technical training on seed production
- 4 Facilitating cost to the NGO

**8.26** The production programme with respect of pulses under the programme cover 109 farmers in 3 villages covering 35 ha. for production of foundation and certified seeds. Three varieties of mung seeds were sown in the month of January and February with proper sowing practices, fertiliser and pesticides were applied at right time as per the suggestions of technical experts. The farmers were given training before the sowing and at the time of sowing. The stakeholders expects to produce around 262 qu. of mung seeds. NABARD had sanctioned an amount of Rs. 11.16 lakh under Farmers Technology Transfer Fund (FTTF), out of which Rs. 7.44 were released by the end of March 2008.

**8.27** In order to improve the overall Seed Replacement Rate the following issues need to be addressed :

- 0 Matching of shortfall between production and requirement
- 1 supply of breeder seeds
- 2 Systems and procedures to be followed for release of seeds developed by research establishments
- 3 Processing and distribution channels / outlets for distribution with modification in the role of Govt. and private agencies
- 4 Storage and preservation of seeds
- 5 Extension services to make the farmers aware about the package of practices to be followed

### **Constraints in the Marketing Aspects**

**8.29** The marketing of pulses followed a traditional arrangement in the state as a whole, where the producers sold their produce at the village level to the traders or in the local haat frequented by the traders. The produce in its turn changed hands and there were around 7 to 8 layers before the processed dal came into the hands of the final consumers. But the producers themselves did not get their due share and sell the produce as and when required without caring anyway about the prices.

**8.30** The marketing constraints with respect to the pulses in the sample districts can be summarised as follow :

i. **Distress Sale** : The farmers were forced to sale their produce just after the harvesting but due to the glut in the market get lower price. As they had to meet the immediate requirements, they are unable to hold the produce so as to sale the same later and get better price.

ii. **Unstable Price** : The prices were low immediately after the harvest and generally picked up after certain passage of time. But the farmers were affected by this instability.

iii. **Lack of Marketing Information** : Due to the lack of information on the prevailing trend in the prices, production trends, etc, the farmers sold their produce at a much lower price.

iv. **Lack of Storage Facilities** : Inadequate storage facilities, the farmers are lost a substantial amount of their produce to driage, spoliage, rodents, etc. and were forced to sale their produce.

v. **Inadequate transportation facilities** : Due to inadequate transportation facilities at the village level, the producers sold the pulses to the traders directly from their farm or village, which offered the lesser price than prevailing at the nearby / district markets.

### **Initiatives for Improving Marketing**

A number of initiatives have been introduced by the institutional and non institutional sources to improve the marketing of pulses in the state.

#### **National Agricultural Cooperative Marketing Federation of India Limited (NAFED)**

**8.31** National Agricultural Cooperative Marketing Federation of India Limited (NAFED) was set up in 1958 as the Central nodal agency of Govt. of India for procurement of pulses, millets and oilseeds under Price Support System (PSS).

The NAFED performs the following major activities :

- i. undertakes the sale of pulses and oilseeds procured under PSS and import and provides storage facilities
- ii. procures the pulses, fruits for internal trade
- iii. distributes the agricultural machinery, implements and other inputs
- iv. assists for technical advice in agricultural production for the promotion and the working of its members and cooperative marketing, processing and supply societies .
- v. The involvement of seed business has been envisaged as one of the thrust areas of commodities including cereals, pulses and oilseeds. The seeds production programmes spread across the states of Utrakhand, UP, Rajasthan, AP, MP, Assam, Gujarat, Orissa, Goa and Maharashtra and are undertaken through tie up with farmers, State Seed Corporation and reputed private seed producing companies. The seeds are being supplied to various state Governments including states of J&K, Himachal Pradesh, Rajasthan, Madhya Pradesh, Uttar Pradesh, Jharkhand, Orissa, Andhra Pradesh, Karnataka and Chattisgarh.

**8.32** However, the operations of NAFED with regard to pulses in Orissa was almost nil as there was no procurement during the lat three years. The selling rate for pulses in Orissa has always been higher than the MSP in the recent years and hence, the NAFED has not been

very much active in the pulses sector, but has been quite active in paddy procurement in the state.

### **Orissa State Marketing Board (OSAMB)**

**8.33** Orissa State Marketing Board (OSAMB) was established to facilitate the forward and backward market integration of agricultural produce, which ultimately leads to remunerative price realisation to producers and availability of quality produce to the consumers.

The major activities of the Board included the following :

- i. implement the regulation of marketing in the state
- ii. provide infrastructural facilities for the marketing of notified agricultural produce
- iii. grading of agricultural produce in the markets
- iv. coordinate all the market committees for information services
- v. eliminate mal practices in the marketing systems
- vi. arrange or organise seminars, workshops or exhibitions on subjects relating to agricultural marketing

**8.34** OSAMB has 60 Regional Market Cooperatives (RCMs), with operational area of 51 Revenue Sub divisions. There were two RMCs in Kalahandi (Kesinga and Bhawanipatna) and three RMCs (Hinjilicut, Digpahandi and Bhanjanagar) in Ganjam district. However all these RMCs were engaged in the procurement of paddy and oilseeds. The trading of pulses never took place in the RMCs. One of the major reasons for the same was the fact that the surplus available with the farmers was quite low and hence no trading was done.

### **Direct Marketing**

**8.35** Direct marketing is an innovative concept, which involves marketing of produce by farmers directly to the millers / consumers without any middlemen. Direct marketing gives rise to a number of benefits both for the producers (farmers/sellers) and buyers (millers/consumers). It enables producers and millers and other bulk buyers to economise on transportation cost and improve the price realisation. It also provides incentives to the large scale marketing companies i.e. millers/exporters to purchase directly from the producing areas.

**8.36** Direct marketing by farmers to the millers / consumers has been experimented through Apni Mandi in Punjab and Haryana. The concept with certain modifications was introduced in Andhra Pradesh through Rythu Bazars. These markets at present are run through the assistance of the Govt. as promotional ventures.

However, in Orissa though the Krushak Bazars have been established at various places to facilitate the direct marketing of agricultural produce, the initiative has not yet resulted in any success so far and keeping in mind the non existent network of pulses marketing in the state, the initiative may be successful if other commodities like vegetables, forest produce are also combined with it and proper infrastructure is developed for the same.

## **Constraints in Processing Aspects**

**8.37** Dal milling is one of the major food processing industries in the state, next only to rice milling. The efficiency of conversion of grain to dal by traditional method of milling is low and that from the wet method is inferior in cooking quality. The average dal yield varies from 68-75 per cent by the traditional method. However, the sample units had reported it to be around 81-82 per cent.

The Central Food Technological Research Institute (CFTRI), Mysore has recommended an improved method of dal milling and the same is used by the modern dal mills operating in the state. However, most of the dal mills in the villages and block levels, still follow the traditional milling and use the processed dal for home consumption.

**8.38** The major constraints affecting the processing activities in the state include the following :

i. Due to the unavailability of adequate and good quality pulses, the mills were running in sub optimum capacity. The major portion of the produce of Kalahandi district was going to the two dal mills at Rayagada, a number of mills at Raipur (Chattisgarh) and the mills at Jatni (Khurda district of Orissa). Similarly, the produce of Ganjam district was going to Vishakhapatnam in Andhra Pradesh for processing.

ii. The lack of proper infrastructure, particularly in Kalahandi, district was one of the major reasons for the lack of interest on the part of the entrepreneurs to establish the dal mills in the district. The situation was much worse as out of the four modern dal mills established in Kalahandi, only one mill was operating at the time of the field visit. Similarly in the neighbouring Bolangir district, three dal mills were established, out of which only one was operating as informed by the officials of the DIC. Some of the entrepreneurs had combined the operations of the rice and dal milling in one unit so as to operate for a longer period during the year.

iii. The financial constraints was another reason for slow growth of processing activities in the districts. The cost of raw materials accounted for almost 85 to 90 per cent of the cost of operations of the processing units. Apart from that, the investment cost of the units was also quite substantial, ranging between Rs. 28 lakh to Rs. 37 lakh, depending on the installed capacity. The entrepreneurs thus needed both the working and block capital for the units, which sometimes were inadequate. The bankers on their part were proceeding in a cautious manner taking into account the previous record and experiences of the entrepreneurs.

iv. The lack of entrepreneurship was found out to be another reason for the non establishment of the dal processing units in Kalahandi district, whereas the same was not the case in Ganjam district.

## **Initiative of ORMAS**

**8.39** One commendable initiative in this regard was taken up by the Orissa Rural Development and Marketing Society (ORMAS). ORMAS is the first and only organisation of its type under the Panchayati Raj Department, Govt. of Orissa, facilitating sustainable livelihood for rural producers under different poverty alleviation programmes. In the process,

it provides training, capacity building, value addition, by adopting key activity approach and clusters, etc.

ORMAS facilitates the marketing of rural produce with the following interventions :

- i. market research
- ii. activity selection
- iii. assessing feasibility of key activities
- iv. technological upgradation
- v. design and diversification

**8.40** ORMAS through the District Supply and Marketing Society (DSMS) offices established in 30 districts of Orissa undertakes a number of activities including the marketing and processing and value additions in various products. The mini dal mills assisted in various tribal districts, including Kalahandi provides a scope for the SHG members to earn certain amount of income by undertaking the milling activity.

**8.41** But the crux of the matter is the non availability of adequate amount of pulses for processing. Thus, everything boils down to increasing production, productivity, marketable surplus, providing adequate infrastructure, making provision for finance and finally proper marketing arrangement so as to revive the pulses sector in the state.

## CHAPETR - IX

### SUMMARY AND CONCLUSIONS

The 'pulses' is the broad term used to describe the dried, edible seeds of legumes. It is a common name for the members of the leguminose (pea) family and are an important source of protein especially in developing countries providing dietary protein to a large number of people.

#### **Pulses in India**

**9.1** India is the world's largest producer of pulses with total production varying between 11.1 million tonnes in 2002-03 to 14.2 million tonnes in 2006-07. The pulses are grown over an area of around 20 to 23 million ha. of the land and has an overall productivity in the range of 500 kg/ha to 635 kg/ha. The area under pulses constitute only 18 to 19 per cent of the area under foodgrains, its production only 7 to 8 per cent of the foodgrains production and its productivity 35 to 37 per cent of the productivity of foodgrains.

**9.2** The pulses are grown both in Kharif and Rabi season with almost equal proportion being devoted to each season. The productivity of Rabi pulses however were much higher in the range of 600 kg. as against 400 to 530 kg. for the Kharif pulses during the period between 2000-01 to 2006-07.

**9.3** There was marginal improvement in the irrigated area under pulses from 12.5 per cent during 2000-01 to 15 per cent during 2005-06, as against 50.4 per cent to 52.3 per cent for total cereals. The per day availability of pulses in India reduced from 60.7 gms in 1950-51 to 30 gms in 2000-01 and has fluctuated between 30 to 35 gms. afterwards. The amount is much lower than the recommendations of the Indian Council of Medical Research at 43 gm/day.

**9.4** The major Kharif pulses cultivated in India include Green Gram / Mung, Black Gram / Urad and Pigeon Peas / Arhar whereas the major Rabi pulses include Chick Peas / Bengal Gram, Green Peas, Lentil / Masoor. The Chick Peas / Gram is the most widely cultivated pulse in India with almost 30 per cent of the total area under pulses, followed by Pigeon Peas / Arhar, Green Gram / Mung and Black Gram / Urad in around 13 to 16 per cent of the area and Lentil on around 7 to 8 per cent of the area. The production of Chick Pea constituted around 40 per cent of the total pulses production, followed by Pigeon Peas (around 20 per cent), Black Gram, Green Gram, Lentil (5 to 7 per cent).

**9.5** The major pulses growing states in the country are Madhya Pradesh, Maharashtra, Rajasthan and Uttar Pradesh each contributing 10 to 15 per cent of the area, followed by Karnataka and Andhra Pradesh with 5 to 10 per cent of the area each. Orissa with around 3 to 5 per cent of both area and production of pulses in the country has very seldom been in reckoning as far as the pulses sector in the country is concerned.

#### **Pulses in Orissa**

**9.6** The area under pulses in the state of Orissa increased by 34 per cent from 6.04 lakh ha. in 2000-01 to 8.09 lakh ha. in 2005-06. There was a sharp increase in the area under pulses in the year 2006-07 to 19.51 lakh ha. which was attributed to interventions taken up by the Govt. under ISOPOM introduced since 2004-05. As a corollary to the expansion of area

under pulses, the production of pulses increased from 2.13 lakh tonnes in 2000-01 to 3.36 lakh tonnes in 2005-06, but due to the increase in area under pulses, the production of pulses increased to 8.66 lakh ha. during 2006-07. The productivity of pulses in the state also showed an improvement of around 26 per cent during the period from 2000-01 to 2006-07. The productivity however was much lesser in comparison to that of the all India level which was 616 kg/ha. during 2006-07.

**9.7** Orissa has always been considered as a deficit state as far as the pulses are concerned, with the total production falling short of the total requirement which include seed, feed and wastage. According to the Orissa Agriculture Statistics, around 1.24 lakh ha. area were diverted from paddy to pulses during 2004-05 to 2006-07.

**9.8** The pulses are grown as mixed crop in a large part of the state with paddy & Arhar, Arhar & Ground nut and Arhar & Mung & Urad being the most prominent. However, the area under inter-cropping as reported in the Orissa Agriculture Statistics hovers around 0.50 to 0.60 thousand ha. Looking at increase in area under pulses and also the fall in the area under inter-cropping, it may be inferred that there is an increasing tendency on the part of the farmers to go for pure cropping of pulses.

### **Objectives of the Study**

**9.9** The present study was undertaken with the following objectives with specific reference to the state of Orissa :

- 0 analyse the area, production and productivity of selected pulses
- 1 look into the issues and constraints in the farm management of the pulses
- 2 analyse the forward and backward linkages in the production of pulses
- 3 assess the efficiency of different channels of marketing and the role of MSP
- 4 explore the post harvest management including grading, processing, packing, value addition, branding, etc.
- 5 identify the constraints in the production , marketing and processing
- 6 role of institutional credit and extension mechanism in the pulses

### **Sample Design and Methodology**

**9.10** The analysis of the cropping pattern of the state brought out the fact that Pigeon Peas was cultivated throughout the state, Black Gram as Rabi crop in the coastal plains & central table land, Green Gram in Rabi season as a pure crop and Horse Gram during the late Kharif and early Rabi crop throughout the state. Keeping in mind the importance of Arhar, Mung and Urad in the overall pulses scenario of the state, the three pulses were selected for detailed analysis.

**9.11** The district-wise and season-wise area and production of pulses during the triennium ending 2006-07 showed Ganjam and Kalahandi to be the No 1 and No. 2 districts in terms of the area under selected pulses i.e. Green Gram, Black Gram and Arhar. The two districts also presented a varied picture as the first one is considered to be a developed district with better infrastructure whereas the second one was regarded as an underdeveloped district having limited infrastructure base. The analysis of pulses sector in both the districts would throw light on the different aspects of the sector.

**9.12** The primary data on various aspects of the cultivation of pulses was collected from 70 farmers (35 each in both the districts), the tricky, eventhough, sketchy idea about the trading in pulses from 10 traders (5 each from both the districts), processing details from 6 dal processing units (2 in Kalahandi and 4 in Ganjam). The interaction were held with the officials of Agriculture Department, Govt. of Orissa, scientists of Orissa University of Agriculture & Technology (OUAT), Regional Pulses Research Centre, Krishi Vigyan Kendra, National Food Security Mission, Orissa State Marketing Board, NGOs, etc. to get an insight into the different dimensions of the pulses cultivation, marketing, processing, research and development in the pulses sector of the state.

**9.13** The feedback on the sample farmers was utilised to arrive at the conclusions on the cost of cultivation, farm business income. The information of the processing units was taken into consideration to estimate the viability of the units. The simple arithmetic tools like measure of central tendency, financial rate of return, etc. were used to arrive at the conclusions. The discussions with the various govt. and non govt. agencies threw light on the issues / constraints affecting the pulses sector in the state and the initiatives taken up so far to mitigate the same.

### **Pulses in Sample Districts**

**9.14** A part of Ganjam district comes under coastal plains and the other part comes under the Eastern Ghats, with around 30 per cent of the area under pulses, of which Green Gram and Black Gram were prominent. The whole of Kalahandi district comes under the Eastern Ghats, with around 30 per cent of the gross cropped area under pulses, of which Pigeon Peas, Green Gram and Black Gram were prominent.

**9.15** One interesting feature of the pulses in the sample districts reveals that the other pulses consisting of Cow Pea, Horse Pea, Filed Pea and Lentils have for some years been equally important in the overall pulses basket. The area and production of the selected pulses over a period from 1997-98 to 2006-07 in both Ganjam and Kalahandi districts showed fluctuating trend with the year 2001-02 and 2002-03 being the worst years.

### **Cultivation Aspects / Practices of Pulses**

**9.16** The average operating area of the sample farmers were 2.51 ha. and 2.54 ha. in Ganjam and Kalahandi districts respectively and paddy (52 per cent), Green Gram (27 per cent) & Black Gram (12 per cent) were the major crop grown by the sample farmers in Ganjam district. The paddy (57 per cent), Arhar (22 per cent), Green Gram (9 per cent) occupied the major portion of the land of the sample farmers in Kalahandi district.

**9.17** The sample farmers were cultivating Green Gram and Black Gram both under irrigated and unirrigated conditions in Ganjam district whereas the sample farmers were cultivating Green Gram only under unirrigated condition in Kalahandi district. The sample farmers of Kalahandi district were cultivating Arhar under unirrigated conditions. The 'Paira' method of cultivation of both Green and Black Gram, where the pulses seeds were sown one / two weeks before the harvesting of paddy, was quite popular among the sample farmers in Ganjam district.

**9.18** Around 90 per cent of the sample farmers preferred to use their own seeds or seeds bought from other farmers for Green and Black Gram and also the Arhar. The sample farmers

cited the unavailability of the seeds at the right time and low germination rate of the seeds were main reasons given by the farmers for not purchasing the same from sales counter of the department. However, at the same time it was observed that the sample farmers were using around 37 to 38 kg. of seeds per ha. instead of the recommended quantity of 25 kg. per ha. The use of seeds for the paira method of sowing was around 45 kg. per ha. which was almost double the recommended amount.

**9.19** The use of chemical fertilisers used by the sample farmers was almost nil and only farm yard manure was used by them. Apart from weeding once/twice a week, no inter-cultural operations were adopted by the sample farmers. Limited quantity of pesticides / insecticides was used mainly to prevent the crop from diseases like leaf spot disease, powdery mildew and insects like aphids and white fly.

#### **Cost of Cultivation and Profitability of Pulses**

**9.20** The different variations of the cost of cultivation were calculated by taking into account various components. The cost A 1 was calculated by taking into consideration the paid out costs like hired labour, animal labour, machine labour, seeds, fertilisers, pesticides/insecticides, land revenue & taxes, interest on borrowed capital/working capital. The cost A 2 included the cost A 1 and the rent paid for the leased in land. The cost B 1 added the imputed value of family labour to the cost A 1. Similarly, the cost B 2 included the imputed value of family labour with the cost A 2. But since the sample farmers had devoted the lease-in- land for cultivation of commercial crops like ground nut, sunflower, vegetables etc. the lease rent was not included in the cost of cultivation. Hence, the cost at A 1 & A 2 for the sample farmers were identical and B 1 & B 2 were also identical.

**9.21** Since the farmers kept nearly one third of the produce for own consumption and seed purpose, the gross value of output sold was calculated by multiplying the average sale price of the produce with the marketable surplus. The profitability of the cultivation was estimated by deducting the different cost variations from the gross value of output sold.

#### **Cost and Profitability of Green Gram**

**9.22** The cost of cultivation at A 1 & A 2 was Rs. 2176.10 and Rs. 2896. 10 at B 1 & B 2 for Green Gram under unirrigated conditions in Ganjam district. The yield of the 4.25 qu. per ha. and keeping 1.25 qu. for own requirement, the remaining 3.00 qu. were sold at Rs. 1700 per qu. by the sample farmers. The Gross sales proceeds was estimated to be Rs. 5100 and the profit at A1 & A 2 and B 1 & B 2 were Rs. 2923.90 and Rs. 2203.90 per ha. respectively.

**9.23** There was a substantial variation in the cost of cultivation under the irrigated conditions in Ganjam district as the cost of cultivation at A 1& A 2 was Rs. 4990.00 and at B 1 & B 2 Rs. 5890.00. However, the increase in yield rate of the pulses under irrigated condition at 5 qu. per ha. was only 18 per cent. The marketable surplus of 3.75 qu. was sold at Rs. 1787.00 per qu. and the gross sales proceeds was Rs. 6701.25. The profit at A & A 2 was Rs. 1711.25 and at B 1 & B 2 was Rs. 811.25. This makes the cultivation of Green Gram under irrigated condition less profitable than that of the unirrigated land and may be one of the reasons why the sample farmers had cultivated other commercial crops under the irrigated land.

**9.24** The cost of cultivation of the Green Gram under unirrigated conditions in Kalahandi district was almost similar to that of the Ganjam district. The cost at A 1 & A 2 was Rs. 2339.00 and at B 1 & B 2 was Rs. 3297.00. The yield was 4.25 qu. per ha. and the gross value of output sold @ Rs. 1721 per qu. was Rs. 5593.25. The profit at A 1 & A 2 was Rs. 3254.25 and the same at B 1 & B 2 was Rs. 2296.25 per ha. Thus the cultivation of Green Gram under Kalahandi district showed comparatively higher profitability for the sample farmers in comparison to that of the Ganjam district.

#### **Cost of Cultivation and Profitability of Black Gram**

**9.25** The sample farmers in Ganjam district had cultivated Black Gram under irrigated and unirrigated conditions. The cost of the Black Gram under irrigated conditions was Rs. 2176.92 at A 1 & A 2 and Rs. 3279.92 at B 1 & B 2. The yield was 4.25 qu. and the marketable surplus was estimated to be 2.75 qu. The gross value of output sold was Rs. 5293.75 with the price per qu. being Rs. 1925.00 per qu. The profit at A 1 & A 2 was Rs. 3116.83 and at B 1 & B 2 was Rs. 2013.83 per ha.

**9.26** The cost of cultivation of Black Gram under irrigated conditions was Rs. 4945.50 per ha. at A 1 & A 2 and Rs. 5868.50 at B 1 & B 2. The yield of the crop on an average was 6 qu. which was higher by 41 per cent in comparison to the unirrigated conditions. Keeping 1.75 qu. for home consumption, the remaining 4.25 qu. was sold at Rs. 1950.00 per qu. and the gross sales proceeds was Rs. 8287.50. The profit of Black Gram under unirrigated condition at cost A 1 & A 2 was Rs. 3342.00 and at B 1 and B 2 was Rs. 2419.00.

**9.27** A cursory comparison of the cultivation of Black Gram under unirrigated and irrigated conditions shows that there is substantial difference between the yield rate of the two. However, since there is not much difference between the sale price of the two crops, there is marginal difference between the profitability of the crops rate per qu. of these two crops. Hence, the sample farmers preferred to cultivate the commercial crops on the irrigated land and were more comfortable with the Paira method of sowing.

#### **Cost of Cultivation and Profitability of Green and Black Gram under 'Paira' Method**

**9.28** One popular method of sowing was the Paira method of sowing usually followed by the sample farmers for both Green and Black Gram in Ganjam district. The cost of cultivation at A 1 & A 2 of both the pulses was Rs. 2086.70 and at B 1 & B 2 was Rs. 3086.70 per ha. The yield was lower in comparison to sowing method at 3.75 qu. and keeping one third for personal requirement, the gross value of output sold was Rs. 5087.50 @ Rs. 1850 per qu. The profit at A 1 & A 2 was Rs. 3000.80 and at B 1 & B 2 was Rs. 2000.80.

#### **Cost of Cultivation and Profitability of Arhar**

**9.29** The sample farmers in Kalahandi district had taken up the cultivation of Arhar, popularly known as 'Kandul' in the local language. The per ha. use of seeds was approximately 25 kg. instead of the recommended amount of 10-15 kg.. The use of chemical fertiliser was minimal and the farmers admitted that the produce was organic by default. The cultivation was mainly on the unirrigated land. The cost of cultivation at A 1 & A 2 was Rs. 2467.00 and at B 1 & B 2 was Rs. 3478.00. The yield of the crop was 5.05 per ha and again keeping 20.02 for home consumption and seeds, the marketable surplus was estimated to be 3.03. With the average price at Rs., 2100. 00 per qu., the gross sales proceeds amounted to Rs. 6363.00. The profit at A 1 & A 2 was Rs. 3896.00 and at B 1 & B 2 was Rs. 2885.00.

**9.30** The overall analysis of the cost of cultivation and profitability reveal that the Arhar cultivation was more profitable than that of Green Gram in Kalahandi district whereas the cultivation of Green Gram and Black Gram yielded almost similar profitability in Ganjam district.

**9.31** The sample farmers sold the produce either to the local village trader or at the local haat. The prices of the pulses had fluctuated over time and the concern for the same was shown by the sample farmers.

### **Processing of Pulses**

**9.32** The processing of pulses were undertaken at three stages i.e. primary consisting mainly of production of cleaned, graded and packaged pulses, secondary consisting of dehusking, splitting, polishing, turmeric coating of pulses and tertiary resulting mainly in preparation of roasted, fried dal and other associated products. The conventional pulses milling procedure include wet milling comprising of cleaning, soaking, mixing with red soil, conditioning, dehusking and splitting, grading and bagging whereas dry milling does not include the soaking.

### **Investment Cost of Dal Processing Units**

**9.33** The operations offered by the sample processing units i.e. dal mills included the cleaning, pitting, pre-treatment with oil, conditioning, dehusking & splitting and polishing. The overall cost of investment of the sample units was estimated to be Rs. 28.05 lakh, which included various components such as land & site development (Rs. 1.75 lakh), civil construction (Rs. 12.50 lakh), plant & machinery (8.50 lakh), electrical & other items (Rs. 3.00 lakh), Miscellaneous fixed assets (Rs.1.80 lakh) and miscellaneous expenses (Rs. 0.80 lakh).

### **Cost of Operation of the Dal Processing Units**

**9.34** The cost of operation of the sample dal mills per MT was Rs. 23586 and was almost 90 per cent of the cost of raw materials. Other components of cost included the electricity, water & other utilities, gunny bags & handling charges, sales & other misc. expenses salaries & wages, sales tax at the rate of 2.8 per cent on an average, oil charges, administrative & other expenses and repair & maintenance, etc.

### **Sales Proceeds of the Processing Units**

**9.35** The main products of the processing units included 80-82 per cent dehusked / split pulses, 13-15 husk and apart from that the broken, dehusked whole pulses, unhusked pulses were about 1-3 per cent of the produce. The sales proceeds from the dehusked pulses was Rs. 30000 per MT whereas that of the husk was Rs. 12000 per MT. The total sales proceeds from one MT of pulses amounted to Rs. 26400. The net proceeds per MT thus amounted to Rs. 2814. The processing capacity of the sample dal mills was calculated to be 1.6 MT per day and the average working days per annum was 210 days / seven months. The per annum processing capacity of the sample units thus amounted to 336 MT. The sample units were utilising 60 per cent, 65 per cent and 70 per cent of their capacity in the first, second and third year of their operation and the working life of the unit was taken as 10 years. The Benefit to

Cost ratio of the sample units was more than 1 and the financial rate of return was around 24 per cent indicating the activity to be viable one.

### **Viability of the Processing Units**

**9.36** The overall processing cost was calculated by adding the interest on working capital at 12 per cent and 12.5 per cent on the term loan, depreciation of plant and machinery at 5 per cent of the cost of plant and machinery. The net value addition was calculated by deducting the processing cost from the gross value of output sold and the same was estimated to be Rs. 1702 per MT. The break even volume of output was calculated by dividing the net value addition per MT with the total cost of investment. The break even volume was 1648 MT and taking the per day processing capacity at 1.6 MT, the break even volume could be arrived in 1030 days and taking the working at 210 days in a year, the sample processing units could break even after 4 years of operation.

### **SHGs in Dal Processing Activity**

**9.37** The ORMAS in collaboration with Banajata, an NGO had extended assistance for the establishment of the mini dal mill in Kalahandi district so as to give the SHG members an opportunity to generate some income. Around 110 members forming 10 SHG groups were engaged in dal processing by purchasing the produce from the local haat and also taking up the same as job work. The members had processed around 860 qu. of Arhar dal and earned a revenue of Rs. 29.28 lakh as during the year 2008-09. The net profit accruing to the members was Rs. 1.22 lakh and the same was distributed among the 10 SHGs.

### **Marketing Aspects of Pulses**

#### **Marketing Channels**

**9.38** There were private as well as institutional marketing channels for pulses in the state and the country. The private source usually include producer, traders, wholesalers, dal millers, retailers, consumers in different combinations. The institutional source on the other hand include the producer, procuring agency, dal miller, wholesaler, retailer and consumer in different combinations. As far the state of Orissa is concerned, the institutional sources had almost no role to play as the pulses had not been traded at the mandis during the last three years. The NAFED, the major procuring agency has not lifted any pulses during the last three years. The market price for the pulses has been higher than the minimum support price and hence, there is no need for the procurement of pulses at the regulated markets.

**9.39** However, the trading in pulses was quite active in the sample districts and all the sample dal mill owners were basically traders and were also quite active in trading of pulses. The traders in Ganjam mainly dealt in Green Gram and Black Gram with traders stationed at Vishakhapatnam in Andhra Pradesh whereas those of Kalahandi dealt mainly in Arhar with traders stationed at Raipur in Chhattisgarh, Bhattapara, Akola & Nagpur in Maharashtra. The consumers usually purchased the unbranded pulses from the local shops though the branded ones are also available at the middle and high ended retail outlets.

#### **Import of Pulses**

**9.40** India has been an importer of pulses over the years and the same was Rs. 2477.29 cr during 2005-06. Myanmar, Canada, Australia, France and China were the five countries from which maximum quantity of pulses was imported over the years. A large share of import of chickpeas, Green Gram, Black Gram and Rajmash was from Myanmar. The ports of Mumbai, Kolkata and Chennai were the major pulses importing points. Though there were only 15-20 licensed importers in the country, the agents were spread all over the country facilitating the trading in different stages. The margin at the level of each agent usually amounted to approximately 1 to 1.5 per cent above the transportation, handling, storage and processing cost.

### **Credit Aspects of Pulses**

**9.41** The crop loan was extended to the sample farmers by the financial institutions for carrying out the short term agricultural operations but the sample branches could not provide the exact break up of the credit extended for the pulses cultivation in particular. The scale of finance for the year 2007-08 for both Kharif and Rabi was fixed for both Ganajm and Kalahandi district. The sample processing units had obtained a loan of Rs. 22.08 lakh, out of which Rs. 15.00 lakh was taken as working capital and Rs. 7.08 lakh as term loan. The processing units however expressed their willingness to avail more loans for procuring raw materials immediately after harvest when there is abundant supply in the market.

### **Constraints and Initiatives taken in Pulses Sector**

#### **Cultivation Related**

**9.42** The pulses sector in the sample districts and the state as a whole suffers from a number of constraints which were broadly divided under cultivation, processing, marketing, credit related. The constraints in the cultivation aspect included abiotic constraints such as cultivation under the rainfed condition on marginal and sub-marginal with poor fertility and low moisture content, imbalance in use of fertiliser, creating nutritional efficiency, low seed replacement rates, heavy cattle/monkey menace, etc. The biotic constraints include heavy weed infestation, improper package practices, inter-state and inter-district variation in soil quality, etc.

#### **ISOPOM**

**9.43** ISOPOM introduced since the year 2004-05 in the state aimed at bringing more area under cultivation of pulses, especially, the rice fallows. The major strategies for the achieving the end included area expansion, introduction of new cultivars through seed related interventions, technology transfer, farm mechanisation, etc. A total of Rs. 233.86 lakh were spent on various components in the state during 2007-08 and amount of Rs. 400.00 lakh was allocated for the programme for the year 2008-09.

#### **NFSM - Pulses**

**9.44** The NFSM on Pulses was introduced in 10 districts of the including Ganjam and Kalahandi during the year 2007-08 with the aim of increasing the production of pulses through area expansion and enhancement of productivity, restoring soil fertility at individual farm level, creating employment opportunities and enhancing farm profits. The interventions under the scheme include the production and distribution of breeder seeds, production of

foundation and certified seeds, distribution of certified seeds, integrated pest management, distribution of sprinkler sets, integrated pest management, training and capacity building, etc. Against the target of Rs. 456.76 lakh the achievement was Rs. 153.235 lakh during the year 2007-08. The low achievement may be attributed to the delay in launch of the programme in the Rabi 2007-08. The programme has picked up steam during the year 2008-09 and a number of initiatives like as supply of paper mill sludge to the farmers, Farmer Field Schools, supply of gypsum, provision for storage bins, supply of micro nutrients have been taken up in full swing under the NFSM in the sample districts.

### **Regional Pulses Research Centre**

**9.45** The Regional Pulses Research Centre at Ganjam was actively involved in the development of variety of pulses as the All India Coordinated Research Project on MULLARP (Mung Bean, Urad Bean, Lentil, Lathyrus, Rajmash, Pigeon Pea) was being implemented at the centre. The centre has developed different varieties of Mung, Urad and Arhar and devoted area of around 16.5 ha. for variety of pulses including Mung, Urad, Arhar and Pigeon Pea.

### **Marketing Related**

**9.46** The marketing of pulses in the sample districts was very much unorganised as the produce passed through 7-8 hands before reaching the final consumers, with each extracting commission for the same. The distress sale, fluctuating prices, lack of proper market information, lack of storage facilities and inadequate transportation facilities were some of the major obstacles for ensuring the proper price to the farmers.

**9.47** The institutional marketing arrangement like through the NAFED and OSAMB had not made any impact on the marketing of pulses as the produce were not traded in the mandis. The bulk of the produce were disposed at the village level. The mandis provide mechanism for marketing of paddy, cotton and oilseeds but not pulses.

### **Credit Related**

**9.48** The processing units were running in sub optimum capacity due to the unavailability of adequate and good quality pulses and according to the admission of the sample entrepreneurs, the mills were slowly being closed down. The lack of proper infrastructure, particularly in Kalahandi district was the major reason for the lack of interest on the part of the entrepreneurs to establish the units.

The difficulty in getting adequate quantity of working capital was also another reason for the cautious approach in the establishment of processing units in the districts.

### **Suggestions to strengthen Pulses Sector**

**9.49** Since the major problem in the pulses sector is the increase in area and production of pulses, the major thrust need to be given to the following aspects :

i. The supply of good quality seeds in adequate quantity to the farmers is the need of the hour. Most of the sample farmers as well as the stakeholders in general had expressed their reservation about the availability of adequate amount of seeds at the time of their need. The

seed production as well as the distribution network has to be stronger so as to cater to the demand of the farmers.

ii. The general perception among the farmers about the unavailability of seeds at the sales counters, their low germination rate and higher susceptibility to the attack of pests and diseases need to be corrected.

iii. According to the information given in the Publication i.e. 'Status of Agriculture in Orissa', 2008' of Deptt. of Agriculture, Govt. of Orissa, the seed replacement rate of Black Gram, Mung and Arhar varied in the range of 1 to 2 per cent and for field pea in the range of 3 to 8 per cent during the period from 2004-05 to 2007-08 for the state as a whole. It is an accepted fact that the use of good quality seeds can improve the productivity of pulses by 15 to 20 per cent. Here comes the need for increasing the seeds replacement rate and the strengthening of Seed Village Programme introduced in the state.

iv. Keeping in mind the difference in soil fertility and climatic conditions, there is a need for the development and distribution of specific variety of seeds for specific areas. The common variety of seeds being supplied by the institutional sources sometimes proved to be less productive and more susceptible to attack of pests and diseases. This calls for development of specific variety of seeds by the research institutions.

v. Even if around 70 per cent of the Green Gram and Black Gram are cultivated by 'Paira' method in the coastal districts of the state, till now no specific variety suitable for the same has been developed. Similarly, no winter variety for Black Gram has been developed in the state though the pulses perform better during the rabi season. The research institutions in the state have been trying to develop a suitable variety but have not met with success. This needs the attention of the researchers in the state.

vi. One major initiative undertaken to improve the seed replacement rate is the adoption of Seed Village Programmes at various districts for production of certified seeds. A group of farmers in a village devote a certain portion of their land for the production of seeds which are certified by the Orissa Seeds Certification Agency and finally distributed among the farmers through the local sales centres. These initiatives have been more prominent in paddy whereas the initiative has to take off on a smaller scale in case of pulses. NABARD is also associated with the 'Pilot Project on Seed Village Programme' in 9 coastal districts, of which the interventions related to pulses are underway in 3 districts.

vii. Apart from the production of foundation / certified seeds, it is necessary to ensure the marketing of the same. The seeds are marketed through the sales counters of the Orissa State Seeds Corporation only. Keeping in mind the staff shortage and heavy requirement, opportunity may be explored for marketing of seeds through the private seed dealers.

viii. The lack of fertiliser, irrigated management both during the kharif and rabi season leads to the low yield of pulses. The farmers in general exhibit a lax attitude towards the pulses cultivation, always giving it a secondary status in comparison to paddy and other commercial crops. Though the initiatives like 'Farmer's Field School' to create awareness among the farmers has been a step in right direction, very few progressive farmers get the opportunity of associating with the same. The extension mechanism need to be strengthened to make the farmers aware about the various aspects of cultivation.

ix. The 1500 odd Farmers Clubs, an informal forum of farmers at grass roots level, formed under the auspices of NABARD can serve as a media for dissemination of information on package of practices of different pulses. The training programmes can be arranged in collaboration with agencies like ATMA, OUAT to promote scientific method of cultivation of pulses. These clubs can act as change agents, especially, in 76 villages adopted by NABARD under the Village Development Programme.

x. A number of agencies such as APICOL, OWDM, etc. have been associated with the Agriculture Department for the improvement of the pulses sector in the state by improving the cultivation, marketing and also the processing related activities. A coordinated effort on the part of all the agencies is needed to uplift the pulses sector of the state.

xi. There were instances of rapid price fluctuations in the pulses within one season affecting the income of the farmers due to sudden glut in the market after the harvesting and the import of pulses from abroad. Since there was absence of proper system of marketing of pulses, the farmers sold their produce to the local trader at whatever price available. The Cooperative marketing through PACS on a experimental basis may be introduced so as to insulate the farmers from price fluctuations by improving their bargaining power.

xii. Some of the stakeholders gave the opinion that the seeds should be included in the B component of scale of finance for pulses. But the cooperatives themselves had reservation on this issue due their bitter experience during the year 2001-02 and 2002-03, lack of storage facilities and uncertainty on the part of the farmers for purchasing the same. However, some via media can be explored in this regard.

xiii. The unavailability of adequate and good quality raw materials, lack of proper infrastructure, the limited availability of finance for procuring raw materials, the competition from the neighbouring states such as Chattisgarh, etc. were the major reasons for limited establishment of processing units in the state. The credit related constraints can be addressed by the bankers by providing assistance for the establishment, expansion and modernization of dal mills by providing both the working as well as block capital though in a cautious manner.

