ROLE OF ORISSA STATE SEEDS CORPORATION IN THE PRODUCTION AND DISTRIBUTION OF SEEDS OF MAJOR PULSES IN ODISHA

By

Vandana Choudhury

Admission no.23ABM/13

Department of Agribusiness Management

Centre for Post Graduate Studies

Orissa University of Agriculture and Technology

Bhubaneswar-751003

2015

ROLE OF ORISSA STATE SEEDS CORPORATION IN THE PRODUCTION AND DISTRIBUTION OF SEEDS OF MAJOR PULSES IN ODISHA

A Thesis submitted to the Orissa University of Agriculture and Technology in Partial fulfillment of the Requirement for the degree of

Master of Business Administration

(Agribusiness Management)

By

Vandana Choudhury

Admission no.23ABM/13

Department of Agribusiness Management

Centre for Post Graduate Studies

Orissa University of Agriculture and Technology

Bhubaneswar-751003

2015

ORISSA UNIVERSITY OF AGRICULTURE AND TECHNOLOGY

DEPARTMENT OF AGRIBUSINESS MANAGEMENT

CENTRE FOR POST GRADUATE STUDIES (CPGS)

CERTIFICATE

Dr. Debdutt Behura
Asst. Professor
Department of Agribusiness Management

Bhubaneswar
Date:

This is to certify that the thesis entitled "Role of Orissa State Seeds Corporation in the production and distribution of seeds of major pulses in Odisha" submitted in partial fulfillment of the requirements for the award of the degree of Master of Business Administration in Agribusiness Management to the Orissa University of Agriculture and Technology is a faithful record of bonafide and original research work carried out by Miss Vandana Choudhury under my guidance and supervision. No part of this thesis has been submitted for any other degree or diploma.

It is further certified that the assistance and help received by her from various sources during the course of investigation has been duly acknowledged.

Chairman
Advisory Committee

ORISSA UNIVERSITY OF AGRICULTURE AND TECHNOLOGY

DEPARTMENT OF AGRIBUSINESS MANAGEMENT

CENTRE FOR POST GRADUATE STUDIES (CPGS)

CERTIFICATE

This is to certify that the thesis entitled "Role of Orissa State Seeds Corporation in the production and distribution of seeds of major pulses in Odisha" submitted by Miss Vandana Choudhury to the Orissa University of Agriculture and Technology, Bhubaneswar in partial fulfillment of the requirements for the degree of Master of Business Administration (Agribusiness Management) has been approved/disapproved by the students' advisory committee and the external examiner.

Advisory Committee

Chairman:
Dr. Debdutt Behura
Asst. Professor
Department of Agribusiness Management ……...……..

Member
Dr. Samarendra Mahapatra
Head
Department of Agribusiness Management ……

Member
Dr. Bibhudha Parasar
Head
Department of Extension Education ……..

External Examiner ……...

DECLARATION

I, Vandana Choudhury (Admission no - 23ABM / 13), do hereby declare that the project report entitled "Role of Orissa State Seeds Corporation in the Production and Distribution of Seeds of Major Pulses in Odisha" being submitted to Center for Post Graduate Studies, Orissa University of Agriculture & Technology, Bhubaneswar, is solely prepared by me for the partial fulfillment of MBA Degree in Agribusiness Management and has not been submitted elsewhere either in whole or in part to any other University or Academic Institution, Magazine or journals at any time before, for the award of any degree or prize.

Vandana Choudhury

ACKNOWLEDGEMENT

Talent and capabilities are of course necessary but opportunities and right guidance are also very important backups without which no one can climb the ladder to success. This project is not the culmination of hard work of just one person but is the result of a lot of help from a lot of people. I have taken efforts in this thesis work. However, it would not have been possible without the kind support and help of many individuals and organizations. I would like to extend my sincere thanks to all of them. The gratitude cannot be expressed in words, either written or oral but here I make an attempt to acknowledge those who have helped me in the successful completion of this project.

At the outset, I would like to extend my sincere gratitude and reverence to the esteemed organization, Orissa State Seeds Corporation and its management for providing me with the opportunity to pursue my major project in their organization.

Foremost, I would like to express my sincere gratitude to my advisor **Dr. Debdutt Behura** for the continuous support of my study and research, for his patience, motivation, enthusiasm, and immense knowledge. His knowledge & guidance were instrumental at all the time of research and writing of this thesis.

I am deeply obliged to the Company Secretary of OSSC Ltd**, Mr. Subrat Kumar Mishra** for his cordial support, guidance and knowledge at various stages during the course of the training. I am much thankful to them for providing their valuable time and providing all necessary Information whenever required during the project period. My sincere thanks also go to all the staff members of Orissa State Seeds Corporation Ltd for providing me their valuable time in completing this project.

Last but not the least; I would like to thank my family: my parents and friends for their continuous support and encouragement.

Vandana Choudhury

CONTENTS

LIST OF FIGURES

LIST OF TABLES

ABBREVIATIONS USED

APICOL	Agricultural Promotion & Investment Corporation of Odisha Limited
ASPO	Assistant Seed Production Officers
CRRI	Cental Rice Research Institute
DAFP	Directorate of Agriculture and Food Production
FAOSTAT	Food and Agriculture Organisation Statistics
GVAP	Gross Value of Agricultural Production
HVC	High Value crops
ICAR	Indian Council of Agricultural Research
ISOPOM	Integrated Scheme of Oilseeds and Pulses
IIPR	*Indian Institute of Pulses Research*
KVK	Krishi Vigyan Kendra
LAMPs	*Large Area Multi Purpose Societies*
MNC	Multi National Companies
MOU	Memorandum of Understanding
NFSM	National Food Security Mission
NSC	National Seeds Corporation
OAIC	Orissa Agro Industries Corporation
OSSC	Orissa State Seeds Corporation
OUAT	Orissa University of Agriculture and Technology
OSSCA	Orissa State Seed Certifying agency
OWDM	*Odisha* Watershed Development Mission
PACS	Primary Agricultural Credit Cooperatives
RKVY	Rashtriya Krishi Vikash Yojna
SRR	Seed Replacement Rate
SAU	State Agricultural University
SVS	Seed Village Scheme
TFC	Threshing Floor Certificates

ABSTRACT

The importance of seeds as an agricultural input and as the vital determinant of crop productivity is well recognized. In fact, the efficacy of other agricultural inputs depends largely on the appropriateness and the quality of seeds used. High Yielding Varieties (HYV) seeds of appropriate characteristics for meeting the requirement of different agro climatic conditions and cropping systems with resistance to insects, pests, and diseases as well as various abiotic factors are needed by farmers.

With a view to enhancing the production of quality seeds and to ensure their adequate availability to the farmers at affordable rates, Orissa State Seeds Corporation Limited has been designated as the nodal agency for production and distribution of certified seeds to the farmers of the state. In order to diversify its operations in the area of certified seed production and distribution and also to avail the benefit of financial assistance under Integrated Scheme of Oilseeds, Pulses, (ISOPOM), production of certified seeds of oilseeds, pulses is undertaken by OSSC Ltd through registered growers in addition to its own seed village scheme.

The present study has been intended primarily as a research initiative to serve as the basis of making an in depth analysis of the issues relating to the various aspects of production and distribution of the seeds of major pulses in Odisha, namely black gram (biri) and green gram (moong) particularly in the district of Puri and the role of Orissa State Seeds Corporation Ltd in this regard. The study was undertaken in Puri district among registered seed growers of these two pulses under OSSC Ltd and by interaction with them through questionnaire and information collected regarding their source of obtaining quality seeds, the varieties of seeds, seed production practices followed, their access to information on new varietal releases and other support facilities, access to credit, their knowledge about seed replacement rate, aspects and problems relating to marketing, storage of seeds, seed certification etc were obtained. Information was also gathered from certain seed traders and farmers and by analyzing these findings it was found that the seed production of pulses though viable has not been significant. Though the formal seed production process is through OSSC Ltd, the Seed Replacement Rate for these crops in the state has been low and steps are being taken to improve the performance of seed production and marketing. However, there is an urgent need for the State Seed Corporations to transform themselves in tune with the industry in terms of infrastructure, technologies, approach and the management culture to be able to survive in the competitive market and to enhance their contribution in the national endeavour of increasing food production to attain food & nutritional security. It also attempts to put forth suggestions to improve the pulses seed sector in the state. Some issues related to seed multiplication and delivery systems in Odisha are also discussed.

CHAPTER-1

INTRODUCTION

1. INTRODUCTION

Seed is the basic and most critical input for sustainable agriculture and boosting agricultural productivity. The importance of quality seeds has been recognized from time immemorial. The old scripture, Manu Smriti says "Subeejam Sukshetre Jayate Sampadyathe" i.e., Good seed in good soil yields abundantly. Seed quality has been treated as sacred, being an important factor in the improvement of agriculture and agrarian societies.

Every farmer should have access to healthy seeds which are genetically pure, with high seed vigour and good germination percentage. Timely availability of good quality seeds at reasonable price ensures good yield and profit to the farmers. The seeds play a vital role in agriculture and acts as a carrier of the genetic potential of varieties. Quality seed production which follows efficient certification procedures plays a major role in the increase of food production of our country. To ensure this, the Government has prescribed standards and has brought in seed production techniques, testing, certification and marketing procedures through the Seeds Act, 1966.

Pulses are major sources of proteins among the vegetarians in India, and complement the staple cereals in the diets with proteins, essential amino acids, vitamins and minerals. India ranks first in the world in terms of pulse production (25% of total worlds production) (FAOSTAT 2010). Though India is the world's largest producer of pulses, it imports a large amount of pulses to meet the growing domestic needs. During 2013-14, India imported 3.05 million tons of pulses from the countries like Australia, Canada, and Myanmar worth Rs 10551 crores. Thus, India is the largest importer, producer and consumer of pulses. It has been estimated that India's population would reach 1.68 billion by 2030 from the present level of 1.21 billion. Accordingly, the projected pulse requirement for the year 2030 is 32 million tons with an anticipated required growth rate of 4.2% (IIPR Vision 2030). In view of this; India has to develop and adopt more efficient crop production technologies along with favorable policies to encourage farmers to bring more area under pulses.

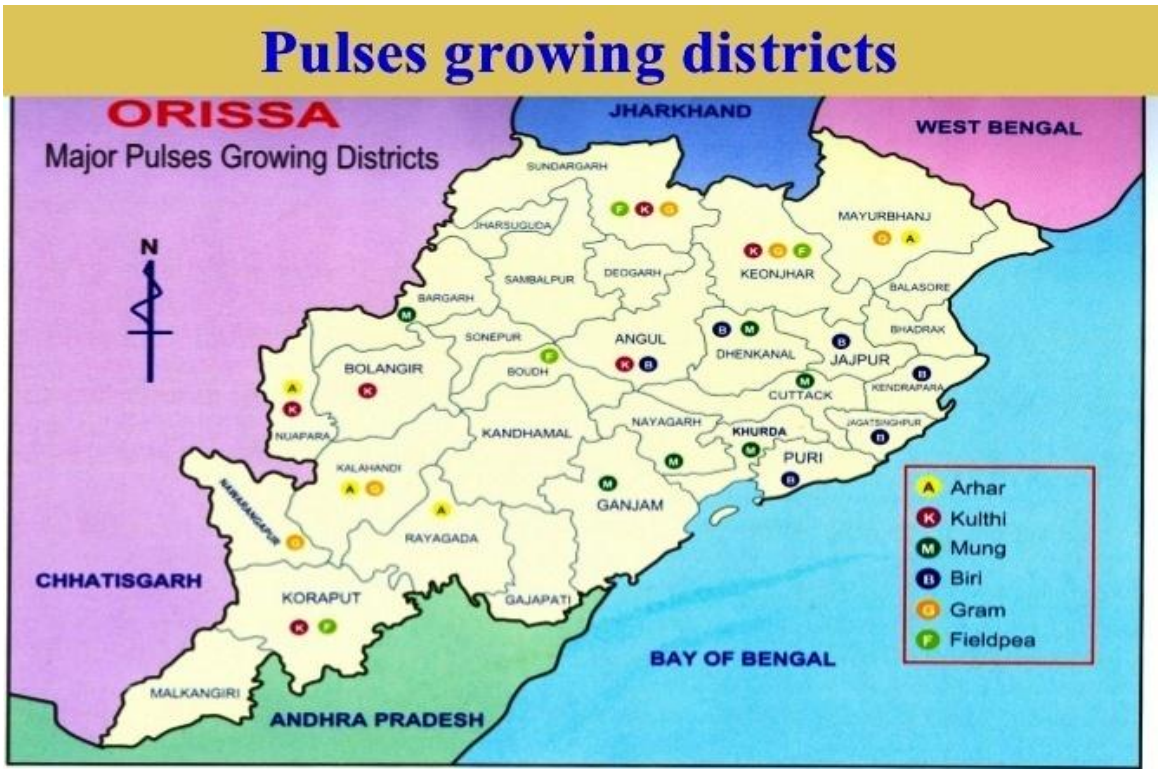
In India, production of pulses is increasing during the last three decades. This could be achieved largely due to availability of quality seed, which is the most vital and crucial input for sustaining high yield. Maintaining the genetic purity of the seed is of utmost importance and will enable growers to exploit the full benefits of introducing improved varieties of seeds. Thus, seed production needs to be carried out under skilled supervision and standardized well-organized conditions.

The formal seed sector in Odisha is represented by the Orissa State Seeds Corporation Ltd. (OSSC LTD), Department of Agriculture, Orissa University of agriculture and technology (OUAT) and private seed growers and dealers with support from OUAT. Informal seed sector includes own saved seeds, borrowing from others, village seed bank and local seed trade which contribute to about 75% of seed requirement of the farmers of the state. For timely supply of required quantity of certified seeds to the farmers, regular planning has to be made at least three years ahead, since for supply of the certified seeds in a season, the same have to be produced during the previous growing seasons of the crop.

Similarly, for production of the required quantity of certified seeds, foundation seeds have to be produced in the previous season, which in turn have to be produced from breeder seeds during previous season. So also the breeder seeds are produced from the nucleus seeds in the previous season. Thus to meet the seed requirement of the state, a long term planning is necessary so that as much as possible different varieties of certified seeds could be produced in the different agro-climatic regions of the state. The necessary arrangement can well be made in time for effective supply of required seeds. In Odisha, there is a need to continuously enhance and strengthen the formal and informal seed sector because of the participation of other equally important seed growers and institutes (private and government). Approximately 80-90% of all planting materials used are largely sourced from farmers' own-saved seed. Farmers save seeds of local landrace and use this continuously for about 3-4 years. In the current scenario, the demand for good quality certified seeds far exceed the availability in the market.

Pulses are an indispensable part of the diet of the people of the state of Odisha. As far as the production of major pulses are concerned, the green gram (mung bean) and black gram (biri) are the major pulses produced in the state, followed by arhar and kulthi covering 10.9% (0.953 million hectares) of the total agricultural land area with very low seed replacement ratio of 2-3% because the proportion of quality seeds available each year is 10-12%. Productivity is only 415 kg/ha which is well below the national average of 700 kg/ha. Irrigated tracts like the Mahanadi Delta, the Rushikulya plains and Hirakud and Badimula regions are the prominent pulse growing areas. Production of pulses is concentrated in the districts like Cuttack, Puri, Kalahandi, Koraput Dhenkanal, Bolangir, Rayagada, Naupada and Sambalpur. The pulses can be broadly divided into kharif and rabi crops.

Figure-1.1 Major pulses growing districts of Odisha



The share of major pulses in the overall pulses basket has remained almost unchanged over the years, except in case of arhar (pigeon pea) where the share has gradually declined since the year 2002-03. The share of other pulses such as cowpea, lentil and field pea, 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.

The agro-ecological situation of western Odisha is considered to be favourable for cultivation of the identified pulse crops. So far attempts have been made to promote capacity building of the farmers through local extension machineries which have been found to be inadequate to meet the desired results. Hence module development in arhar, green gram and black gram has been planned to strengthen local extension mechanism and to handhold and guide farmers for higher production in pulse cultivation.

1.1: Aim and Scope of the study

The present study was undertaken to analyze the production practices and distribution of quality seeds of major pulses (mainly black gram and green gram) with special reference to Puri district of Odisha.

The scope of the study is to discuss the important aspects and the actual scenario of seed production process of above two pulses in the state, The vital purpose for which the

study has been conducted is to learn about the system and efficiency in the seed production process of non paddy crops like pulses which form a major part of the agricultural economy and the diet of people of the state. Analyzing the attitude of seed growers, traders and farmers cultivating pulses, whether various programmes, schemes and support services on the part of government as well as the Orissa State Seeds Corporation Ltd. (OSSC LTD) that has been designated as the nodal agency for production, procurement, processing and supply of quality seeds to the farmers of the state has been significant and instrumental in bringing about noticeable changes in area, production and productivity of the state through the production and distribution of quality seeds. Despite various efforts, there have been gaps within the actual demand and supply of quality seeds. The overall study would try to suggest ways to improve the problems identified.

A strategic action-plan is necessary to motivate farmers to switch over to improved seeds by replacing the use of traditional/home preserved seeds in coming years

1.2: Objectives of the study

The present study was undertaken with the following objectives with specific reference to the state of Odisha:

- To study about the pulse seed production system of the state
- To know about the role of OSSC Ltd in the production and distribution of quality seeds.
- To analyze the trend in the production and distribution of quality seeds of OSSC Ltd
- To analyze the forward and backward linkages in the production of pulses
- To find out the constraints in the production and distribution of major pulses in study area and suggest policy measures to overcome them.

CHAPTER-2

REVIEW OF LITERATURE

2. REVIEW OF LITERATURE

As per research norms literature is of paramount importance to any research behavior. Review of literature helps to acquire broad and general background in the given field or discipline. So an acquaintance with earlier pertinent studies has been felt necessary to develop good understanding of the present study and to formulate appropriate research methodology. Though there were references of many studies carried out related to various aspects related to pulses, seed development system in India, seed marketing but there hardly exists any study that specifically deals with the production and marketing of seeds of pulses in Odisha.

In this chapter, an attempt has been made to review pertinent literature keeping in view the aspects related to the topic entitled; "Role of Orissa State Seeds Corporation Ltd in the production and distribution of pulses seeds in Odisha". Here is a brief account of the work reported by past researchers.

2.1: Structure of Seed Industry in India

Singh et al, (2008) in their study reported that the origin of Indian seed industry could be traced back to the establishment of national and state seed corporations during the 1960s, which continued to expand both in terms of their number and business during the 1970s. The industry underwent structural changes with the entry of private seed companies, mostly family-owned, during the 1980s and this trend continued in the 1990s also. The private seed companies focused mainly on hybrid seeds and a few large companies diversified into research and development (R&D) to increase their share in the seed market. The new seed policy of 1988 and the economy-wide reforms of 1991 attracted the multinational companies (MNCs) to India in a major way. Most of them entered through partnership with the national companies, and only a few established their independent seed business in the country. The industry was mainly governed by the Seeds Act (1966) and thrived largely on the material bred by the public plant breeding programmes of the institutes under the Indian Council of Agricultural Research (ICAR) and SAUs. This is a typical development path followed by seed industries even in the developed countries (Morris, 1998). The private seed sector has witnessed tremendous growth and now it supplies most of the hybrid seeds in the country.

Today, the Indian seed industry is heading towards a maturity phase with three major undergoing changes. First, private seed companies consider research and development (R&D) as an important mechanism to differentiate their product and enhance their market power.

This tendency is likely to intensify further. The second major change is arising from the process of globalization and liberalization. The resource-rich MNCs with well-established R&D programmes overseas are expanding their activities through mergers and acquisitions and the national companies may find it difficult to compete with them. Third, the industry is going to be governed by multiple regulations, and protection of intellectual property rights (IPRs) is emerging as an important factor to shape its growth and performance.

2.2: Seed Sector

Seed sector in India is of two types namely formal and informal. Informal sector is the one where farmers produce seeds without following certification procedures and exchange it amongst themselves. The formal type of seed sector follows seed certification procedures and standards to produce a particular variety of seed.

Table 2.1 Difference between formal and informal seed sector

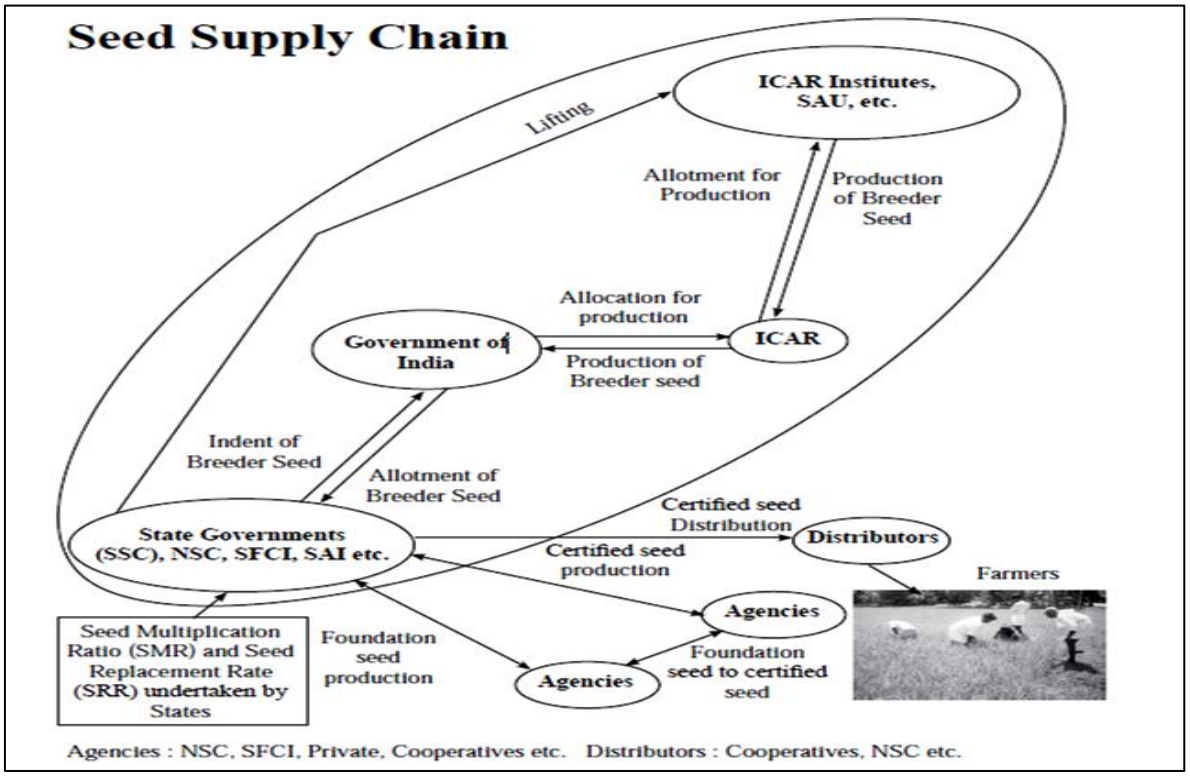
Formal	Informal
Centrally planned system with mechanized production and homogenous in nature.	System is locally planned, un mechanized production using local resources, no specialization, heterogeneous in space and time
There exists a system of Quality Control, us of identified and notified varieties, certified and truthfully labelled seeds.	Traditional system of seed processing, use of local seed types, truthfully labelled and other unlabelled seeds.
Seed production is done by National Government Agencies, State Government Agencies, Government Assisted and other cooperatives, MNCs and TNCs domestic private sector and joint ventures	Farmer saved seeds, Farmer to Farmer exchange, Farmers Cooperatives, Community Groups, Non-Governmental Organizations, Seed Growers Associations
Large quantities of seeds are marketed through Government owned companies, private companies, State Universities.	Small quantities of seeds are marketed through community level. Highly localized, use of conventional and unconventional exchange mechanisms.

2.3: Major players in seed industry

According to Vijayalakshmi et al. (2013), Indian Seed Industry is one of the biggest seed market in the world involving various institutions and organizations like government institutions, public sector organizations, research and academic laboratories and institutions

and private Sector. Ministry of Agriculture and the Department of Seed Certification, Indian Council of Agricultural Research (ICAR), State Agricultural Universities (SAU), National Seeds Corporation (NSC), State Farm Corporation of India (SFCI), 15 State Seed Corporations (SSCs), 22 State Seed Certification Centers and 104 notified Seed Testing Laboratories are major players in the seed industry. Nearly 150 large private seed companies nationwide are involved in seed production.

Figure 2.1 Seed supply system in India



2.4: Classes of Seeds

Four main classes of seeds are defined by the Association of Official Seed Certification Agency nucleus, breeder, foundation & certified seeds. The Indian seed programme adheres to the limited three generation system of seed multiplication in a phased manner, namely, breeder, foundation and certified seed. In India, farmers depend for their seed supply primarily on the state department of Agriculture and the National Seeds Corporation. The Department of Agriculture in all states has a planned programme of seed multiplication.

Koodilingam (2001) reported that the primary objective of any seed production programme is to make available suitable quantity of high quality seeds. The quality seed should be pure, homogenous and free from diseases and pests. The use of quality seeds is the most vital input for obtaining higher yields. The varietal purity, uniformity and stability are the main important characters to realize full yield potential of a variety. Maintenance of genetic purity

and identity of crop varieties is the foremost important task in any seed production programme. The potentiality of the variety gets lowered generation after generation. The seed to seeds method of production is usually limited to three or four generations with the first used basic seeds (as nucleus/breeder/foundation/certified seed.

A farmer's choice of which seeds from which crops should be selected and planted is guided by agro-ecological and cultural conditions as well as household needs and constraints (Bellon 1996; Haugen 2001)

A private-sector dominated seed industry may not serve resource-poor farmers in marginal areas, and may also raise seed prices beyond the reach of small farmers. The available evidences support this trend (Pal et al., 2007).

As the supply of commercial seed improved and farmers had a better access to seed markets, importance of the traditional seed system diminished. However, traditional seed systems were found to be very effective in terms of popularization and seed provision of new varieties. Once a variety was accepted by the farmers, formal seed systems faced little risk in the production and delivery of new variety on a large scale (Pal et al., 2000).

Within the informal seed system, social relationships play an important part of seed exchange (Cromwell 1997; Wright *et al*. 1994; McGuire 2001). Relationships between community members and between farmers and local market traders may act as informal certification ensuring that seeds are of acceptable quality and adapted to local conditions.

According to Indian Institute of Pulses Research, Kanpur, the production of pulses can be tremendously increased if traditional and old varieties are replaced by high yielding improved varieties. The Indian Institute of Pulses Research (IIPR), Kanpur is of the opinion that the available technology has the potential to double the present level productivity provided the technology gap between lab and land is reduced.

2.5: Constraints in Quality Seed Production of Pulses

Ram et al., (2013) reported that production of high-quality seed is fundamental pre-requisition for modern agriculture. Most of pulse crops are grown in each season from seeds, and seed quality can have a major component for harvesting potential crop yield. The major production constraints, availability of quality seed of improved varieties at right time and

places have been a major constraint for enhancing production and productivity of pulses in India. The seed replacement rate (SRR) in pulses are very low i.e. 11.9 per cent in chickpea to 23.89 per cent in black gram at country level. This is primarily due to lack of suitable insect-pest and disease resistant verities. Out of 24.80 million ha, about 84% of the area is under rainfed/dryland conditions. Lack of fine tuned package of practices, highly susceptible to drought and water logged conditions, unorganized seed production programmes, poor production of breeder seed to foundation and certified seed pulses by the state departments are some of hurdle in quality seed production. To ensure timely availability of quality seed, seed production system must be enhanced with introduction of contractual obligation component by involving seed grower associations, farmers, and NGO's besides SAU's, IIPR and State Seed Corporations to fulfillment of target of NFSM pulses. Participation of seed growers in seed production should be encouraged by way of simplifying the registration under seed village schemes including 60,000 villages for seed production and follow seed certification procedures as per seed standards.

According to the information given in the Publication, 'Status of Agriculture in Orissa', 2008' of Dept. of Agriculture, Govt. of Orissa, the seed replacement rate of black gram, moong 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.

The area under pulses is 22% (19% of GVAP Gross Value Agricultural Production), while area under oilseeds is about 9% (with 13% share in GVAP) and area under other crops which include sugarcane, fruits and vegetables is 13% (in value terms contributes only 10%). However, cost of production of pulses, oilseeds and other crops are low compared to paddy, hence net returns per hectare to economy and to the farmers are high compared to paddy (Reddy, 2009a, 2009b, 2010b; Reddy et al., 2011).

To enhance district level GVAP (Gross Value Agricultural Production), Orissa needs to diversify its crop sector towards pulses, oilseeds and HVCs (High Value Crops) through creation/development of enabling factors like certified seed, credit, fertilizers, drainage facilities, supplementary irrigation and infrastructure for marketing, which also increases farmers income (Reddy,2004).

The growth rate of vital inputs like seed replacement ratio, fertilizer and energy use is slow and less than all-India, which needs to be improved (Orissa Agricultural Statistics, 2011).

The seed replacement ratio (SRR) is defined as the percentage of area sowed with new seed every year. It is much lower in Orissa than all India for many crops including main crop paddy. To enhance agricultural growth, we need to increase application of inputs like seed, fertilizer, power consumption and irrigated area. The lower SRR is also due to high logistic costs in seed production and distribution in the remote villages with low infrastructure and lack of farmer's ability to pay for high priced seed (Reddy, 2004) resulted in reluctance of private seed companies in the seed distribution

Sahu and Nayak, (2007) reported that important pulse crops grown under rice fallow with available residual soil moisture are pigeon pea, green gram, black gram and horse gram. Production and productivity of these crops are not encouraging due to aberrant weather, soil acidity, and non-adoption of high yielding varieties and neglect in phosphate application. Attempts are initiated through central sponsored schemes for improving production and productivity.

As per an article written by Bijoy Pradhan on 21st June, 2015 in "The new Sunday Express", the state will fail in its pulses production target due to seed production in the state being much less than the actual demand. Agriculture minister of Odisha stated that the SRR in respect of pulses and oilseeds in the state was less than 4 percent last year and seed production has been much less than actual demand. There has been a decline of 66.18 percent in SRR in case of black gram.As per the report the agriculture department had supplied 1342.44 quintals of certified black gram seeds to the farmers in 2014-15 against 2969.89 quintals supplied in 2011-12.

While the department had supplied 582.02 quintals of arhar seeds in 2011-12 the seeds supply came down by 73.35 percent to 155 quintals in 2104-15. Though there was marginal increase in the supply of moong or green gram seeds (4154 quintals) to the farmers in the last kharif season against 2011-12(3603.5 quintals) the department has targeted to supply only 2274 quintals for the ensuing kharif. so as a step towards achieving the pulse seed production target and to make Odisha self-reliant in pulses and oilseeds production and to augment seeds production of pulses and oilseeds the Orissa state seeds corporation has recently signed a memorandum of understanding with national seeds corporation and international crop

research institute for semi-arid tropics (ICRI-SAT) to ensure adequate supply of quality seeds of pulses and oilseeds to farmers.

Although there is a demand of arhar, green gram, black gram and groundnut to the tune of 1101, 14800, 16480 and 50,000 quintals respectively in the current fiscal, the maximum production of these pulses expected from both the corporations is 300, 5000 and 20,000 quintals respectively. To bridge the gap, the Agriculture department has decided to produce the select non-paddy seeds inside the state by signing this tripartite agreement with reputed agencies like NSC and ICRISAT so that 80 percent of the total seeds would be produced in our own state

As per another article published by Express News Service, the State Government of Odisha may not be in a position to supply quality seeds for pulses cultivation in next season due to the shortage of quality seeds in pulses this year.

Registered seed growing farmers have started selling certified seeds as non-seeds in open market protesting the low price fixed by the State's seed pricing committee. While the whole grain prices of mung, biri and arhar are ruling high in open market, the State Government is offering price equivalent to market price for certified seeds which the farmers have grown from foundation seeds. The State Government has fixed the price of mung seeds at Rs.9,000 per quintal but the market price of whole grain mung is over Rs.10,000 per quintal.

The State's seed pricing committee has fixed the price of biri (black gram) seeds at Rs.8,000 per quintal while the market price of it is about Rs.9,000 per quintal.

However, the seeds pricing committee of Orissa State Seeds Corporation (OSSC LTD) has recommended Rs.10,200 per quintal for mung seeds, Rs.8,500 each per quintal of biri and arhar to the Government. Sources in the Agriculture Department said the registered seeds growing farmers of the State had produced 6,300 quintals of certified biri seeds, 8,870 quintals of mung seeds and 560 quintals of arhar seeds. OSSC Ltd has placed an order for procurement of 900 quintals of arhar seeds from National Seeds Corporation (NSC) at Rs 13,500 per quintal when State farmers are ready to supply at Rs.8,500 per quintal. Since the Seeds Corporation is not keen to procure arhar seeds from State farmers, the seed growers have started selling the certified seeds in the open market at non-seed price.

CHAPTER-3

MATERIALS AND METHODS

3. MATERIALS AND METHODS

This chapter deals with the methodology followed to accomplish the objectives of the study. The conceptual and analytical framework used in this study is presented in this chapter. The description and selection of study area, method of selection of respondents, sample size, collection of the data from primary and secondary sources and the analytical framework are discussed in this chapter.

3.1: Approach and nature of study

The present study comes within the preview of descriptive and explanatory research in nature. The essentiality of an explanatory research is that it must continue to remain flexible so that many different facets of a problem may be considered as and when they arise and come to the notice of the researcher. Interview and observation techniques have been used during the course of this research study.

This research has been emphasized on the role of OSSC Ltd in the production and distribution of pulses seeds mostly black gram & green gram in Odisha with the help of primary and secondary data collected during the study. The study was carried out under Orissa State Seeds Corporation Limited as it is the only corporation under the administrative control of the Department of Agriculture and Food production, Government of Odisha which undertakes the production and multiplication of foundation and certified seeds of all crops and varieties under the purview of the seeds act as well as the distribution of seeds to farmers at reasonable price and sufficient quantities to support agricultural production programme of the state.

3.2: Research methodology

Methodology is the systematic, theoretical analysis of the body of methods and principles associated with a field of study or branch of knowledge. It, typically, encompasses concepts such as paradigm, theoretical model, phases and quantitative or qualitative techniques. A methodology does not set out to provide solutions but offers the theoretical underpinning for understanding which method, set of methods or so called “best practices” can be applied to a specific case.

The main purpose of the study is to have a brief idea about how the OSSC Ltd is involved in the production & distribution of the seeds of pulses mostly black gram and green gram in Odisha. So a descriptive & slightly exploratory research methodology has been used for this study. A survey was administered to a selected sample from a specific population identified.

The term ‘survey’ is commonly applied to a research methodology designed to collect data from a specific population, or a sample from that population, and typically utilizes a questionnaire or an interview as the survey instrument.

3.3: Methodology adopted

- Identifying the members involved in the production and distribution process.
- Scheduling interviews by developing separate questionnaires for the seed growers, traders and the farmers.
- Developing questionnaires separately for the seed growers, traders and the farmers and scheduling conducting interviews for collecting firsthand information.
- Undertaking field-visits and personal interaction with the registered seed growers, traders and the farmers of black gram and green gram for impact assessment during pulses seed production, certification and selling and distribution
- Collection of secondary, statistical data from the organization and various other secondary sources
- Analysis of the primary and secondary data for drawing certain inferences
- Drafting of report

3.4: Research design

Research design is the blue print of research. It is the conceptual structure within which research is conducted. Here survey kind of research design has been adopted where data has been collected from various seed growers, traders & farmers. This kind of research design was well suited to collect the data since it gave a chance to interact with the people involved in the whole process of the production and distribution of pulses from the seed growers to the farmers, which made it possible to understand the dynamic factors of the research by having a firsthand experience.

When we talk of research methodology we not only talk of research methods we use in the context of our research study & explain why we are using a particular method or not using a particular method or technique so that the research methods can be evaluated either by the researchers or others.

- The research design used in the study is exploratory design.
- The sources of data used in this study are primary and secondary data
- Using survey method for collecting data

- Deciding the sample size for each group, namely the seed growers, farmers and traders.
- For the research quota sampling method is used
- Data collection is on convenience based method

3.5: Need Identification

The important aspect of research is identification, conceptualization, and definition of need. The need of the study was to understand about the role of OSSC Ltd in the production and distribution of seeds of major pulses namely black gram and green gram in the state of Odisha.

3.6: Place of Operation

In order to achieve the main objective of production of certified seeds of pulses & their marketing at reasonable prices to the farmers, OSSC Ltd organizes seed production programmes through seed growers at various places in the state of Odisha. The study was undertaken under the Orissa State Seeds Corporation Ltd, situated at Samantarapur, Old Town, Bhubaneswar and therefore the study was based in the district of Puri, coming under the seed production unit of Bhubaneswar

3.7: Selection of areas

The villages of Jagannathpur, Mathasahi, Dandamukundapur in Pipili block under Puri district were selected purposely as the registered pulses seed growers were belonging to these villages.

3.8: Selection of respondents:

Respondents were mainly the black gram and green gram seed growers registered under OSSC Ltd for their seed production programme for rabi 2014-15. The major respondents included growers followed by traders and farmers cultivating pulses

3.9: Sampling plan and collection of data

Here purposive sampling procedure was adopted for the study. The study specifically aimed at the registered seed growers of pulses from whom quality seeds are procured by OSSC Ltd, processed, tagged, bagged , stored and subsequently marketed through the departmental seed sales centre, its registered seed dealers and own outlets among the farmers. On the basis of

purposive sampling, the seed growers registered under OSSC LTD Ltd for seed production programme of black gram and green gram for rabi 2014-15 were selected and interviewed. Thereafter the seed growers, seed traders and farmers were personally visited at their respective villages to get information on cultivation of pulses seeds and their distribution and marketing process. In this research a sample of 10 pulse seed growers of Puri district, 15 seed traders and some farmers were taken for the canvassing purpose.

The list of the registered seed growers along with their villages and blocks is presented in Appendix-1

In addition to the seed growers, discussions were also held with pulse growers and seed traders engaged in pulse seed marketing. Sets of questionnaires were developed to elicit information from three groups of respondents' viz., pulse seed growers, seed traders and pulse growers. These questionnaires were pretested and then modified to suit to the local need. The questionnaire consisted of both open and close type questions so that the respondents felt free to interact during conversation. The responses on the questionnaire were obtained through direct interaction with the seed growers, traders and farmers; so as to get firsthand holistic information about the activities related to pulses seed production, farming and distribution. The questionnaire uncovered the seed production practices of pulses, farmer' experience, the problems encountered by them during various aspects of harvesting, storage, seed certification and marketing as well as their suggestions and remarks.

- Secondary data were collected from journals, books, from the official records of the Orissa State Seeds Corporation Ltd. as well as through interaction with various officials of the corporation.
- Information about the registered seed growers under the seed production programme for rabi 2014-15, along with the class of seed, quantity of seed utilized & the area covered was collected from OSSC Ltd.
- The data on the quantity of foundation and certified seeds produced in different districts of Odisha for the period 2004-2005 to 2013-14 was also collected from the production department of OSSC Ltd.
- The seed supply position of OSSC Ltd. during the years from 2005-06 to 2014-15, involving the total indent and supply for both the seasons of rabi and kharif was collected from the marketing department of OSSC Ltd.

- The seed replacement rate of pulses in Odisha for the last few years was also collected from the seeds section of the Directorate of Agriculture, government of Odisha.

3.10: Data Analysis

After collection of the data, an in-depth analysis of the data was made by interpreting the data in excel sheet, drawing pie charts to support the importance of the finding, interpreting the results and giving recommendations and suggestions. The data analysis has been done based on nature of the data keeping in view the objectives of the study. Both qualitative and quantitative descriptions have been incorporated as fit to the study. The data analysis consisted of examining the surveys for correctness and completeness with the help of simple statistical and analytical tools. The collected data was also analyzed and compared to the secondary data, and then they are evaluated and presented with inferences for easy understanding. Tabular analysis was adopted to compile the general characteristics of the sample farmers, the resource structure, cost structure, returns, profits and opinions of farmers regarding the problems in production and marketing. Simple statistics like averages and percentages were used to compare, contrast and interpret results in an appropriate way.

3.10.a: Growth rate analysis:

For assessing the trends in area, production and productivity of pulses in Odisha, the following growth rate formula was employed.

$^{yt} = ab^t u^t$……. (1)

Where,

^{yt} = area/production/productivity in the year ‘t’

a = intercept indicating Y in the base period (t = 0)

b = Regression coefficient

^{t} = Time period in years

u^t = Disturbance term for the year ‘t’.

Equation (1) was converted into the logarithmic form to facilitate the use of linear regression. By taking logarithm on both sides of the equation (1), we get the equation (2).

LnY = lna + t lnb + lnut …… (2)

This is of the linear form.

Yt = A + Bt + et …… (3)

Where,

Yt = lnYt
A = lna
B = lnb
Et = lnut

The linear regression of the above form (3) was fitted separately for area, production and productivity of pulses. The values of 'a' and 'b' were estimated by using ordinary least squares technique.

Later, the original 'a' and 'b' parameters in equation (1) were obtained by taking anti-logarithms of 'a' and 'b' values as,

a = Anti log A
b = Anti log B
Average annual compound rate was calculated as
b = 1 + g
g = b – 1

To obtain percentage compound growth rate, the value of g was multiplied by 100.

Limitations

- The findings of the study are based on the information collected from a representative sample of seed growers, farmers, and traders. The information collected pertains to the year 2014-15. Data collected was solely dependent upon respondents' responses so accuracy could vary.
- Though, other pulses are cultivated in the state, the study focuses only on two leading pulse crops namely black gram & green gram.
- The secondary information was also collected on various aspects of pulses but limited secondary information was available on investment made on marketing of pulses and therefore nothing elaborate and conclusive could be analyzed
- The area of study considered was quite vast and the study was confined to respondents of Puri only. Lack of sufficient time was also a constraint. Many of the important aspects and areas could not be covered due to lack of time. Due to time constraints, the survey work could not cover the important pulses seed producing districts of Balasore, Ganjam, Balangir, Kalahandi etc.
- According to the sample size the results and findings may be suggestive but not conclusive

ORGANISATION PROFILE

The Orissa State Seeds Corporation Ltd. (OSSC LTD) has been designated as the nodal agency for production, procurement, processing and supply of quality seeds to the farmers in the state of Odisha. Orissa State Seeds Corporation Limited (OSSC LTD) is a government entity under the administrative control of the Department of Agriculture; Government of Odisha.

The Orissa State Seeds Corporation Limited was incorporated on 24th February 1978 under the under the National Seeds Project with main objective to produce, multiply, procure, process and supply quality seeds to the farmers at reasonable prices and in sufficient quantities in order to support agricultural production programme in Odisha and to enhance the crop yield and productivity. OSSC Ltd. has been performing its role and has earned credibility of supplying quality seeds at reasonable prices and has oriented the grower community to produce quality certified seeds of different crops. Through its own seed village programme, OSSC LTD supplies foundation seeds to the growers for multiplication of certified seeds with the involvement of Orissa State Seed and Organic Product Certifying agency (OSSOPCA).The certified seeds of different varieties of paddy, pulses and oil seeds etc. are sold to the farmers of Odisha through authorized private dealers of OSSC Ltd and PACS / LAMPS. To ensure quality of the seeds and to prevent sale of spurious seeds, seed samples are drawn for analysis by the quality control inspectors. OSSC Ltd has been formed with the goal of making the state of Odisha self sufficient in the production and distribution of quality seeds.

OSSC Ltd is working with the following mandates:

- Timely supply of quality seeds in each season i.e. Kharif and Rabi through different Dealers/ PACS under bulk sale and through the different Deputy Director of Agriculture Ranges under different schemes as per the indents of the Director of Agriculture & Food Production, Odisha.
- To arrange and supply vegetable seeds through Director of Horticulture, Odisha
- To take up production and demonstration programmes in the farmer's field.
- To produce foundation & certified seeds for the state's requirements.
- To make the state of Odisha self sufficient in the field of production and distribution of quality seeds.
- Processing of raw seeds available under seed production programme.

- Installation and operation of required processing plants as per state policy and requirement of OSSC Ltd.
- Construction of flat ventilated seed store for scientifically storing of seeds to ensure proper germination of seeds in farmer's field.
- Packing of vegetable seeds as per demand of different Govt. organizations

Seed production units and its area of operation

OSSC Ltd. has its presence in all over the state of Odisha covering all the revenue districts of the state, divided into seven units headed by the Seed Production Officers (SPO) at the unit level and Assistant Seed Production Officers (ASPO) at the district level.

Seed Production Units of OSSC Ltd covering some major districts of Odisha

Sl.No	*Name of the unit*	*Districts covered*
1	Balasore	Balasore, Bhadrak, Keonjar, and Mayurbhjanja
2	Berhampur	Ganjam, Gajapati,Khandamal & Boudh
3	Bhubaneswar	Puri, Khurda and Nayagarh
4	Bargarh	Bargarh, Deogarh, Sambalpur, Jharsuguda, Sundergarh
5	Bhawanipatna	Bolangir, Sonepur, Kalahandi and Nuapada.
6	Cuttack	Cuttack, Jagatsingpur, Jajpur, Kendrapara, Dhenkanal, Angul
7	Jeypore	Koraput, Rayagada, Malkangiri and Nowrangpur

Functioning of OSSC Ltd.

The seed development process is narrated below:-

- Procurement of breeder seeds from Govt. of India.
- Multiplication of breeder seeds to the foundation seeds through growers & in own farm.
- Distribution of foundation seeds to the growers for multiplication to raw seeds.
- Receipt of raw seeds from growers.
- Processing of raw seeds in seed processing plant.
- Certification of processed seeds for sale to farmers
- Marketing of certified seeds

Seed Production

OSSC Ltd takes up the production of both foundation and certified seeds. The breeder seeds lifted by OSSC Ltd are multiplied to foundation seeds in government farms, OUAT farms and in the selected registered seed growers' field. OSSC Ltd procures the Foundation seeds for undertaking production programme under Seed Village Scheme (SVS) for

multiplication of certified seeds. The production programme for various crops in each season is taken up considering the prospective plan relating to the seed requirement of the state prepared by the Director of Agriculture & Food Production, Odisha. At present, around 4500 nos. of seed growers are involved in seed production programme of OSSC Ltd. The production programme is taken up in identified compact patches in close proximity to the seed processing plants. The foundation seeds are used for production of certified seeds, which are sold to farmers for raising crops on a large scale. OSSC Ltd certification agency (OSSC LTDA) inspects the fields of the seeds growers & submits Threshing Floor Certificates (T.F.C) to growers showing the expected yield (raw seeds) based on conditions of the crop. The grower submits the TFC to the company at the time of processing of seeds.

Engineering:-

After seed multiplication OSSC Ltd mostly procures unprocessed seeds from the registered seed growers and sends them to processing plants for processing. During processing foreign materials such as pieces of straw, small stones inseparable and other such materials are separated along with impurities in the crop like under size grain, chaffs & dust. After processing seeds are being collected in separate bags, seed treating chemicals are put in the bags & stacked for collection process. At present OSSC Ltd have 36 processing plants at different locations of the state. Out of which 27 are owned by OSSC Ltd & other 9 are Government processing plants utilized by OSSC Ltd.

Storage of seeds

Proper storage is the most important factor for the seed germination and viability. To store the seeds properly adequate number of storage go downs are required, which are not available with OSSC Ltd.

Marketing:-

The production of quality seeds as well as their marketing is given emphasis by the corporation. The production of seeds inside the state is carried out through the Seed Village Scheme of OSSC Ltd called *MO Bihana Yojana and* the programme is done with involvement of individual growers. In order to multiply the seed to fulfil the demand of the State, OSSC Ltd also procures the seeds produced by the seed organisers grown inside the state with whom MOU is signed. To meet the shortfall requirement of seeds, OSSC Ltd also procures seeds through offers received from the national level and state level seeds corporations and through tender process. The gamut of activities of the Corporation is

increasing day by day. With OSSC Ltd's limited manpower resources managing the activities at the field level becomes very much difficult.

Present activities and justification of manpower

At present 4219 seed growers are involved in seed production. It is desirable that the required manpower should be there at the head office and filed level to carry out the operations.

1. No of Growers at present - 4219
2. No of dealers - 3140
3. No of PACS - 878
4. No. of processing plants - 41 (own-32, govt.-6, private-3)
5. No. of designated godowns - 36
6. No of own godowns – 67(capacity of storing 220000 quintals)
7. No of farms – 5 (Bargarh, barapali, Barikel, Paramanpur, Babanpur)
8. No of employees – 131 (own-119+ deputation-12)
9. Name of the bank – State bank of India, old town branch
10. Cash credit – 40 crores @ 10% rate of interest

Finance & supply chain

- The seeds procured by OSSC Ltd are sold in subsidized rate to cater the needs of the farmers. The subsidy bills are then raised and submitted to the Directorate of Agriculture and Food Production, Odisha and Director of Horticulture after proper reconciliation with the DDAs and DDH. The peak period of procurement starts from November and ends in May. During this period OSSC Ltd procures Kharif and Rabi produce from inside state and shortfall quantity from outside agencies. Considering the volume of business during the peak period OSSC Ltd requires at least 100.00 crores working capital for timely procurement, processing and distribution of seeds.. OSSC Ltd solely depends on DA&FP (O) for release of subsidy in time

CHAPTER-4

RESULTS AND DISCUSSION

4. RESULTS AND DISCUSSION

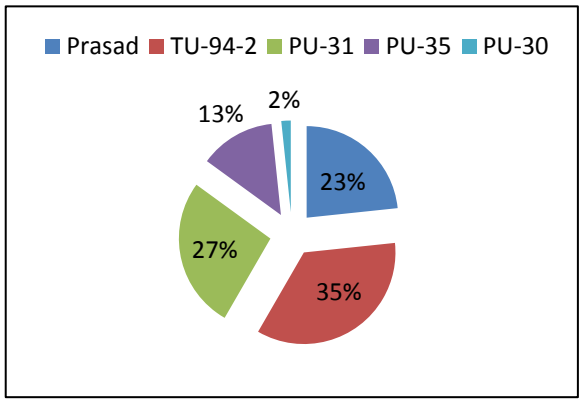
4.1: Results

For the production of quality seeds, seed production programs are undertaken under OSSC Ltd, through its seed production programs. During the rabi 2014-15, seed production programme was undertaken for the production of different varieties of black gram and green gram among 124 registered seed growers in Puri district. Among them 59 and 65 seed growers were registered under black gram and green gram constituting about 47.58 percent and 52.14 percent of the growers respectively. However there were few seed growers who have also registerd for seed production of different varieties of single crop as well as of both green gram and black gram. Out of the total 474 hectares area under pulse seed production during rabi 2014-15 in Puri district, 47 percent and 53 percent of the total area under pulses have been registered under black gram and green gram respectively. About 96.6 quintals of seeds were supplied by OSSC Ltd constituting 44 quintals of black gram and 52.6 quintals of green gram.

Table 4.1 Varietal percentages of black gram seed growers registered under the seed production programme for rabi 2014-15 in Puri district

Varieties of black gram grown	No of seed growers	Percentage of seed growers
Prasad	14	23.72
TU-94-2	22	35.59
PU-31	16	27.11
PU-35	8	13.55
PU-30	1	1.69
Total	59	100

Figure 4.1 Varietal percentage of black gram seed growers registered under the seed production programme for rabi 2014-15 in Puri district



The Table 4.1 and Figure 4.1depicts the varietal percentages of black gram seed growers in Puri district. Out of total of 59 seed growers registered under the seed production programme of Puri for rabi 2014-15, certified seeds were provided for 5 varieties of black gram namely Prasad, TU-94-2, PU-31, PU-35 and PU-30. Highest percentage of seed growers i.e. about 35.59 percent were found to take up seed production of the variety TU-94-2, followed by 27.11 percent for PU-31. Likewise 23.72 percent, 13.35 percent and 1.69 percent of total seed growers of black gram had taken seed production program of Prasad, PU-35 and PU-30 respectively.

Likewise for green gram, the varietal percentage of registered seed growers has been depicted in table 4.2 and figure 4.2. Out of total of 65 seed growers registered under the seed production programme for rabi 2014-15, foundation seeds were provided for 4 varieties of black gram namely prasad, Tarm-1, SML-668, COGG, Pusa Visal. Highest percentage of seed growers i.e. about 58.46percent were found to have registered and provided with foundation seeds by OSSC Ltd for the certified seed production of the variety Tarm-1, followed by 38.46percent of seed growers for the variety SML-668, 1.53percent of total seed growers each under the varieties COGG and Pusa visal.

Table 4.2 Varietal percentage for green gram during seed production programme of rabi 2014-15 in Puri district

Varieties of green gram grown	No of seed growers	Percentage of seed growers
Tarm-1	39	58.46
SML-668	25	38.46
COGG	1	1.53
Pusa visal	1	1.53
Total	65	100

Figure 4.2 Percentage of green gram seeds by OSSC during seed production programme of rabi 2014-15 in Puri district

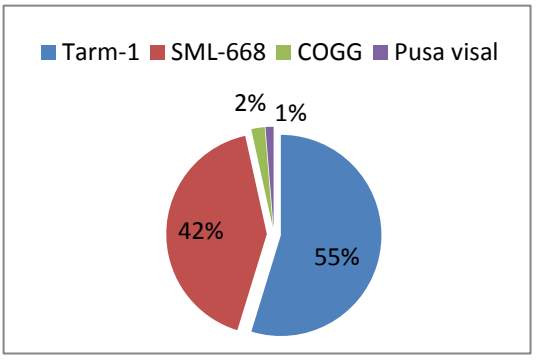
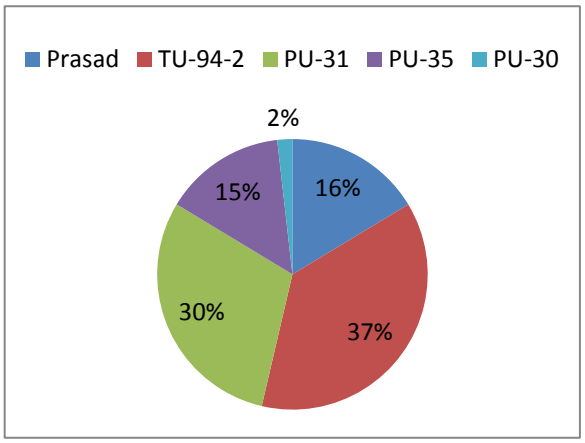


Table: 4.3.Variety wise actual distribution of black gram seeds by OSSC Ltd during seed production programme of rabi 2014-15 in Puri district

Variety	Quantity of seed distributed by OSSC Ltd (quintals)	Percentage of seeds distributed by OSSC Ltd
Prasad	7.2	16.36
TU-94-2	16.40	37.27
PU-31	13.20	30
PU-35	6.4	14.54
PU-30	0.8	1.8
total	44	100

Figure4.3 Percentage of different varieties of black gram seeds distributed by OSSC Ltd during seed production programme of rabi 2014-15 in Puri district



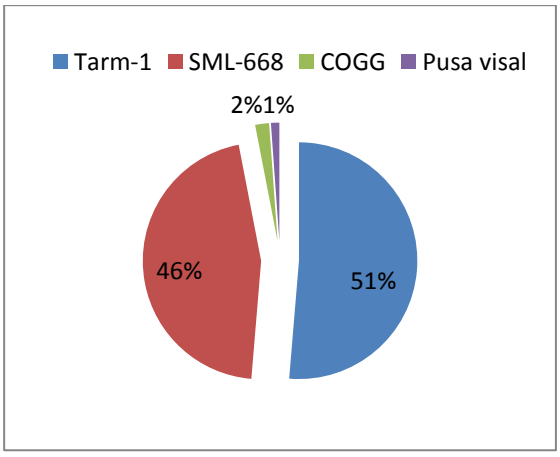
Out of the total quantity of 44 quintals of black gram seeds supplied to the seed growers of Puri district, highest percentage has been supplied for the variety TU-94-2 i.e 16.40 quintals constituting about 37.27percent followed by 30 percent in PU-31 and rest other varieties, as

depicted in Table4.3 and Figure 4.3. Out of these few seeds were also registered for foundation seed production and were provided with certain varieties of green gram and black gram.

Table: 4.4 Variety wise actual distributions of green gram seeds by OSSC Ltd during seed production programme of rabi 2014-15 in Puri district

Variety	Quantity of seed distributed in quintals	Percentage of seeds distributed by OSSC Ltd
Tarm-1	27	51.3
SML-668	24	45.62
COGG	1	1.9
Pusa visal	0.6	1.14
total	52.6	100

Figure4.4 Percentage of different varieties of green gram seeds distributed by OSSC Ltd during seed production programme of rabi 2014-15 in Puri district



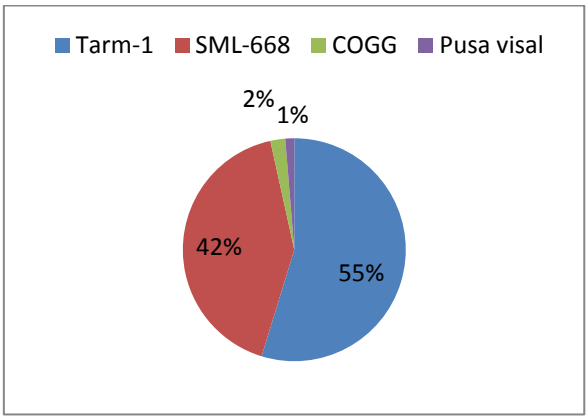
Similarly Table 4.4 and Figure 4.4 in case of green gram, the highest percentage of seeds has been distributed for varieties like Tarm-1 and SML-668 constituting about 51.3 percent and 45.62 percent respectively out of total quantity of 52.6 quintals. Out of this 1 quintal breeder seed was provided for the variety COGG and 4.2 quintals of breeder seed for Tarm-1 and 0.6 quintals for Pusa visal.

The Table4.5 and Figure4.5 depicts the varietal diversity of green gram for certified seed production undertaken under the seed production program during rabi 2014-15 for Puri district. It is evident that the highest percentage of land has been registered under TU-94-2 followed by the variety PU-31 in green gram. Out of 66 hectares of registered area for certified seed production for black gram under PU-31, 3 hectares have been registered for production of foundation seed from breeder seed.

Table 4.5 Varietal diversity of green gram under the seed production programme for rabi 2014-15 in Puri district

Varieties	Area covered in hectares	Percentage of land under different varieties
Tarm-1	127	54.74
SML-668	97	41.81
COGG	5	2.15
Pusa visal	3	1.3
Total	232	100

Table 4.5 Varietal diversity of green gram seeds under the seed production programme for rabi 2014-15 in Puri district

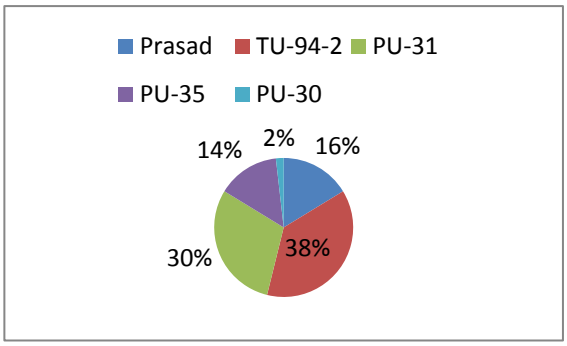


Similarly from table 4.6 and Figure 4.6 representing the varietal diversity of black gram under seed distribution programme in Puri, it can be observed that the variety Tarm-1 has about 55 percentage of land registered under it. Out of total of 232 hectares registered under green gram, 29 hectares constituting about 12.18 percent has been registered for foundation seed production. This includes 21 hectares under Tarm-1, 5 hectares under COGG and 3 hectares under Pusa visal.

Table 4.6 Varietal diversity of black gram seeds under the seed production programme for rabi 2014-15 in Puri district

Variety	Area covered in hectares	Percentage of land under different varieties
Prasad	36	16.28
TU-94-2	83	37.55
PU-31	66	29.86
PU-35	32	14.47
PU-30	4	1.80
Total	221	100

Figure 4.6 Varietal diversity of black gram seeds under the seed production programme for rabi 2014-15 in Puri district



4.1.1: Method of establishing crops by farmers:

The Paira method of sowing is usually followed by the farmers mostly in coastal districts of the state, including certain parts of Puri. 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 is harvested carefully so as not to cause any damage to the pulses. The seed rate used by this method was approximately around 45 kg. It

is observed from the study that farmers mostly follow paira method than sole cropping because of being efficient and cost effective. Also in coastal districts pulses are mainly grown during rabi in rice fallows under available moisture conditions whereas they are grown as sole or mixed crops in inland areas.

4.1.2: Awareness about seed replacement rate:

Seed Replacement rate is the most crucial factor responsible for enhancing the production and productivity. So awareness regarding the seed replacement rate is necessary. The statistics represent that most of the farmers are aware of SRR, but initiatives should be taken for those who are unaware of it because for better yield and production farmers need to replace the old varieties with new improved seeds with better attributes and germination potential. Though significantly not aware of SRR, the factors like word of mouth have led farmers to replace the old varieties with the new ones. Word of mouth is the one of the cheapest and the most effective medium for dissemination of any information and it is the method through which most farmers and growers have come to know about the benefits of replacing the old varieties with new ones and have adopted those varieties. Also the knowledge about the use of better quality seeds through mass media, demonstrations and extension programmes etc have caused them to adapt improved varieties and they have seen significant changes in their crop yield by using them.

4.2: Discussion

4.2.1: Growth in area, yield and production of pulses in Odisha

The area, production and productivity of pulses in Odisha are placed in table 4.1. It shows that area under pulses has been increasing since 2002-03 onwards, excepting that of in 2011-12 where it had decreased. Though increasing, there is still vast scope for increasing the area under the pulses in the state. Though productivity has exhibited an increasing trend, the yield is too low as compared to national average. The reasons for low productivity is non-availability of suitable high yielding varieties of green gram (moong) & black gram (biri) grown in rice fallows in pre-rabi & rabi seasons. Besides, they are grown under poor management practices. Pulse crops are comparatively less remunerative when grown without fertilizer broadcasted under residual moisture. Further, the area under pulses is replaced by high value crops like vegetables. Thus, attempts are being made to bring more area under

pulses crops through adoption of mixed cropping, crop rotation, paddy bund plantation and introducing appropriate varieties suitable for cultivation in the state.

Table 4.7: Area, production & productivity of pulses crops in Odisha

Year	Area (lakh ha.)	Productivity (Kg/ha.)	Production (Lakh Mt.)
2000-01	13.9	365	5.1
2001-02	17.4	400	6.9
2002-03	13.1	349	4.6
2003-04	16.4	379	6.2
2004-05	16.5	378	6.2
2005-06	18.8	422	7.9
2006-07	19.50	444	8.6
2007-08	19.8	458	9.1
2008-09	20.0	497	9.9
2009-10	20.92	460	9.63
2010-11	20.85	481	10.01
2011-12	19.98	493	9.85
2012-13	20.42	508	10.37
2013-14	20.88	507	10.58

Area, yield and production of pulses have been growing at an average annual compound growth rate of 3.11, 2.94 and 6.14 percent respectively during the period from 2000-01 to 2013-14.

4.2.2: Seed Replacement Rate

The Seed Replacement Rate (SRR) refers to the percentage of area of a particular crop in which improved / certified seeds are used in a given crop season to the total cropped area under that crop. According to many agricultural scientists, one of the main reasons for the low productivity of many food crops in Odisha is the poor Seed Replacement Rate (SRR). As low seed replacement rate was one of the identified factors for low productivity and production in the state, the State Action Plan, SAP 2008 as well as Annual Action Plans gave much emphasis on enhancing the SRR. The SRR of pulse crops like arhar, urad, moong etc *in* the state remained below five percent in the absence of any target set for SRR under State Action Plan.

Table: 4.8: Seed replacement rate of pulses in Odisha

Crop	2010-11			2011-12			2012-13			2013-14			2014-15		
	Kh.	Ra.	Total	Kh	Ra	Total	Kh	Ra	Total	Kh	Ra	Total	Kh	Ra	Total
Moong	1.57	5.44	4.39	1.88	2.62	2.41	1.32	3.47	2.88	3.27	9.13	7.68	1.72	5.92	4.89
Urad	1.21	5.65	3.67	3.27	3.72	3.52	2.39	2.02	2.19	1.95	5.47	3.98	3.51	0.29	1.54
Gram		5.33	5.33		5.67	5.67		1.43	1.43		6.80	6.80		3.65	3.65
Arhar	1.43		1.43	4.75		4.75	4.14		4.14	7.62		7.62	5.48		5.48
Field pea		13	13		10.94	10.94		1.99	1.99		6.58	6.58		2.04	2.04

Source: Directorate of Agricuture, Government of Odisha

The table 4.10 depicts seed replacement rate of major pulses in Odisha during 2010-11 to 2014-15. The table reveals that SRR remained highest for arhar during 2014-15 which was about 5.48, while for rest of the pulses it remained below five. But during rabi 2014-15, the SRR of green gram (moong) was above five i.e.5.92. During 2012-13, the SRR for all the five major pulse crops was well below five percent, with the highest for arhar being at 4.14, where as in 2013-14, SRR remained above five for all the pulse crops excepting for urad which was 3.9. The SRR for green gram (moong) has shown a fluctuating trend from 4.39 in 2010-11, gradually decreasing to 2.41 in 2011-12, slightly increasing to 2.88 in 2012-13, then suddenly rising to 7.68 percent during 2013-14 and again declining to 4.89 percent in 2014-15. The SRR for urad has been abysmally low throughout the period from 2010-11 to 2014-15, with just 1.54 during the 2014-15. It is dismal in comparison to other pulse crops. SRR for field pea was quite high during 2010-11 and 2011-12 but surprisingly it fell down drastically to just 1.99 during 2012-13, suddenly increased to 6.58 in 2013-14 and then declined to 2.04 during 2014-15. The table also depicts that while both moong and urad are grown both during the rabi and kharif seasons in Odisha, gram and field pea are raised only during rabi and arhar during kharif only. It is noticed that compared to kharif, pulses have better SRR during the rabi seasons.

National seed plan envisaged SRR of 33 for self pollinated crops but the state has failed to achieve that.Some of the reasons for non-achievement of the targeted SRR were found to be non-supply of adequate quantity of seeds in time, sale of substandard seeds to farmers and shortage of extension staff.

4.2.3 Seed Distribution Process.

In Odisha, pulse seed production program is taken up by OUAT, OSSC Ltd, OAIC and Department of Agriculture. OUAT is responsible for production of breeder seeds. To limited scale, OUAT also produces foundation seeds. OSSC Ltd/OAIC through their registered seed growers and in their own farm produces foundation and certified seeds. A substantial quantity of foundation seeds and certified seeds are produced in the Agriculture Department farms. At present scenario, a large no of private entrepreneurs are coming forward to take a vital role in certified seed production as well as in marketing of seeds in Odisha.

- Requirement of breeder seeds for the state is decided by a committee comprising of the representatives from OUAT, OSSOPCA, OSSC Ltd and Directorate of Agriculture.
- The committee decides the quantity as well as varieties basing on the seed rolling plan for certified seeds and Seed Multiplication Ratio (achieved) of different crops.
- The variety wise requirement are discussed at the kharif and rabi seed meeting held at seed division of the DAC, Government of India and breeder seed indent is placed with the different pulse research stations located within and outside the state.
- The indented breeder seeds are allocated by the GOI for lifting by the indenting agency. In Odisha, the OSSC Ltd and OAIC are the nodal agencies for lifting of all type of Breeder seeds.
- A State level monitoring team comprising officers from Department of Agriculture, OSSOPCA, OUAT, NSC, OSSC Ltd have been formed to monitor the production of breeder seeds. The Joint Director of Agriculture (Farm & Seeds) is the Chairman of the Breeder seed monitoring team.
- The seed growers being the registered seed growers are the members of OSSC Ltd. They obtain their seeds from OSSC Ltd and after conversion from breeder to foundation, foundation to certified and certified seeds to certified C_1 and C_2; seeds are procured by OSSC Ltd. In case these seeds fail the minimum seed standard norms, OSSC Ltd can reject the lot after laboratory testing.
- After the seeds are harvested they are sent for seed testing laboratories. For testing, samples are collected at three phases from the seed lot; Guard's sample, farmer's sample and laboratory sample. At seed testing laboratories after examining for the required moisture content and permissible content of ODB mixture, if the lot is rejected then the growers have to pay double the processing charge of Rs 40 in addition to the price of Rs.13.50 per gunny bag and Rs.4 per thiram packet and take

their lot back. OSSC Ltd has its own seed testing laboratory at Santarapur, old town, Bhubaneswar.

- As per the prescribed norms the maximum registration permitted for each seed grower is limited to only 10 hectares and the registration fees is Rs 275 per hectare for seeds to be converted to certified from foundation seeds and it is Rs 327 per hectare for conversion of breeder seeds to foundation seeds.
- Different varieties of green gram and black gram are mainly grown in the rabi season as the conditions are favourable for growing pulses

4.2.4: Production of foundation seeds:

At present required quantity of foundation seeds are produced in Government farms, farms with OSSC Ltd. and OUAT farms and in some cases in the field of registered seed growers of OSSC Ltd/OAIC having good experience in seed production, so that there is proper utilization of the precious breeder seeds that will make available the required quantity of foundation seeds of desired varieties. The foundation seeds are produced under the vigilant supervision of the OSSOPCA before certifying the produce. In case of unfavorable conditions, to meet the requirement both for Foundation and certified seed, the state also depends upon the outside state agencies.

As during production and procurement of seeds there may be loss of 10% of the total production. To meet the shortage, it is planned to produce at least 10% more quantity of foundation seeds than the calculated requirement. The table 4.9 represents the amount of foundation seeds produced by registered seed growers of OSSC LTD Ltd. in different districts under for the last 10 years starting from 2004-05 to 2013-14.

It is observed from the table 4.9 that the production of foundation seeds is highest for black gram and green gram in comparison to other pulse crops seeds, followed by arhar, gram and field pea. In fact more districts are also involved in the foundation seed production of green gram i.e about 10 districts and for Black gram it is almost 7 districts, which indicates that both these crops are suitable for a variety of agro climatic zones and so are grown on a wide scale throughout the state. The district of Balasore has been producing the highest amount of foundation seeds, followed by Puri district, then Cuttack. Puri district is actively involved and contributes substantial amount to foundation seed production in Odisha.

Table: 4.9: Production of Foundation Seeds of different types of pulses in Odisha during 2004-5 to 2013-14 (Qts)

District	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14
ARHAR										
Ganjam	0	9	0	13.7	0	0	0	0	0	0
Bargarh	0	6	0	28.72	0	0	0	0	0	0
Sundargarh	8.7	12.6	0	0	0	0	0	0	0	9.04
Total	8.7	27.6	0	42.42	0	0	0	0	0	9.04
BLACK GRAM (BIRI)										
Ganjam	4	0	0	0	0	4.16	0	0	4	0
Khurda	0	6	12.2	120	0	0	0	0	78	39.64
Puri	12	9	16.4	172.31	8.2	15.8	59.6	112	100	40
Balasore	12.08	12.6	19.3	394.6	30.6	63.36	204.12	100.2	143.36	180
Bhadrak	0	3.02	12.6	180.3	12.4	0	0	70	20	51
Cuttack	14	5.3	18.9	115	9	13.32	0	86.9	0	4
Koraput	0	0	13.65	0	0	0	0	0	1.44	0
Total	42.08	35.92	93.05	982.21	60.2	96.64	263.72	447.1	346.8	314.64
GREEN GRAM (MOONG)										
Balasore	26.67	28.69	24.6	0	0	30.56	117	60	28.12	35
Bhadrak	0	12	8.2	0	0	0	100.64	39.2	0	20.56
Mayurbhanj	0	0	5.92	0	0	0	0	0	0	19.96
Khurdha	0	6.4	6.6	0	0	22	59.64	137.2	18.8	70
Puri	3	9	12	0	3.64	0	70	117.2	58.4	100.6
Cuttack	15	0	16.4	0	0	1.6	0	0	0	0
Jagatsingpur	0	0	0	0	0	0	0	0	0	0
Ganjam	12	0	0	0	0	20.78	64.93	28.68	37.76	6
Koraput	0	0	0	0	0	0	0	0	7.92	0
Kalahandi	0	0	0	0	0	14.96	0	0	0	0
Total	56.67	56.09	73.72	0	3.64	89.9	412.21	382.28	151	252.12
FIELD PEA										
Koraput	6.22	5.18	0	0	0	9.6	15.2	0	0	0
Bargarh	0	0	7.2	0	0	0	0	0	0	0
Total	6.22	5.18	7.2	0	0	9.6	15.2	0	0	0
GRAM										
Bargarh	6.75	7.8	4.8	0	0	0	0	0	0	0
Puri	0	0	0	0	0	52.72	0	0	0	0
Total	6.75	7.8	4.8	0	0	52.27	0	0	0	0

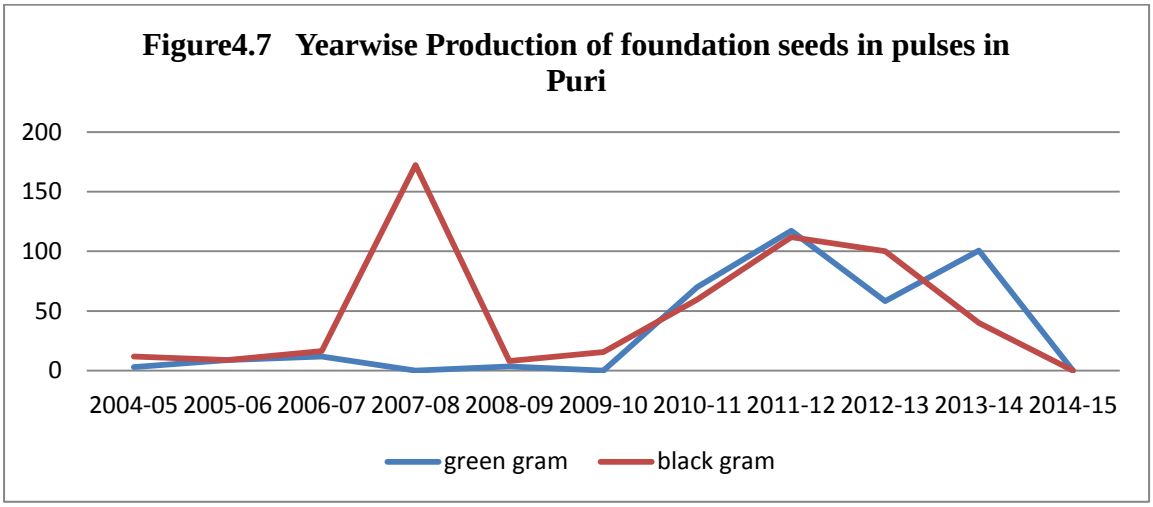
Source- OSSC Ltd

Table 4.10 depicts production of foundation seeds of green gram and black gram in Puri. Increasing trend in the production of foundation seeds of pulse crops of greengram and black gram is an indication that more seed growers have taken up seed production in the district of Puri. The production of foundation seeds for black gram has been higher in comparison to green gram. After an initial low production for both the crops, black gram seed production greatly increased during 2007-08 and then sharply declined, while production for green gram

seeds following a very low production till 2009-10. Afterwards the production for both increased Figure4.7 depicts the line graph for this trend..So it is inferred that Puri contributes a substantial share to foundation seed production of Odisha.

Table: 4.10 Production of foundation seeds of green gram and black gram in Puri from 2004-05 to 2013-14(Qts)

Puri	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14
Green gram	3	9	12	0	3.64	0	70	117.2	58.4	100.6
Black gram	12	9	16.4	172.31	8.2	15.8	59.6	112	100	40

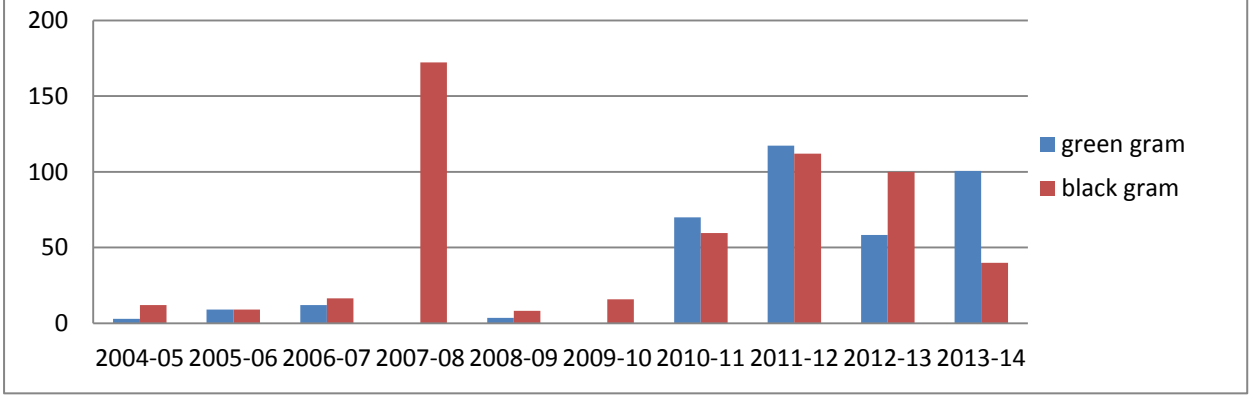


The table 4.11 reveals that Puri has been actively involved in the production of foundation seeds under OSSC Ltd. Initially the share of Puri in production of foundation seeds was low at 5.29 percent for green gram while it was about 28.51 percent for black gram. Puri achieved 28percent share again in 2012-13 which was the highest in last 10 years. During 2008-09, Puri produced the entire amount of green gram foundation seeds for OSSC Ltd in the state, while in the successive years there was no production while for black gram it had increased in comparison to the preceding years. But the percentage share has gradually increased for last 5 years especially for moong and it was the highest of about 40% in 2013-14.The trend is graphically represented in Figure 4.8.

Table: 4.11 Year wise percentage share of Puri in the production of foundation seeds in Odisha

District	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14
Black gram	28.51	25.05	17.62	17.54	13.62	16.34	22.59	25.05	28.83	12.71
Green gram	5.29	16.04	16.27	0	100	0	16.98	30.65	38.67	39.9

Figure 4.8 Percentage share of Puri in the production of foundation seeds in Odisha



4.2.5: Production of certified seeds

The foundation seeds are used for multiplication/production of certified seeds, which are sold to the farmers for raising crops on a large scale. There is distribution of foundation seeds to the growers for multiplication of certified seeds. The seeds procured from from growers are processed, tagged, bagged and then sold as certified seeds to the farmers. The amount of certified seeds of various pulse crops for the period from 2004-05 till 2013-14 in different districts of Odisha produced and procured by the OSSC Ltd from various registered seed growers under its jurisdiction has been stated in table no.4.12

Mainly OSSC Ltd deals with seeds of different varieties of pulse crops namely, arhar, black gram, green gram, field pea and bengal gram. It is found that the production of certified seeds of green gram (moong) and black gram (biri) are higher in comparison to other pulse crops. Like foundation seeds, the production of certified seeds for green gram and black gram is also undertaken in more no of districts. In case of black gram (biri), the district of Balasore has been producing the highest amount of certified seeds and this has been gradually increasing. But the district of Puri isn't far behind and is gradually catching up as a major producer of certified pulse seed.

Table: 4.12 Production of certified seeds of pulses in Odisha during 2004-5 to 2013-14

District	2004-	2005-	2006-	2007-	2008-	2009-	2010-	2011-	2012-	2013-14

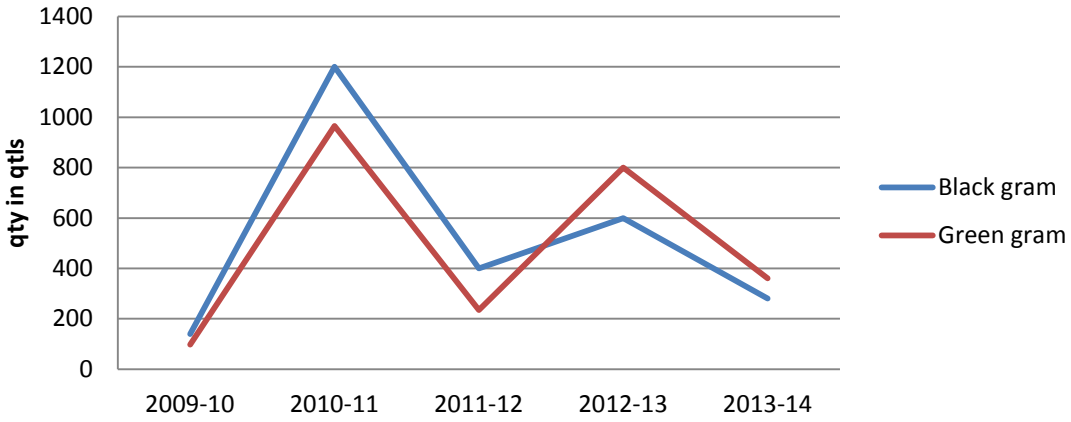
	05	06	07	08	09	10	11	12	13	
ARHAR										
Ganjam	0	0	0	0	0	0	0	0	0	8.6
Bargarh	35	50	34.48	49	1.88	0	2.2	0	0	0
Sundargarh	20.8	25	0	34.53	0	0	0	7	0	0
Raygada	0	0	0	0	0	0	0	8	0	0
Bhawanipatna	0	0	0	0	0	0	0	6	0	0
Total	55.8	75	34.48	83.53	1.88	0	2.2	21	0	8.6
BLACK GRAM (BIRI)										
Koraput	0	0	0	0	0	0	0	0	0	19.26
Balasore	275	202	490.84	69.5	243.69	242	886.04	30	1098	641
Cuttack	91.7	52	325	0	60	100.33	600	22	482	34
Bhadrak	84	38	175	0	40	60	120	18	0	108
Khurda	0	0	0	0	0	0	80	100	651.98	163
Ganjam	0	0	0	0	0	0	0	0	27.06	0
Bolangir	0	0	0	0	0	0	0	0	6.48	0
Puri	0	0	0	0	0	140	1200	400	600	280.2
Total	450.7	292	990.84	69.5	343.69	542.33	2886	570	2865.6	1245.46
GREEN GRAM (MOONG)										
Balasore	1016	415	446.44	36.84	193	215.35	801.91	147	1926.6	280
Cuttack	206.24	52	325	0	56	48.3	410	57	0	31.96
Bhadrak	86	81	175	0	41.96	60	95	0	400	30.92
Mayurbhanj	0	0	0	0	0	0	0	0	0	9.08
Bolangir	0	0	0	0	0	0	0	0	56.32	0
Ganjam	0	0	0	0	0	0	0	0	194.92	16.12
Malkangiri	0	0	0	0	0	0	0	0	5	0
Koraput	0	0	0	0	0	0	0	0	32.4	23.2
Khurdha	0	0	0	0	0	0	125	126	560.4	235.72
puri	0	0	0	0	0	98	965	235	800	360
Total	1308.2	548	946.44	36.48	290.94	421.65	2396.9	565	3975.6	987
FIELD PEA										
Ganjam	0	5	0	1.88	0	0	10.4	10	0	0
Jeypore	0	0	0	0	0	0	9	0	0	0
total		5	0	1.88	0	0	19.4	10	0	
GRAM										
Khurdha	0	0	0	0	0	0	0	0	22.2	52.32

Source- OSSC ltd.

Table: 4.13 Production of certified seeds in Puri from 2009-10 to 2013-14

District	2009-10	2010-11	2011-12	2012-13	2013-14
Black gram	140	1200	400	600	280.2
Green gram	98	965	235	800	360

Figure 4.9 Yearwise production of certified seeds of pulses in Puri

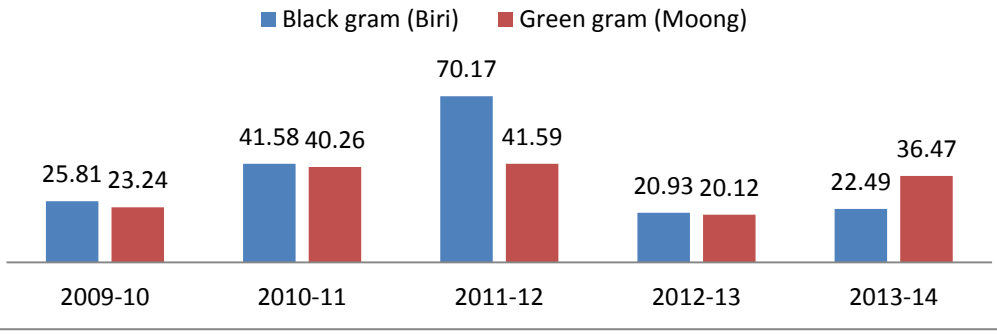


The table 4.13 depicts that Puri has a major share in the production of certified seeds for both black gram and green gram in Odisha, though it has been in the seed production process of black gram and green gram since last 5 yrs only, while districts of Balasore, Cuttack and Bhadrak have been in this field for last 10yrs. After an initial increase from 2009-10 to 2010-11 the certified seed production decreased in 2011-12. It increased in the succeeding year.

Table: 4.14 Year wise percentage share of Puri in the production of certified seeds in Odisha

District	2009-10	2010-11	2011-12	2012-13	2013-14
Black gram (biri)	25.81	41.58	70.17	20.93	22.49
Green gram (moong)	23.24	40.26	41.59	20.12	36.47

Figure 4.10 Percentage share of Puri in Certified seed production



The district of Puri also takes the major share in the production of certified seeds for black gram and green gram(Table 4.14). .Puri produced about major share of 41.58 percent and 40.26 percent black gram and green gram repectively during 2010-11.It even produced more

than 70% of certified seeds produced in whole of Odisha.The share of Puri in the last 5 years has not been below 20 percent.

So going by the trend it can be inferred that there is good potential for pulse seed production in Puri and it can gradually increase and take a major share in pulse seed production and come at par with major pulse producing districts of Balasore and Cuttack.

4.2.6: Certified seed Production by MOU farms

In addition to registered seed growers, OSSC Ltd also involves various MOU farms for production and procurement of certified seeds.MOU farms are the private farms that have made agreements with OSSC Ltd to undertake seed production on regular basis as per the need of OSSC Ltd. Table4.15 indicates the amount of certified seeds procured by OSSC Ltd from various village and MOU (memorandum of understanding) farms from 2010-11 to 2013-14

Table: 4.15 Procurement of certified seeds from Seed Village Scheme & MOU Farms during 2010-11 to 2013-14 (Qty in Qtls)

Sl.no	Crop	Class	2010-11	2011-12	2012-13	2013-14
1	Arhar	C	2.20	21.00	0.00	18.60
2	Black gram (Biri)	C	2886.04	4149.00	2865.56	1275.12
3	Green gram (Moong)	C	2396.91	4284.00	3975.64	1070.46
4	Field pea	C	19.40	10.00	0.00	0.00
5	Gram	C	0.00	0.00	22.20	0.00
	Total		5304.55	8464	6863.4	2364.18

The table 4.15 shows that the seed production by MOU farms has been the highest for both green gram (moong) and black gram (biri) in comparison to other pulse crops. The production by these farms has increased during 2010-12, but then followed a declining trend, amounting to just 1275.12 quintals and 1070.46 quintals for black gram and green gram respectively during 2013-14. The production and procurement for other pulse crops are abysmally low. The total procurement of certified seeds from Seed Village Scheme & MOU Farms was the highest during 2011-12, declining to 2368.18 quintals during 2013-14. So initiatives have to be taken up by OSSC LTD Ltd to encourage farmers under seed village scheme and MOU farms for production of quality pulse seeds in Odisha.

4.2.7: Seed Supply Position

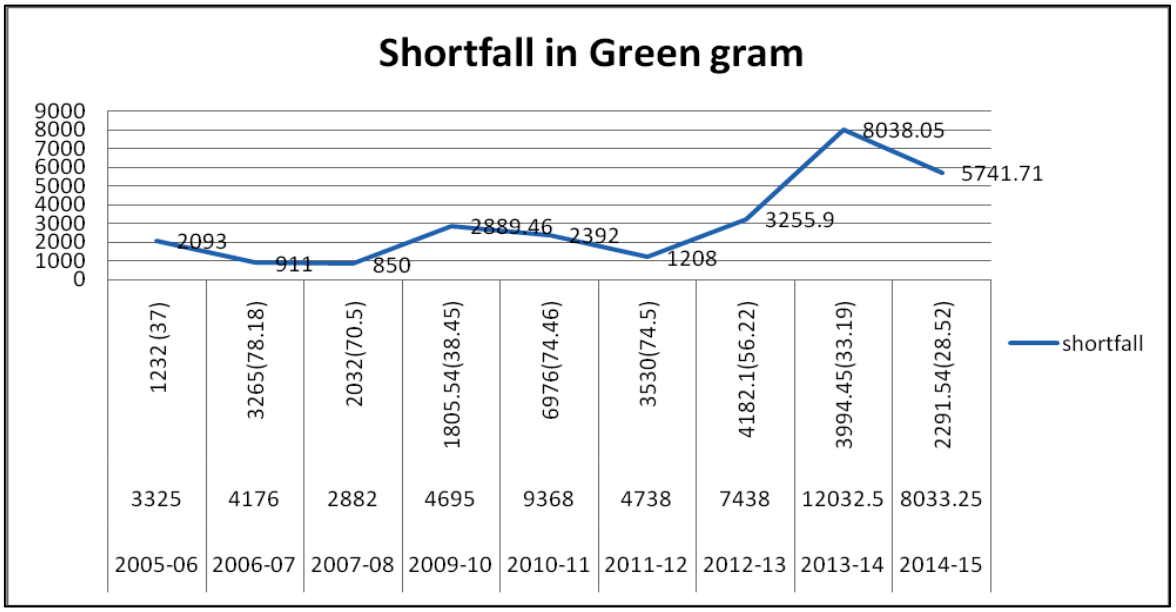
Seed supply position repesents the actual sale or distribution of seeds by OSSC Ltd. It actually indicates the difference beween the indent of seeds placed with OSSC Ltd and the

actual sales. After the seed indents have been placed, OSSC Ltd takes a note of the seed stock available with it and in case of deficit, procures stocks from outside agencies or states and supplies the total amount as per the indent placed. But there has been huge deficit in the amount of seeds supplied to that of indent placed with the OSSC Ltd, leading to huge gap between the total indent and total supply.

Table 4.16 Seed supply position for green gram seeds of OSSC Ltd

Year	Green gram		
	Indent (qty in qtls)	**Supply** (qty in qtls)	**Shortfall** (qty in qtls)
2005-06	3325	1232 (37)	2093
2006-07	4176	3265(78.18)	911
2007-08	2882	2032(70.5)	850
2008-09	6234	1788.53(28.6)	4445.47
2009-10	4695	1805.54(38.45)	2889.46
2010-11	9368	6976(74.46)	2392
2011-12	4738	3530(74.5)	1208
2012-13	7438	4182.1(56.22)	3255.9
2013-14	12032.5	3994.45(33.19)	8038.05
2014-15	8033.25	2291.54(28.52)	5741.71
Total	**62921.75**	**31097.16(49.42)**	**31824.59**

Figure 4.11 Shortfall in the supply of quality seeds in green gram



Source-OSSC LTD Ltd. (*Figures in parentheses represent percentage achievement against indented quantity)*

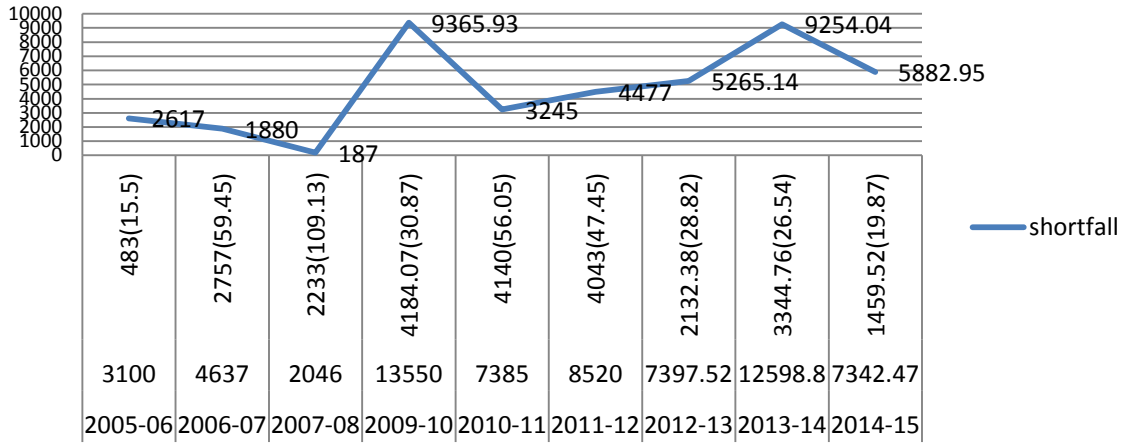
Table 4.16 presents the green gram seeds supplied by OSSC Ltd from 2005-06 to 2014-15.During 2005-15 the OSSC Ltd has supplied only 31097.16 quintals i.e just about 50

percent of the total, though the director placed indent for supply of 62921.75 quintals resulting in the short supply by 31824.59 quintals, i.e almost 50 percent. As may be seen from the table 4.15, the supply of green gram seeds declined from 78percentof indent in 2006-07 to just 28.52percent, during 2014-15.During 2010 -12 the supply rate was highest,around 75 percent of indent but then the supply gradually started decreasing leading to huge shortfall of seeds.The trend in the seed supply position is represented in Figure 4.12

Table 4.17 Seed supply position for Black gram seeds of OSSC LTD Ltd.

year	Black gram		
	Indent (qty in qtls)	**Supply (**qty in qtls)	**Shortfall (**qty in qtls)
2005-06	3100	483(15.5)	2617
2006-07	4637	2757(59.45)	1880
2007-08	2046	2233(109.13)	187
2008-09	5681	5507.83(96.95)	173.17
2009-10	13550	4184.07(30.87)	9365.93
2010-11	7385	4140(56.05)	3245
2011-12	8520	4043(47.45)	4477
2012-13	7397.52	2132.38(28.82)	5265.14
2013-14	12598.8	3344.76(26.54)	9254.04
2014-15	7342.47	1459.52(19.87)	5882.95
Total	72257.79	30284.56(41.91)	42347.23

Figure 4.12 Shortfall in the supply of quality seeds in black gram



SOURCE- OSSC Ltd. (*Figures in parentheses represent percentage achievement against indented quantity*)

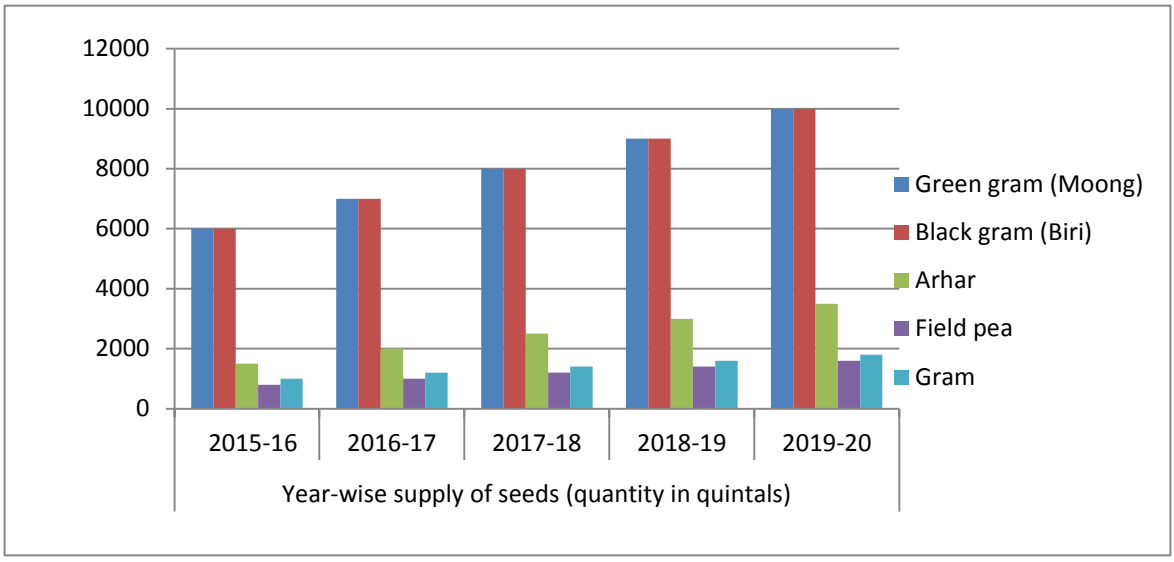
From the seed supply position of black gram in Odisha for the last ten years it is evident that, OSSC Ltd could supply only about 41.91 percent of the total indent (Table 4.17 and Figure 4.12). During 2007-08 the supply was higher than the indent and in the consecutive year it was about 96 percent of the total indent but during 2014-15 it was drastically declined to

about 20 percent supply of total indent. It is seen that OSSC Ltd has not been able to provide seeds as per the demand. Though a formal body, there are anomalies in the production and efficient distribution of seeds by OSSC Ltd. So efforts should be taken to look for reasons for this huge deficit and steps should be taken for effective management of seed supply and distribution.

Table 4.18 Production programme & arrangement for supply of certified seeds during 2015-16 to 2019-20 by OSSC Ltd

Sl.no	Crop	Year-wise supply of seeds (quantity in quintals)				
		2015-16	2016-17	2017-18	2018-19	2019-20
1	Greengram (Moong)	6000	7000	8000	9000	10000
2	Blackgram (Biri)	6000	7000	8000	9000	10000
3	Arhar	1500	2000	2500	3000	3500
4	Field pea	800	1000	1200	1400	1600
5	Gram	1000	1200	1400	1600	1800

Figure 4.13 Year wise plan for the production of certified seeds in pulses by OSSC Ltd.



The OSSC Ltd has already planned and set target for the production of certified seeds from its different sources for the next five years 2015-16 to 2019-20 as depicted in Table 4.18. It has set a target to achieve 10000 quintals of certified seeds each for black gram and green gram by 2020 and for this it have to take up efficient measures in the proper production, distribution and ,management of quality seeds.

4.2.8: Current practice on seed transaction in Odisha

- Seed indent are collected at gram panchayat level by the field level functionaries
- The indent are consolidated at district level and send to state level
- At state level, total seed requirement are placed to the seed corporation
- Additional seed indent arising due to flood, drought etc. are also collected.
- Accordingly breeder seed indent is placed with Government of India
- Breeder seed of different pulse crops are being procured by OSSC Ltd from different research institute both inside as well as outside the state
- Foundation seeds are produced at government farms, OSSC own farms, registered seed growers, MOU farms etc by sowing breeder seeds procured from the research institute in the following year.
- Certified seeds are produced by utilizing Foundation seeds produced earlier from breeder seeds through the registered seed growers/MOU farms etc
- Certified seeds thus produced are processed, tagged, bagged, tested for genetic purity, ODB, germination percentage etc and then sold to the farmers through OSSC own outlets, PACKS and its own dealer net work
- Transactions of seed and maintaining of records are done.
- Daily supply and sale position of seed are collected.
- Calculation of subsidized amount of seed are done and accordingly bills are prepared.

- After the seeds are harvested they are sent for seed testing laboratories. For testing, samples are collected at 3 phases from the seed lot; guard's sample, farmer's sample and laboratory sample. At seed testing laboratories, after examining for the required moisture content and permissible content of ODB mixture, if the lot is rejected then the growers have to pay double the processing charge of Rs.40 in addition to the price of Rs.13.50 per gunny bag and Rs.4 per thiram packet and take their lot back. OSSC Ltd has its own seed testing laboratory at Santarapur, Old town, Bhubaneswar.
- As per the prescribed norms the maximum registration permitted for each seed grower is limited to only 10 hectares and the registration fees is Rs 275 per hectare for seeds to be converted to certified from foundation seeds and its Rs 327 per hectare for conversion of breeder seeds to foundation seeds.
- Also it is found out that the subsidy provided to the seed growers in case of varieties of seeds released within 10 years is more than the varieties that have been released before 10 years. This is another step taken by the Government to encourage the seed growers

to use new varieties of quality seeds rather than using the old varieties. This huge difference in price of varieties due to subsidy has encouraged the seed growers to use new varieties, because gradually new varieties with better attributes are being developed and old varieties need to be replaced with new ones. And as per the view of the seed growers, with increase in seed replacement rate gradually the yield and productivity has also increased.

- For kharif 2015, the procurement price of certified seeds of green gram (moong) and black gram (biri) by OSSC Ltd from registered seed growers have been found to be Rs.9603 and Rs.8049 respectively which after inclusion of transportation charges of Rs.40 and loading and unloading charges of Rs.12 and subsidy are sold at Rs. 9655 and Rs.8041 for green gram (moong) for black gram (biri) respectively. For kharif 2014, the procurement price was Rs 9603 for green gram but for black gram it was Rs.7786.
- For kharif 2015, the price at which certified seeds are to be supplied to the farmers has been fixed at Rs.6000 and Rs. 5500 for varieties of green gram (moong) and black gram (biri). For kharif 2014, it was Rs. 4600 and Rs.4350 for different varieties of green gram (moong) and black gram (biri).The Government has set the prices low to encourage farmers to go for quality seeds that would benefit them, but certain farmers are ignorant about them and steps need to be taken to make them aware of the use of quality seeds in pulse prodution.
- For kharif, 2015 season the price has been hiked by about Rs.1000 for the foundation seeds of both green gram (moong) and black gram (biri). During rabi 2014-15, the sale of foundation seeds to farmers was fixed at Rs. 9466 and Rs. 7947 per quintal for green gram (moong) and black gram (biri) respectively while for Kharif 2015, it has been fixed at Rs. 9566 and Rs. 8047 respectively.
- There is no provision of any subsidy for foundation seeds.
- NFSM i.e. National Food Security Mission subsidy is also applicable in the respective district of its operation.
- OSSC Ltd has its own dealer network and PACS for the sale of quality seeds to the farmers. After procurement of seeds, the seed growers are paid through cheque, but most of them have been complaining about delay in payment and huge amount of outstanding with OSSC Ltd regarding their dues.

- Storage of seeds is also a major problem for traders, farmers and growers as well. Due to lack of proper storage facilities, seeds are susceptible to deterioration in quality mostly due to fungus infection and humidity followed by pests and other factors.
- The registered seed growers have been associated with OSSC Ltd since a long time Though they have been benefitted through their association with OSSC Ltd but, while some issues like the outstanding payments on OSSC Ltd, lack of support services, unavailability of certain desired varieties at the time of requirement etc add to the causes of dissatisfaction for certain seed growers. So OSSC Ltd should look into these matters and thoroughly monitor each process and maintain appropriate link with its beneficiaries.

4.2.9: Problems related to pulse seed production in Odisha.

- Breeder seeds are timely not available with the breeder seed producing institutes/universities resulting in non-lifting of breeder seeds.
- There are difficulties in achieving the seed multiplication rate in case of multiplication from breeder seed to foundation seed due to frequent natural calamities prevalent in Odisha .
- Lack of infrastructural facilities such as insufficient number of processing plants and storage go-downs for storing of the stock.
- Irregular power supply to the processing plant at the time of peak period of processing.
- Lack of adequate technical personnel of seed producing agencies for supervision of production programme.
- The OSSC Ltd along with the OSSOPCA who are the controlling authority in production and certification of seeds in the state are highly understaffed. Infrastructure facilities are too little and inadequate to produce and maintain quality standards of seeds. Immediate measures need to be taken to increase the production units under OSSC Ltd as well as certification centres with sufficient staff.
- Seed Testing Laboratories are quite inadequate to check the large quantities of seed lots being sent for testing. More seed testing laboratories are needed for better seed testing in 30 districts.
- There is non-availability of suitable variety of pulses mostly for green gram and black gram which accounts for more areas. That's why SRR is hardly 3-5 percent against the desired level of at least 10-15 percent.

- Pulses are mostly grown in marginal and sub- marginal lands in rain fed lands of Odisha. Also pulses are very sensitive to acidity and more than 70 percent land in Odisha is acidic, which hinders its cultivation.
- Canal irrigated lands are gradually becoming unsuitable for pulse cultivation due to water logging and farmers switching over to paddy crops.
- Productivity of pulses in rice fallows is becoming unsustainable due to deteriorating soil structure following puddling. Instead of sole crops pulses are mostly grown as mixed crops, intercrops and bund crops.
- Relatively less remunerative and poor market intervention leads the farmers not to invest more on costly inputs.
- Frequent attack of diseases like yellow mosaic virus and powdery mildew attack in pulses also hinders pulse production.
- Also there is poor storability and lack of storage facility.
- Stray cattle menace restricts the horizontal expansion.
- Poor land preparation in rice fallows in absence of suitable zero tillage implement

4.2.10: The seed production and distribution system in the state can be improved by the following initiatives

- More MOU farms should be encouraged to produce seeds within Odisha as the seeds produced inside the state are more acclimatized to our climatic conditions. In case of seeds brought from outside the state there is chance of occurring developmental variation and also the procurement cost of seeds will be higher due to extra transportation charges involved.
- At the time of collection of certification charges by the certification agency from the seed growers, premium may be collected towards insurance of their seed crop.
- Database information on seed growers/seed producing agencies and buyers/dealers may be developed online.
- In order to meet the demand of Odisha, sufficient quantity of breeder seeds should be produced by the breeder seed producing institutions.
- The breeder seeds of green gram (moong) and black gram (biri) having cold tolerant characteristics should be produced by the breeder seed producing institutions.
- New storage go-downs and processing plants should be established and existing plants should be upgraded.

- Strengthening of Seed Corporation, OAIC, Seed Certification Agency and Seed Testing Laboratory should be made.
- The seed production officer and seed certification officer should be posted at each district level.
- Vigorous training programmes should be conducted for the officials involved in seed production programme. State agricultural university (OUAT) should be actively involved in hybrid seed production and their research wing should be strengthened.

4.2.11: Scientific methods to be adopted

- Seed indenting system from gram panchayat level to state level can be made online, so that information from the end users can be assessed instantly. The end users will also be benefitted by knowing the variety wise availability of seeds at state level and can modify their indents accordingly.
- Data entry of the supply of seeds should be online, so that monitoring on supply of seeds will be easier and less time will be required for computing utilization of seed subsidy amount by district level and state level and accordingly the payments will be made to the parties quickly.
- Up-to-date supply, sale of different seeds can be assessed easily by online data entry. So that in case of natural calamities, supply of seeds as per contingent planning will be done quickly
- Registration of seed growers with the Orissa State Seed and Organic Product Certification Agency (OSSOPCA), testing of seed samples at seed testing laboratory and seed licensing system should be online.
- The information system by the OUAT/KVKs should be online, so that the farmers can assess release of new varieties and its characteristics, availability of breeder seeds, availability of foundation seeds, availability of certified seeds, different technical know-how, cost of cultivation of different crops, weather report etc.
- In order to increase the SRR, the no. of sale outlets need to be increased to make quality seeds available at farmer's door step.
- To encourage the farmers to use the quality seeds, new varieties which are superior over the older varieties need to be developed by the research institutions regularly in case of pulses, the cold tolerant varieties should be evolved by the SAU, which are suitable to pre-rabi sowing.

CHAPTER-5

SUMMARY AND CONCLUSION

5. SUMMARY AND CONCLUSION

The pulses form an integral part of the food security of the state of Odisha 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. The emphasis of the Government has, accordingly, been on increasing production of pulses through area expansion and adoption of improved technology so as to ensure the availability of pulses to the masses as per quantity recommended by ICMR. Equally important is the marketing of the pulses particularly in a situation created by the introduction of reforms in the sector and existing demand-supply gap in pulses. Shortage of supply of pulses has resulted in increase in prices, thereby pushing pulses out of the reach of poor household leading to a negative effect on their nutritional status. The increase in population, decrease in per-capita land availability and stagnation in pulses production has created a gap in demand and supply of pulses. National Pulses Development Programme now ISOPOM (Pulses), a centrally sponsored scheme, is in operation in the state since 2004 with objectives of expanding the area & increasing the productivity by incentivizing farmers through provision of subsidy for different seed & non seed components. Some of its important components are production of foundation seeds and certified seeds through seed village scheme, distribution of minikits, bio-fertilizers, farm implements, sprinkler sets at subsidized rates, organizing farmers training and block demonstrations etc.

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.

Also the seed replacement rate is very low which needs to be looked upon. In order to improve the overall Seed Replacement Rate the following issues need to be addressed

- Matching of shortfall between production and requirement supply of breeder seeds
- Systems and procedures to be followed for release of seeds developed by research establishments
- Processing and distribution channels / outlets for distribution with modification in the role of Government and private agencies
- Storage and preservation of seeds

- Extension services to make the farmers aware about the package of practices to be followed

- Focus should be made on providing market information using ICT and to make marketing an integral part of various programme of the Government like pulses promotion programme, extension programme, etc.
- High yielding and quality varieties of pulses capable of resisting disease need to be evolved and make available to the farmers.
- Suitable extension services, farmers training regarding new technology of pulse production should be imparted to the pulse growers.
- Irrigation facilities are to be created and developed in the proper way so that farmers can adopt improved technologies with assured irrigation facilities.
- It is essential to adopt the production system approach by linking the production technology, credit and marketing of major pulses.
- For some pulse crops improved seed has not been proved to be potential due to wide yield variability therein. Crop improvement work should take appropriate technology measures to improve upon these deficiencies.
- Adequate marketing facilities have not been made available to producers of pulse crop. State government should make arrangement to purchase pulses commodities through Cooperative Marketing Federation at Gram Panchayat level in major producing blocks especially during peak market period of respective pulse commodities.
- In tribal district, special marketing institution should be setup for those pulse commodities which are produced in these areas.
- Pulse-processing units at block level should be established and arrangements to procure pulses for these units and to sale finished product / by product may be made through small scale industry/processors on subsidized basis or by cooperative institution in tribal areas.
- Technical Training: The seed industry stretches all the way from genetic research, through varietal development, bulking up, certification, registration, production and marketing. Many of these topics are highly technical, and it needs well trained seed scientists and technologists. So training is an essential element for successful implementation of quality seed production, processing, storage and marketing

There cannot 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 hectares of 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

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 study undertaken was quite helpful in getting an idea about how the production and distribution of quality seeds is undertaken in Odisha and how the Orissa State Seeds Corporation Ltd is involved in the process. There are many problems in the qualitative production and distribution of pulse seeds. Both production and distribution are related to each other and both the aspects have direct bearing on the overall production and productivity of pulses in Odisha. Only seed production will not solve the problem, steps are to be taken to see the process and efficiency of their distribution among the farmers.

REFERENCES

REFERENCES

1. Harbir Singh, Prasoon Mathur and Suresh Pal Indian Seed System Development: Policy and Institutional Options *Agricultural Economics Research Review* Vol. 21 January-June, 2008 pp 21-23

2. Hardev Ram, S. Rajendra Prasad, Vijay Pooniya, Ummed Singh and Lalit Kumar, Quality Seed Production through Pulses Intervention in Rice-Wheat Cropping System *Popular Kheti*
3. *Volume -1, Issue-3* (July-September), 2013 PP 51-56

4. K. Parimala, K. Subramanian. S. Mahalinga Kannan and K. Vijayalakshmi 2013. A Manual on Seed Production and Certification, *Centre for Indian Knowledge Systems, Chennai,page-1,2,11,12*

5. K.vanngamudi et al (eds): Recent Techniques and participatory Approaches in quality seed Production, 2001, Tamil nadu agriculture university

6. R. Abarna Thooyavathy, Subhashini Sridhar,K. Subramanian and K. Vijayalakshmi 2013, Seed Production Techniques for Oilseeds and Pulses, Centre for Indian Knowledge Systems, Chennai

7. Mandal A. B, Sinha A. K and Natarajan S. 2010. Nucleus and breeder seed production manual. Directorate of seed research (DSR) Kushmaur, Mau- 275101 (UP).PP 84-85.

8. Morris, M. L. (1998) *Maize Seed Industries in Developing Countries*, Lynne Rienner Publishers, Colorado

Websites

1. www.gov.in
2. www.agricoop.in
3. www.odishaseeds portal.nic.in
4. www.ossc ltd

APPENDICES

APPENDIX-1

List of registered seed growers under green gram seed production programme during rabi 2014-15 for Puri district

Sl. no	Name	village	Gram Panchayat	Block	Variety	Class
1	Manmohan Das	Dandamukundapur	Dandamukundapur	Pipili	Pusa-visal	B
2	Chou. Laxmidhar Sahoo	Dandamukundapur	Dandamukundapur	Pipili	Tarm-1	F
3	Lingaraj Pradhan	Dandamukundapur	Dandamukundapur	Pipili	SML-668	F
4	Satyabadi Swain	Dandamukundapur	Dandamukundapur	Pipili	Tarm-1	F
5	Manmath das	Dandamukundapur	Dandamukundapur	Pipili	Tarm-1	F
6	Manmohan Das	Dandamukundapur	Dandamukundapur	Pipili	Tarm-1	F
7	Laxman Sahoo	Mangarajpur	Dandamukundapur	Pipili	Tarm-1	B
8	Madhusudan Pradhan	Mangarajpur	Dandamukundapur	Pipili	Tarm-1	F
9	Akshaya Ku. Pradhan	Mangarajpur	Dandamukundapur	Pipili	SML-668	F
10	Arun Ku. Pradhan	Abalapur	Dandamukundapur	Pipili	SML-668	F
11	Kailash Ch. Tanga	Mangarajpur	Dandamukundapur	Pipili	SML-668	F
12	Janardana Panda	Ranapur	Dandamukundapur	Pipili	Tarm-1	F
13	Kishore Ch. Pradhan	Kothabada	Dandamukundapur	Pipili	Tarm-1	F
14	Saroj ku. Sahoo	Kothabada	Dandamukundapur	Pipili	SML-668	F
15	Manmohan Das	Dandamukundapur	Dandamukundapur	Pipili	SML-668	F
16	Laxman Sahoo	Kulasekhar Patna	Dandamukundapur	Pipili	SML-668	F
17	Manmohan Das	Dandamukundapur	Dandamukundapur	Pipili	SML-668	F
18	Manoj Ku. sahoo	Abalapur	Dandamukundapur	Pipili	Tarm-1	F
19	Janardana Panda	Kadhimala	Dandamukundapur	Pipili	Tarm-1	F
20	Rajesh Ku. Panda	Ranapur	Dandamukundapur	Pipili	Tarm-1	F
21	Baikuntha Baral	Resinga	Kotakoshanga	Nimapada	Tarm-1	B
22	Chikun Baral	Resinga	Kotakoshanga	Nimapada	Tarm-1	B
23	Dillip Kumar Baral	Resinga	Kotakoshanga	Nimapada	Tarm-1	B
24	Pratap Parida	Resinga	Kotakoshanga	Nimapada	Tarm-1	F
25	Prasanta Ku. Tripathy	Rench sasan	Rench sasan	Nimapada	SML-668	F
26	Umakanta Tripathy	Rench sasan	Rench sasan	Nimapada	Tarm-1	F
27	Narayan Panda	Purusandha	Rench sasan	Nimapada	Tarm-1	F
28	Bhagirathi Panda	Purusandha	Rench sasan	Nimapada	Tarm-1	F
29	Jayanta Ku. Panda	Panidola	Panidola	Pipili	Tarm-1	B
30	Kanhu Charan Pradhan	Pipili NAC	Pipili NAC	Pipili	Tarm-1	F
31	Parikshita Pradhan	Pipili NAC	Pipili NAC	Pipili	Tarm-1	F
32	Dwijaraj Behera	Orakala	Orakala	Pipili	SML-668	F
33	Sudhakar Samantasinghar	Sadangoi Uttarbada	Chainpur	Delanga	Tarm-1	B
34	Sudhakar Samantasinghar	Sadangoi Uttarbada	Chainpur	Delanga	Tarm-1	F
35	Sukanta Ku. sahoo	Sadangoi Uttarbada	Chainpur	Delanga	SML-668	F
36	Subash Ch. Pradhan	Nuagaon	Arisol	Delanga	Tarm-1	B
37	Prasanta ku. Mahunta	Arisol	Arisol	Delanga	Tarm-1	F
38	Dhruba Charan samantaray	Rainsal	Arisol	Delanga	SML-668	F

39	Gyanaranjan Swain	Beroboi	Beroboi	Delanga	COGG	B
40	Ajay Ku. Parida	Buali	Beroboi	Delanga	Tarm-1	F
41	Sanjay Ku. Parida	Buali	Beroboi	Delanga	SML-668	F
					Tarm-1	B
42	Jogengdra Swain	Rench	Beroboi	Delanga	SML-668	F
43	Akrura Pal	Nuasasan	Nuasasan	Pipili	SML-668	F
44	Jayakrushna Rath	Srikanthapur	Nuasasan	Pipili	SML-668	F
45	Rajkishore Panda	Srikanthapur	Nuasasan	Pipili	Tarm-1	F
46	Santosh Ku.Sahoo	Jagannathpur	Jagannathpur	Pipili	Tarm-1	F
47	Madan Panda	Jagannathpur	Jagannathpur	Pipili	Tarm-1	F
48	Purna Ch. Pottayat	Jagannathpur	Jagannathpur	Pipili	SML-668	F
49	Pradeep Ku. nayak	Jagannathpur	Jagannathpur	Pipili	SML-668	F
50	Benudhar Swain	Harianta	Gobindpur	Pipili	Tarm-1	F
51	Dusasan Dalai	Aruha	Gobindpur	Pipili	SML-668	F
52	Ashok Pradhan	Totapada	kanti	Pipili	SML-668	F
53	Sudhira Sahoo	Anantpur	kanti	Pipili	SML-668	F
54	Ashok Pradhan	Mathasahi	kanti	Pipili	SML-668	F
55	Kailash Ch. Khatai	Bindha	poparanga	Pipili	Tarm-1	F
56	Suratha Swain	Poshala	Jenapur	Delanga	SML-668	F
57	Radhamohan Baral	Kumundala	Gudamotori	Delanga	Tarm-1	F
58	Prasanna rout	Godasitha	Payara	Gop	Tarm-1	F
59	Benudhar Das	Jaguliapada	Pubasasan	Pipili	SML-668	F
60	Benudhar Das	Laxminarayanpur	Laxminarayanpur	Pipili	Tarm-1	F
61	Rajkishore Nayak	Kakudikoshaya	Laxminarayanpur	Pipili	Tarm-1	F
62	Dhaneswar Parida	Athabatia	Mangalapur	Pipili	SML-668	F
63	Sarat Jena	Bantalsingh	Hatasahi	Pipili	SML-668	F
64	Balakrushna Pradhan	Tailasahi	Singh Berhampur	Delanga	Tarm-1	F
65	Balakrushna Pradhan	Singh Berhampur	Singh Berhampur	Delanga	Tarm-1	F

APPENDIX-2

List of registered seed growers under black gram seed production programme during rabi 2014-15 for Puri district

Sl.no	Name	village	Gram Panchayat	Block	Variety	Class
1	Manmath Das	Dandamukundapur	Dandamukundapur	Pipili	Prasad	F
2	Janardana Panda	Dandamukudapur	Dandamukudapur	Pipili	Prasad	F
3	Manmath Das	Dandamukundapur	Dandamukundapur	Pipili	TU-94-2	F
4	Manmath Das	Dandamukundapur	Dandamukundapur	Pipili	TU-94-2	F
5	Chou. Laxmidhar Das	Dandamukundapur	Dandamukundapur	Pipili	TU-94-2	F
6	Madhab Jena	Dandamukundapur	Dandamukundapur	Pipili	TU-94-2	F
7	Mukunda Tanga	Mangarajpur	Dandamukundapur	Pipili	TU-94-2	F
8	Gokula Tanga	Mangarajpur	Dandamukundapur	Pipili	PU-31	F
9	Ramesh Tanga	Mangarajpur	Dandamukundapur	Pipili	Prasad	F
10	Amulya Ku. Pradhan	Mangarajpur	Dandamukundapur	Pipili	PU-31	F
11	Ashok Ku. Pradhan	Mangarajpur	Dandamukundapur	Pipili	PU-31	F
12	Kailash Ch. Tanga	Mangarajpur	Dandamukundapur	Pipili	TU-94-2	F
13	Manoj Ku. Sahoo	Mangarajpur	Dandamukundapur	Pipili	Prasad	F
14	Sankarsan Pradhan	Kothabada No.3	Dandamukundapur	Pipili	PU-31	F
15	Kishore Chandra Pradhan	Kothabada No.3	Dandamukundapur	Pipili	TU-94-2	F
16	Banabihari Muduli	Abalapur	Dandamukundapur	Pipili	TU-94-2	F
17	Bhagirathi Panda	Ranapur	Dandamukundapur	Pipili	TU-94-2	F
18	Janardana Panda	Ranapur	Ranapur	Pipili	Prasad	F
19	Ramesh Ch. Mekap	Choudamana	Nuasasan	Pipili	PU-31	F
20	Akrura Pal	Choudamana	Nuasasan	Pipili	PU-35	F
21	Rabinarayan Sahoo	Choudamana	Nuasasan	Pipili	PU-35	F
22	Rabindranath sahoo	Choudamana	Nuasasan	Pipili	TU-94-2	F
					PU-35	F
23	Laxminarayan Sahoo	Nuasasan	Nuasasan	Pipili	PU-31	F
24	Laxmidhar Nayak	Jagannathpur	Jagannathpur	Pipili	TU-94-2	F
25	Madan Panda	Jagannathpur	Jagannathpur	Pipili	PU-35	F
26	Chitrasena Baral	Resinga	Kotakoshanga	Nimapada	Prasad	F
27	Chaitan Baral	Resinga	Kotakoshanga	Nimapada	Prasad	F
28	Dipak ku. Baral	Resinga	Kotakoshanga	Nimapada	PU-31	F
29	Ashok ku. Baral	Resinga	Kotakoshanga	Nimapada	PU-31	F
30	Pradipta Ku. Baral	Resinga	Kotakoshanga	Nimapada	Prasad	F
31	Dusasan Biswal	Kotakoshanga	Kotakoshanga	Nimapada	Prasad	F
32	Dusasan Biswal	Kotakoshanga	Kotakoshanga	Nimapada	PU-31	B

33	Maheswar Sahoo	Rench sasan	Rench sasan	Nimapada	TU-94-2	F
34	Prasantanu Tripathy	Rench sasan	Rench sasan	Nimapada	TU-94-2	F
35	Gadadhar Biswal	Haripur	Birapurusottampur	Pipili	PU-35	F
36	Dhruba charan Pradhan	Haripur	Birapurusottampur	Pipili	Prasad	F
37	Bijaya ku. Pradhan	Rupadeipur	Rupadeipur	Pipili	PU-30	F
38	Bijaya Ku. Pradhan	Rupadeipur	Rupadeipur	Pipili	TU-94-2	F
39	Kailash Ch. Khatai	Bindha	Bindha	Pipili	TU-94-2	F
40	Krushna Ch.Muduli	Durgadaspur	Durgadaspur	Pipili	TU-94-2	F
41	Benudhar Swain	Gobindapur	Gobindpur	Pipili	TU-94-2	F
42	Rajkishore Panda	Srikanthapur	Srikanthapur	Pipili	PU-35	F
43	Dusasan Dalai	Ruha	Aruha	Pipili	PU-31	F
44	Dusasan Dalai	Ruha	Aruha	Pipili	PU-31	F
45	Diptimaya Behera	Darada	Darada	Pipili	PU-31	F
46	Dwijaraj Behera	Orakala	Orakala	Pipili	PU-31	F
47	Jayanta Ku. Panda	Panidola	Panidola	Pipili	PU-31	F
48	Hemant ku Panda	Kadhimala	Kadhimala	Pipili	Prasad	F
49	Benudhar das	Ekchalia	Ekchalia	Pipili	TU-94-2	F
50	Umakanta Panda	Siula	Siula	Pipili	PU-31	B
51	Sarat Jena	Bantalsingh	Bantalsingh	Pipili	Prasad	F
52	Akshay Swain	Bilipada	Bilipada	Pipili	Prasad	F
53	Kanhu Charan Pradhan	Pipili NAC	Pipili NAC	Pipili	TU-94-2	F
54	Sukanta ku. Sahoo	Sadangoi Dakhinabada	Chainpur	Delanga	TU-94-2	F
55	Prasanta ku. Mahunta	Arisol	Arisol	Delanga	PU-35	F
56	Ajay Ku. Parida	Buali	Beroboi	Delanga	PU-35	F
57	Sarat ku. Swain	Pidhapatna	Beroboi	Delanga	TU-94-2	F
	Manoranjan Singh	Beroboi	Beroboi	Delanga	PU-31	F
58	Sridhar jena	Humara	Humara	Delanga	PU-31	F
59	Dhruba charan Samantaray	Rainsal	Rainsal	Delanga	TU-94-2	F

Survey on production and marketing of Black gram/Green gram seed in Odisha

Seed Growers - Case study on seed production

District:

Block:

Village:

Date of interview:

Seed grower's name:

If the seed grower purchase foundation seeds from or supply certified seeds to a private trader, please indicate the private trader:

Problems in obtaining Breeder/Foundation seed:

What problems do you encounter in obtaining certification as seed grower?

Land holding: Owned land:

Leased/Rented-in land:

Leased-out land:

Total land under cultivation:

3. During which season do you grow Black gram/Green gram seeds?

   Kharif / Rabi

4. What portion of the Black gram/Green gram area is used for Black gram/Green gram seed production during

   a. Kharif season(acre)

   b. Rabi season(acre)

5. Who decides on the variety and the area where the variety will be grown? Please explain further.

6. What varieties do you grow and to what extent are these varieties grown?

Variety	Breeder seed procured	Foundation seed procured	Proportion of Black gram/Green gram seed area (ac)	Seed produced (qt)

7. Where do you get Breeder/foundation seeds?

8. What are your sources of information on new varieties?

9. Do you have access to private agencies/individuals for the purchase of foundation seeds?

Yes / No

10. If yes, what are these sources?

11. Other than official recommendations on Black gram/Green gram varieties for seed production, are you aware of other new varietal releases? Yes / No

12. If yes, what are your sources of information?

13. If you were to choose between old and new varietal releases, would you be willing to grow new varietal releases? Yes / No

14. If yes, why?

15. Seed production practices

a. What is your basis of choosing the area in your farm where seed production is done?

Elevation

Source of irrigation

Soil fertility

Distance from residence

Others, specify

16. a. Does your production practice differ by variety? Yes / No

If yes, collect information on input use for seed production for each variety

b. Does your production practice differ by season? Yes / No

If yes, collect information on input use for seed production for each season

Production practices for each variety and season

a. Variety: ***Season:***

Area where input was applied (ha):

Inputs	*Amount*	*Cost*
Power for land preparation (source and time spent)		
Foundation seeds		
Fertilizers (by type)		

1.)

2.)

3.)

Rhizobium culture

Other chemicals / Micronutrients/ pesticides

FYM cost

Power for sowing seeds(bullock power)

Irrigation cost

Power for harvesting/threshing (source and time spent)

Labor

Land preparation

Crop establishment

Crop care (weeding and chemical application)

Rouging

Harvesting

Threshing

Post-harvest (drying, transporting)

Cleaning of seeds

Other inputs

Production:

Price of Black gram/Green gram seeds:

17. How do your production practices for seed production differ with grain production?

18. Where do you sell your Black gram/Green gram seeds?

19. What problems do you encounter in selling seeds?

20. What are the problems that you encounter in obtaining certification for your seeds?

21. Do you sell the seed right after harvest? Yes / No

22. If not, do you have problems of storing the seeds until it is sold? Please explain further.

23. What are the main problems and risks involved in seed production?

24. Is Black gram/Green gram seed yield changing in the past 10 years?
    Increasing / Decreasing / No change

25. What was the reason for the change?

26. Do you have access to credit for Black gram/Green gram seed production? Yes / No

27. If loan was obtained last year,
    a. Source of loan
    b. Amount borrowed
    c. Interest rate/year
    d. Collateral for loan

28. What problems do you encounter in obtaining the loan?
    a. Too many requirements Yes / No
    b. No collateral to use Yes / No
    c. Difficult to obtain approval even if all requirements are ready Yes / No
    d. Others, specify

29. Do traders provide credit to seed growers? Yes / No

30. If loan was obtained last year,
    a. Amount borrowed
    c. Interest rate/year
    d. Collateral for loan
    e. Other details

31. Is there a seed grower's association/cooperative aside from the ordinary farmer association?

32. If yes, please provide details of your membership:

a. Name of association

b. Purpose of association

c. Years of existence

d. Length of your membership

e. Benefits provided by association

e. Benefits gained by respondent

33. What programs on seed production did you participate in?

Please describe and, if possible, provide year of program implementation.

Program by implementer	Description
Government/NGO/Other agency	
Training	
Foundation seed price	
Subsidy	
Input price subsidy	
Others, specify	

34. What are the benefits that you gained from the programs?

Program by implementor	Benefit

35. Does the selling price of Black gram/Green gram seeds vary by variety? If yes, please provide prices.

Variety	Selling price (Rs/kg)

36. Are you engaged in contract farming for seed production? Describe the contract and how long have you engaged in it.

37. What other forms of technical support do you receive?

38. Problem of seed certification:

a) Whether problem in registration of area for seed certification? If yes give reason:

b) What is the cost of registration per hectare?

c) How many times the seed certification officer visit prior to certification of area?

39. How far is the processing unit from the seed farm?

40. Mode of transportation and cost per qt:

41. Taxes while transporting the seed material: Octrai/Sales tax etc

42. Problem in processing:

(a) Delay in processing:

b) Labor problem:

c) Machinery problem:

d) Official apathy

e) Cost of processing:

d) Cost of handling the seed:

43. Problem in seed testing:

44. Mode of payment and problem in getting payment in time:

45. Problem in marketing of seed if the seed is self marketed:

46. Do you have any information gap for demand for a particular variety?

47. What is the distribution chain of paddy seeds produced by you?