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Relevance and Distribution Efficiency of Seed Minikits of Pulses in Maharashtra

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FOREWORD

India has made rapid strides in foodgrain production, especially after the mid-sixties period, which was mainly due to the introduction of new farm technology, popularly known as seed-fertilizer-water technology. Though the new farm technology had powerful impact on food sector of the country, this impact was tardy and dismal in the case of pulse crops. Since pulses are mainly cultivated on marginal lands under rainfed conditions with low input usage and exposure to weather-related yield risks, a breakthrough in yield expansion could not be achieved. Therefore, in order to increase pulse production and encourage farmers to adopt superior varieties of seeds, one of the recent developments has been the seed minikits distribution scheme. The scheme was launched in 2016-17 with a view to not only introduce and popularize latest released HVYs of pulse crops but also encouraging farmers towards seed multiplication at grass root level, including those belonging to below poverty line.

Although the seed minikits scheme is under progress for the last three to four years, several important aspects relating to implementation of the scheme require adequate assessment, especially the efficiency and distributional aspects of seeds, the relevance and usefulness of the scheme and the impact of seed minikits in raising productivity of crops. In the light of this backdrop and keeping in mind the importance of pulse crops, the present study is proposed to examine the need, application, pertinence and efficiency in the distribution of seed minikits for pulse crops in the state of Maharashtra. The study has shown positive impact of seed minikits scheme on pulses crops cultivation in Maharashtra since the element of profit involved in their cultivation was much higher for beneficiary as against the non-beneficiary farmers. Not only this, the beneficiaries even showed higher income generation from pulse cropped area under seed minikits as against cultivation of these crops without seed minikits. The plausible reasons for higher profit margins for beneficiaries could be traced in higher yield levels, higher prices on offer for pulses, adoption of improved varieties of seeds, higher adoption of recommended practices, etc. The scheme is found to have paid rich dividend since it focuses on increasing seed replacement and the replacement of older varieties by newer ones. The study has come out with number of suggestions to improve the effectiveness of the scheme and initiation of these suggested measures will not only increase out reach of seed minikits scheme but also cover more farmers under its ambit.

I hope the findings of the report would assume increasing significance, especially with growing concern for pulses production and food and nutritional security in our country.

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PREFACE

India is the largest producer as well as consumer and importer of pulses in the world. Despite the importance of pulse crops in the dietary pattern of India, the production of pulses remained stagnant for long period of time, which could be attributed to lack of technological breakthrough in pulse cultivation and thereby low productivity of pulse crops in India. Since pulses are mainly cultivated on marginal and sub-marginal lands under rainfed conditions with low input usage, and as their production is exposed to weather-related yield risks, a breakthrough in production and yield expansion could not be achieved. Therefore, in order to increase pulse production and encourage farmers to adopt superior varieties of seeds, one of the recent developments has been the seed minikits distribution programme. The programme/scheme was launched in 2016-17 with a view to not only introduce and popularize latest released/pre-released HVYs of pulse crop but also encouraging farmers towards seed multiplication of various crops at grass root level, including those belonging to below poverty line.

Although the seed minikits scheme is under progress for the last three to four years, several important aspects relating to implementation of the scheme require adequate assessment, especially the efficiency and distributional aspects of seeds. Equally important is to check the relevance and usefulness of the scheme from the farmers' point of view. The other relevant aspects to examine are the significance and impact of seed minikits in raising productivity of crops, and the extent of area being cropped under such seeds. In the light of this backdrop and keeping in mind the importance of pulse crops, the present study is proposed to examine the need, application, pertinence and efficiency in the distribution of seed minikits for pulse crops in the state of Maharashtra.

The study showed positive impact of seed minikits scheme on pulses crops cultivation in the state of Maharashtra since the element of profit involved in the cultivation of pulses crops was much higher for beneficiary as against the non-beneficiary farmers. Not only this, the beneficiaries even showed higher income generation from pulse cropped area under seed minikits as against cultivation of these crops without seed minikits. The plausible reasons for higher profit margins for beneficiaries could be traced in higher yield levels, higher prices on offer for pulses, adoption of improved varieties of seeds, higher adoption of recommended practices, lower susceptibility of crop with respect to insects, pests and diseases, lower cost of production, etc. The scheme is found to have paid rich dividend since it focuses on increasing seed replacement and the

replacement of older varieties by newer ones. However, the study has come out with number of suggestions to improve the effectiveness of the scheme, which mainly revolved around creation of better awareness about the scheme through pamphlet, hoarding, etc., provision of seeds suitable for early and late sowing of pulse crops as per local soil and weather conditions, conducting of workshops for proper guidance about usage of minikits, wider coverage of distribution of seed minikits and provision of higher quantity of seed in minikits. Initiation of these suggested measures will not only increase out reach of seed minikits scheme but also cover more farmers under its ambit.

At the initial stage of this study, a fruitful discussion was held with Mr. Dheeraj Kumar, Agriculture Commissioner, Commissionrate of Agriculture, Government of Maharashtra, Pune and other senior officers of the Department. I am extremely grateful to them for providing inputs for this study. I am equally grateful to Mr. N.T. Shisode, Joint Director of Agriculture, Mr. H.P. Baptiwale, Deputy Director of Agriculture and Mr. V.S. Sonawane, Technical Officer, Commissionrate of Agriculture, GOM, Pune for not only supplying the requisite information but also extending all possible help during the conduct of this study. I also extend special thanks to Mr. Shivaji Jagtap, Mr. Vilas Nalge and Mr. Deepak Supekar, district and Taluka level officers of Ahmednagar, and Mr. Kolapkar, Mr. Anil Rathi, Mr. A.S. Dhole and Mr. G.A. Ghate, district and Taluka level officers of Yavatmal for their support in this study.

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I hereby extend my hearty thanks to Mr. Anil Memane for his support in collection, inputting and analysis of data. I also extend my hearty thanks to Shri S. S. for his support in collection of data for this study.

It gives me pleasure in extending thanks to my esteemed colleagues, both faculty members and office staff, for their cooperation and support in completing the study.

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EXECUTIVE SUMMARY

Background:

In order to increase pulse production and encourage farmers to adopt superior varieties of seeds, one of the recent developments has been the seed minikits distribution programme. Seed minikits distribution programme was launched in 2016-17 in order to introduce and popularize latest released/pre-released HVYs of pulse crop within 10 years of release, and it encourages farmers towards seed multiplication of various crops at grass root level, including those belonging to below poverty line. Seed minikits are distributed for rice, wheat, pulses and nutri-cereals, and the agencies involved in the supply of seed minikits at the national level encompass NSC /HIL / KRIBHCO /NAFED/ IFFCO / IFFDC / Central Multi-state Cooperatives such as NCCF/SSCs etc. Since the programme is under progress for last three to four years, it is necessary to assess various aspects of implementation of this programme, especially the efficiency and the distributional aspects of seeds. Equally important is to check the relevance and usefulness of the scheme from the farmers' point of view. The other relevant aspects to examine are the significance and impact of seed minikits in raising productivity of crops, and the extent of area being cropped under such seeds. Therefore, in the light of this backdrop and keeping in mind the importance of pulse crops, the present study is proposed to examine the need, application, pertinence and efficiency in the distribution of seed minikits for pulse crops in the state of Maharashtra.

Objectives:

The objectives of the study are as follows:

1. To assess the relevance and the requirement of seed mini-kits among the farmers
2. To compare the productivity of pulse crops using seed minikits with the control farmers/non users
3. To suggest policy measures to address the efficiency issues in application/distribution of seed mini-kits.

Findings:

An analysis with respect to changes in area, production and yield of various pulse crops over time revealed several interesting observations. The state of Maharashtra showed an increase in pulse cropped area from 35.48 lakh hectares to 37.72 lakh hectares and production expansion from 19.88 lakh MT to 25.66 lakh MT during the period between TE 2006-07 and TE 2016-17. The increase in area and production of pulse crops was chiefly due to significant increase in area and production of red and Bengal gram in the face of decline in area and production of black and green gram during the same period. The major districts of cultivating various pulse crops mainly belonged to rainfed regions of Vidarbha and Marathwada regions and to some extent irrigated region of Western Maharashtra. These districts accounted for about 85 per cent area and production of red gram and 75-80 per cent area and production of Bengal gram of the state during the last one decade. However, the state of Maharashtra showed about 40 per cent decline in area 45 per cent fall in production of black gram, and about 36 per cent decline in area

as well as production of green gram during the last one decade. Unlike fall in area and production of black and green gram, there was 18 per cent rise in area and 27 per cent increase in production of red gram in Maharashtra during the last one decade. Similarly, Bengal gram in Maharashtra showed about 52 per cent rise in area and 82 per cent increase in production during the same period. Consequently, there was overall expansion in production of pulses in Maharashtra, which was caused not only on account of rise in area but also due to significant rise in yield of red and Bengal gram in the state.

The demographic profile showed that the average family size of sampled farmers was 5.01 which comprised of 3.12 members of family doing farming. The sampled farmers also showed about 27 years of experience in farming. The estimates also revealed that more than 68 per cent of farmers attained education up to middle level and above with proportion of graduate and above being 14 per cent. The caste profile showed significantly higher proportion of farmers belonging to OBC and ST category with 42 per cent of them belonging to OBC and 28 per cent to ST category. All the respondents also showed agriculture and allied activity as their main occupation. However, about 15 per cent of sampled farmers showed various other activities as their subsidiary occupation, which encompassed 5 per cent of them showing salary/pension as their subsidiary source of income and another 5 per cent of them showing self business/services activity as their subsidiary source of income.

The average net operated, irrigated and gross cropped area of farmers was estimated at 5.61 acres, 3.51 acres and 7.44 acres, respectively, which increased with the increase in their land holding size. Although the sampled farmers did not show any leased- out land and showed very marginal presence of leased-in land, medium and large categories, in particular, showed higher uncultivated area. The estimates also showed that about 63 per cent of the net operated area of farmers was irrigated. The average intensity of cropping of sampled farmers was estimated at 133 per cent, which was higher for marginal and medium category as against small and large category. In general, the proportion of net operated area under irrigation was higher for large category of farmers.

As for sources of irrigation, dug well, bore well and a combination dug and bore well irrigation system dominated on the farms belonging to sampled farmers. The sampled farmers showed river lift and farm pond as the other major sources of irrigation. Further, none of the sampled farmers showed area under canal irrigation with the sole exception of marginal category of farmers. The estimates also showed higher proportion of total operated area as rainfed for the small and medium categories of sampled farmers.

The scenario obtaining in terms of cropping pattern revealed that majority of sampled farmers were found to cultivate various crops under irrigated as against unirrigated conditions since various crops cultivated by them under irrigation accounted for about 70 per cent share in the gross cropped area (GCA). In general, the cropping pattern of sampled farmers was seen to be in favour of cultivating tur, bajra, soyabean, cotton, and maize in kharif season and gram, wheat, jowar and onion in rabi season. Various crops like sugarcane, lemon, pomegranate and grapes were cultivated as perennial crops by beneficiary and non-beneficiary farmers. The estimates also showed that various pulse crops like tur, gram, udid, and mung cultivated during kharif and rabi seasons under irrigated and unirrigated conditions accounted for 25.05 per cent share in the gross cropped area for sampled farmers. Among various pulse crops, gram and tur accounted for the major share in GCA.

The average category of farmers showed 27.04 qtl/acre of crop production at aggregate level with all the crops put together. Although per acre net farm business income at aggregate level was estimated at Rs.19,686, it varied from Rs.17,467 for large category to Rs.22,883 for the small category of farmers. However, the gross and net farm income of farmers from the net operated area on per household basis with all crops put together increased with the increase in their land holding size, which was estimated at Rs.1,68,990 and Rs.1,10,536, respectively, for the average category of farmers.

The productivity of crops cultivated under irrigated conditions in general turned out to be higher as against rainfed conditions. The estimates further showed higher productivity of various crops for beneficiary as against non-beneficiary farmers. Among various crops, pulses in particular showed higher productivity for beneficiary as against non-beneficiary farmers, both under irrigated and rainfed conditions.

A comparison of per acre value of output, cost and return estimates between beneficiary and non-beneficiary farmers further revealed that the beneficiaries not only generated 48 per cent higher income from gram and 29 per cent higher income from tur crop but in general 39 higher income from both gram and tur crop put together as against non-beneficiary farmers. Although average per household area allocation under gram and tur crop for beneficiaries was much lower, the productivity of selected pulse crops as well as net prices obtained for these crops stood at much higher for beneficiary farmers, which resulted in significantly higher per acre value of output and consequently much higher net farm income generation for beneficiary farmers as against non-beneficiary farmers.

The distribution of total cost of production across various cultivation activities showed significantly high share of labour charges, followed by expenses towards land preparation, and harvesting and threshing activities. While labour charges accounted for 56 per cent share in average cost of production of gram and tur crops for beneficiary and 42 per cent share in the same for non-beneficiary farmers, the share of land preparation in cost of production was found to be about 24 per cent for beneficiary and 27 per cent for non-beneficiary farmers. The share of harvesting and threshing activity in average cost of production of gram and tur crop at aggregate level was about 9 per cent for beneficiary and 10 per cent for non-beneficiary farmers. These estimates clearly showed that activities like labour payment, land preparation, harvesting and threshing almost cornered about 90 per cent share in cost of production of pulse crops for beneficiary and 80 per cent share for non-beneficiary farmers.

The total human labour allocation during various farming operations in the cultivation of selected pulse crops estimated at 31 man days for beneficiaries and 19 man days for non-beneficiaries showed much lower application labour for non-beneficiary as against beneficiary farmers. The estimates further showed that some of the major activities like harvesting and threshing, land preparation, weeding and plant protection and bagging and transportation put together accounted for 87 per cent share in total human labour for beneficiary and 68 per cent share in the same for non-beneficiary farmers. However, activities like irrigation, interculture, sowing, and plant protection accounted for much higher share in total human labour for non-beneficiary farmers.

The majority of beneficiary farmers availed the facility of seed minikits for pulses by submitting documents like land records and Adhar Card since about 70 per cent of

them aired their view in favour of receiving seed minikits by submitting either a combination of land records and Adhar Card or Adhar Card alone. Further, about 70 per cent of beneficiary farmers aired their view in favour of receiving seed minikits as they belonged to interested category of farmers, SC/ST category, small/marginal farmer category and BPL farmer category. The remaining 30 per cent of beneficiary farmers aired their view in favour of receiving seed minikits due to various combinations of these criteria. However, the beneficiaries did not provide any information relating to amount paid by them or reimbursed for receiving seed minikits since they received the same free of cost from the concerned agency.

Each of the sampled beneficiary households were found to receive Jackey variety of Bengal gram seed and BDN 711 variety of red gram seed under seed minikits scheme with a kit size of 8 kg of seed for Bengal gram and 4 kg for red gram, which helped them to cultivate 59.25 acres of area under Bengal gram and 58.35 acres under red gram with all beneficiaries put together. Further, the average per beneficiary household output produced was estimated at 3.08 qtl for Bengal gram and 3.13 qtl for red gram using seed variety supplied under seed minikit scheme. About 15 per cent of total output produced through seed varieties received under the scheme was retained, which also contained 5 per cent of the same specifically meant for future use as seed. In general, average per household output produced, retained and kept as seed using seed varieties of pulses received under the scheme and subsequently cultivated on farms increased with the increase in land size of beneficiary farmers.

About 90 per cent of sampled beneficiary farmers found seed minikits scheme beneficial/ advantageous to them due to yield difference in pulse crop production, quality difference, profitability and combinations of these factors, which helped them to raise their farm income from pulse crop production.

The major issues faced by beneficiaries revolved around lack of creation of awareness among farmers about the benefits of seed minikits scheme, inadequate supply of seed in the kit and lack of coverage of beneficiary farmers under the scheme. The beneficiaries not only wanted much wider coverage of seed minikit scheme and inclusion of all the pulse growing farmers under the scheme but also more quantity of seed in the kit to minimize their dependence on purchase of seed from other agencies, apart from better creation of awareness among farmers about the benefits of the scheme.

Although majority of the beneficiary farmers did not report any problem faced by them in availing the facility of seed minikits, some among them aired their own perceptions regarding the problems faced by them in availing such facility, and these problems encompassed lack of creation of awareness among farmers about the scheme, non-availability of provision of on-farm/ door step delivery of kits, large number of submission of documents required for availing the facility, and random selection of farmers for the distribution of seed minikits.

The beneficiaries of seed minikits came forward with a number of suggestions in order to improve the effectiveness of the scheme, which mainly encompassed creation of better awareness about the scheme through pamphlet, hoarding, etc., provision of seeds suitable for early and late sowing of pulse crops as per local weather conditions, provision fertilizer, insecticides, etc along with seed minikits at subsidized rates, rise in

market/ support prices for pulse crops, supplying of seed varieties suitable for local condition, conducting of training programme for proper guidance about usage of minikits, and wider coverage/distribution of seed minikits – inclusion of all the farmers.

Policy Prescriptions:

- The study showed positive impact of seed minikits scheme on pulses crops cultivation in the state of Maharashtra since the element of profit involved in the cultivation of pulses crops was much higher for beneficiary as against the non-beneficiary farmers. The plausible reasons for higher profit margins for beneficiaries in pulses crops cultivation could be traced in higher yield levels, higher prices on offer for pulses, adoption of improved varieties of seeds in pulses crops cultivation, higher area under improved varieties, higher adoption of recommended practices such as sowing, seed and other practices including adoption of Rhizobium and PSB culture, lower susceptibility of crop with respect to insects, pests and diseases, lower cost of production due to lower material cost as well as lower application human labour towards irrigation, pests and disease control, weeding practices, plant protection, better quality of produce, etc.

- Although a number of suggestions were made in the past to increase pulses production with emphasis on protective irrigation, soil fertility management, improved crop production technique, plant protection measures, and diversification of cropping pattern. However, these strategies and schemes could not yield the desired results in pulses production. The low level of technology adoption in pulses was the major reason for poor performance of pulses crops in the country. However, the initiation of seed minikits scheme would certainly pay rich dividend since the major thrust of this scheme is on increasing seed replacement and the replacement of older varieties by newer ones, and popularization of latest released/pre-released HYVs of pulse crops.

- The beneficiaries of seed minikits in Maharashtra aired a number of suggestions to improve the effectiveness of the scheme, which mainly revolved around creation of better awareness about the scheme through pamphlet, hoarding, etc., provision of seeds suitable for early and late sowing of pulse crops as per local weather conditions, provision fertilizer, insecticides, etc along with seed minikits at subsidized rates, supplying of seed varieties suitable for local condition, conducting of training programme/workshops for proper guidance about usage of minikits, and wider coverage/distribution of seed minikits.

- There were also several other suggestion extended by the farmers, which encompassed arrangement of demonstrations before the distribution of seed minikits for making farmers aware about various aspects of the kit like content, standard cultivation practice, use of kit under varied soil type and weather conditions, etc., appointment of more skilled and trained agricultural officers for proper dissemination of information about the kit, provision of seed varieties as per local soil and weather conditions, and provision of higher quantity of seed in minikits. Initiation of these suggested measures will not only increase out reach of seed minikits scheme but also cover more farmers under its ambit.

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CONTENTS

LIST OF TABLES

CHAPTER – I
INTRODUCTION

Agricultural development in India can serve as a catalyst for rapid growth of the whole economy. Adoption of a growth strategy based on agricultural development in the lead in a developing country like India could not only promote development of other sectors of the economy but also, and more importantly, give the poor the opportunity to become active participants and beneficiaries of economic growth which means providing food security to them by making the needed food supply available on the one hand and providing them with purchasing power to buy it on the other. Although agricultural sector has always been an important component of the Indian economy, it was only after the mid-sixties period that our country witnessed significant expansion in foodgrain output, which could be attributed to introduction of new technology, popularly known as seed-fertilizer-water technology. Before the mid-sixties, increase in foodgrain output in the country came mostly from the growth of the cultivated area and extension of irrigation. However, since mid-sixties the new farm technology symbolized by HYV seeds and use of chemical fertilizer has been relied upon to get the desired increase in production.

Though the new farm technology had a powerful impact on the food sector of the country, this technology revolution could gain momentum only in some select regions of the country and that too with respect to some cereal crops like rice and wheat. The impact of new technology was tardy and dismal in the case of pulses. In fact, in the race of output growth, pulses have lagged so far behind that these can be categorized as ‘also ran’ (Shah, 2003). A number of earlier studies have also shown a sluggish and erratic growth in pulses and coarse cereal production, though most of the studies are area specific (Moorti et. al. 1991; Bhatia, 1991, Shah, 1997).

The first phase of the green revolution made India practically self-sufficient in food supply by 1970-71 when apart from meeting fully the domestic demand there was a surplus of production available to permit building of stocks from the internal procurement; the second phase took the county a step further in the matter (Bhatia, 1983). However, in the late 1970's and early 1980's, a number of studies raised concerns about a possible deceleration in the growth of foodgrain production, indicating a decline in the momentum of the green revolution and possible exhaustion of the potential of available technology (Alagh and Sharma, 1980; Desai and Namboodiri. 1983). Further, the nineties period not only witnessed a declining trend in area and productivity of various foodgrain

crops but also shift in cropping pattern in favour of high value horticulture and oilseed crops. This has put a threat to food security of the nation. The Government of India is now giving top priority for boosting the production of pulses in the country with the objective of meeting their domestic requirement and also to reduce their import bill.

1.1 Importance of Pulses

Pulses have long been considered as the principal source of dietary proteins in a vegetarian country like India with protein content to the tune of 20-25 per cent per kilogram, which is twice the protein in wheat, thrice that of rice and slightly higher than poultry meat (Dastagiri, et. al. 2018). Since pulse grains are an excellent source of protein, carbohydrates, dietary fibre, vitamins, minerals and phytochemicals, large number of people in India consume pulses as staple food in combination with cereals and depends on them for meeting their protein requirement. In addition, Indian dietary pattern strongly favours consumption of pulses due to their low fat source of protein, presence of essential vitamins and minerals, replacement to some animal protein, and prevention against a number of health related problems. It is on account of these facts that for ages pulse cultivation in India has been considered as an integral part of the farming system. Pulses in India have also long been considered as the poor man's only source of protein.

It is to be noted that prior to green revolution in India, farmers produced pulses with their own seeds and family labour without using external inputs. Pulses cultivation in India was pushed to marginal lands only after the advent of Green Revolution, which chiefly promoted rice and wheat using HYV seeds and chemical fertilizers (Reddy, 2009 and 2015; Singh et. al. 2017). This has resulted in pulses cultivation being practiced on marginal and sub-marginal land, mostly under unirrigated conditions (Deka, 2018). Crop diversification and commercialization of agriculture also adversely affected the status of pulse cultivation in India (Deshpande and Chandrashekhar, 1982; Kumar 1993; Ramasamy and Selvaraj, 2002).

India is the largest producer as well as consumer and importer of pulses in the world with a share of 25 per cent in global production, 27 per cent in world consumption and 14 per cent in world imports. As of 2015, the world's biggest producers of pulses were India, Canada, Myanmar, China, Nigeria, Brazil, Australia, USA, Russia, and Tanzania. Though pulses in India are grown in kharif as well as in rabi seasons, rabi pulses contribute more than 60 per cent of the total production. The major pulses crops cultivated in India encompass red gram or pigeon pea (tur, arhar), chickpea or gram, black gram (urad bean), green gram (moong bean) and lentil (masur). Minor pulses

include rajmash and other beans, cowpea, horse gram, moth, khesari-dal, etc. Despite the importance of pulse crops in the dietary pattern of India, the production of pulses remained stagnant at around 12-14 million tonnes during the period between 1970 and 2008, which could be attributed to lack of technological breakthrough in pulse cultivation and thereby low productivity of pulse crops in India (Roy, et. al. 2017). Low genetic yield of pulses and their vulnerability to pests and diseases is a major hindrance to adoption of pulse cultivation by Indian farmers (Srivastava and Yogranjan, 2018). Due to their cultivation mostly under rain-fed condition, pulses often experience drought at critical growth stages. Lack of drought and disease-resistant varieties of pulse seeds coupled with low yield and income often discourage farmers to cultivate pulses in India.

Since pulses are mainly cultivated on marginal and sub-marginal lands under rainfed conditions with low input usage, and as their production is exposed to weather-related yield risks, a breakthrough in production and yield expansion could not be achieved. Further, pulse production in India has fluctuated widely with no long-term trend. This has led to steady decline in the per capita availability of pulses over the past 20 years or so. The per capita per day availability of pulses in India declined from 45.5 grams in 1978 to 31.5 grams in 2005. This is despite the fact that the demand of pulses increased steadily owing to ever increasing human population in India.

1.1.1 Pulse Development Programmes

In view of unabated population increase, various programmes with respect to pulses were launched during various plan periods. A Centrally Sponsored Pulses Development Scheme was initiated from the Fourth Plan (1969-70 to 1973-74) with the introduction of production technologies and improved varieties amongst the farmers. Further, considering the quantum leap witnessed by the wheat and rice production in India in the aftermath of green revolution, a National Pulse Development Programme, covering almost 13 states, was set up in 1986 with the aim of introducing improved technologies to the farmers. The success of National Pulse Development Programme led to introduction of Technology Mission 1986 in order to boost the oilseeds sector in Indian economy, and pulses too came under this programme. It is to be noted that the previous National Pulses Development Project (NPDP) that was merged with the earlier Centrally Sponsored Scheme on pulses became a boon for the farming communities when the Ministry of Agriculture, Government of India launched it from the seventh plan onwards. In order to supplement the efforts under NPDP, a Special Food Grain Production Program (SFPP) on Pulses was also implemented during 1988-89 on a 100% Central

assistance basis. It deserves mention here that under the Government of India-UNDP Cooperation 1997-2003, Pulses Sector was identified as "Priority Sector" with focus on strengthening this sector on priority basis.

It is to be further noted that earlier though the Government had introduced a number of crop-oriented schemes to improve the output of pulses and coarse cereals, the success of Government schemes depended on the extent of adoption as the farmers grow these crops on poor and unirrigated land with generally low levels of inputs like fertilizers, pesticides, etc. Added to this, pulses crops are more susceptible to pest and disease than cereal crops and, thus, involving high risk. However, in order to augment pulses production in the country, Sidhu and Sidhu (1991) had put forward a number of suggestions, which encompass development of draught-disease-and past resistant high yielding varieties of pulses for different agro-climatic regions, diversification of agriculture through introduction of pulses crops in wheat-paddy monoculture, etc. On the other hand, Kadrekar (1991) had suggested a number of strategies to increase pulses production, especially, in the state of Maharashtra with major emphasis on protective irrigation, soil fertility management, improved crop production technique, plant protection measures, and diversification of cropping pattern. However, these strategies and schemes could not yield the desired results so far as pulses and coarse cereal production in the country are concerned. The low level of technology adoption in pulses could be the major reason for poor performance of pulses crops in the country.

One of the major issues raised in the 11th Plan Approach Paper is the food security. In view of the food security consideration and large existing potential available in eastern and central parts of India, the Central Government has launched the National Food Security Mission (NFSM) as a Central sector scheme in mission-mode aimed at increasing foodgrains production by at least 20 million tonnes by the end of Eleventh Plan. In fact, the National Development Council (NDC) in its 53rd meeting held on 29th May, 2007 resolved to launch a Food Security Mission for rice, wheat and pulses, especially for raising the production levels by 10 million tonnes for rice, 8 million tonnes for wheat and 2 million tonnes for pulses by the end of the Eleventh Five Year Plan (2011-12). In view of achieving these targets and operationalising the resolution taken by NDC, the 'National Food Security Mission (NFSM)' was launched in 2007-08 as a Centrally Sponsored Scheme. The NFSM comprises of three components, which include (a) NFSM – Rice, (b) NFSM – Wheat, and (c) NFSM – Pulses.

The NFSM has been initiated with the chief objectives of: (a) raising the level of production of rice, wheat and pulses through area expansion and productivity enhancement in a sustainable manner, (b) restoring soil fertility and productivity at the individual farm level, (c) creating employment opportunities, (d) enhancing farm level economy, i.e. farm profits, to restore confidence amongst the farmers. In order to achieve these objectives, a number of strategies have been formulated that mainly encompass: (i) implementation of the scheme in a mission mode approach through active engagement of all the stakeholders at various levels, (ii) promotion and extension of improved technologies with respect to seed, Integrated Nutrient Management (INM), including micronutrients, soil amendments, Integrated Pest Management (IPM), and resource conservation technologies, and also capacity building of the farmers, (iii) close monitoring of flow of funds to ensure that interventions reach the target beneficiaries on time, (iv) integration of various proposed intervention with the district plan and fixing targets for each identified district, and (v) constant monitoring and concurrent evaluation for assessing the impact of the interventions for a result oriented approach by the implementing agencies.

The major thrust of this programme is on increasing seed replacement and the replacement of older varieties by newer ones. One of the major features of this is that it offers much more than what earlier programmes offered, especially with respect to capacity building, monitoring and planning. The execution of the programme would be within the district planning framework.

It deserves mention that due to sluggish and erratic growth, the net per capita per day availability of pulses in India declined from 60 grams in 1951 to 31 grams in 2008. This is despite the fact that several policy initiatives, projects and programmes with respect to pulses were undertaken in the past viz. All India Coordinated Pulses Improvement Project *(*AICPIP), National Pulses Development Programme (NPDP), Technology Mission on Pulses (TMOP), Centrally Sponsored Integrated Scheme of Oilseeds, Pulses, Oil palm and Maize *(*ISOPOM*)*, etc. These policies and programmes hardly led to any improvement in pulses production of India. In order to raises pulses production by 2 million tonnes by the end of 2011-12, the existing pulses related programmes were replaced by NFSM-pulses.

The NFSM programme showed an overwhelming success and achieved the targeted additional production of rice, wheat and pulses. The Mission continued during 12th Five Year Plan with new targets of additional production of 25 million tonnes of

foodgrains comprising of 10 million tonnes rice, 8 million tonnes of wheat, 4 million tonnes of pulses and 3 million tonnes of coarse cereals by the end of 12th Five Year Plan. The NFSM programme was found to be a successful proposition even during the 12th Plan, which encouraged continuation of the Mission since the experience and feedback of various implementing States showed positive impact of the programme with rise in area and production of pulses. However, some major changes were made in the approach, norms of financial assistance and implementation strategy under the programme, which are reflected in the revised operational guidelines. Based on the experience and performance of NFSM during 12th Plan, it was decided to continue the programme beyond 12th Five Year Plan, i.e. 2017-18 to 2019-20, which is coterminous with Fourteenth Finance Commission (FFC) period with new targets to achieve 13 million tonnes of additional foodgrains production in India comprising of 5 million tonnes of rice, 3 million tonnes of wheat, 3 million tonnes of pulses and 2 million tonnes Coarse Cereals by 2019-20.

It is to be further noted that, based on recommendations of Expenditure Finance Committee (EFC) meeting, which was held on 29th November, 2017, from the years 2018-19 and 2019-20, NMOOP and Seed Village Programme are now a part of NFSM and thus NFSM will have eight components viz. (i) NFSM- Rice; (ii) NFSM-Wheat; (iii) NFSM-Pulses; (iv) NFSM-Coarse Cereals (Maize, Barley), (v) NFSM-Sub Mission on Nutri Cereals; (vi) NFSM-Commercial Crops; (vii) NFSM-Oilseeds and Oilpalm; and (viii) NFSM-Seed Village Programme. These Operational Guidelines are for NFSM-Foodgrains, Commercial Crops, Oilseeds and Oilpalm, Seed Village Programme and Sub Mission on Nutri -cereals.

1.1.2 Pulse Production in India

Due to the development initiated in more recent times, the pulse production scenario has improved a little in the past few years. During the last one decade, the production of pulse crops in India has increased steadily due to government's efforts and various policy initiatives, which not only include strengthening of seed production and its distribution but also a continuous increase in minimum support prices (MSP) of pulses. The widening gap between demand and supply /availability of pulses India is bridged by imports. India is leading importer of pulses since production of pulse/ legume crops has been stagnant over the years (Yadav, et.al 2019). It has been noticed that about 20 per cent of total pulse demand in India is met by imports. Although India still continues to be one of the leading importers of pulses, the import dependency on pulses has reduced a lot due

to significant expansion of pulses production in India during the last one decade, resulting from various programme initiatives. The production of pulses in India has increased from 13.57 million tonnes in TE 2006-07 to 18.99 million tonnes in TE 2016-17 (Table 1.1).

Table 1.1: Area, Production and Yield of Pulses in India

(Area in '000' Hectares; Production in '000' Tonnes; Yield in 'Kg/Hectare)

State	Area		Production		Yield	
	TE 2006-07	TE 2016-17	TE 2006-07	TE 2016-17	TE 2006-07	TE 2016-17
Andhra Pradesh	1857	1302	1247	1037	672	796
Arunachal Pradesh	7	12	8	14	1068	1090
Assam	105	146	58	109	555	747
Bihar	621	522	451	459	726	879
Chhattisgarh	930	876	438	670	471	765
Goa	11	5	12	5	1114	964
Gujarat	829	706	540	645	651	914
Haryana	181	88	135	66	743	748
Himachal Pradesh	30	30	22	47	733	1590
Jammu & Kashmir	29	19	14	10	500	499
Jharkhand	314	665	197	644	628	968
Karnataka	2152	2701	883	1422	410	527
Kerala	7	2	6	2	824	1094
Madhya Pradesh	4304	6017	3288	5474	764	910
Maharashtra	3548	3770	1991	2565	561	680
Manipur	8	31	4	30	522	961
Meghalaya	4	8	3	12	754	1431
Mizoram	5	4	6	5	1217	1379
Nagaland	33	38	37	43	1098	1149
Orissa	748	814	313	431	418	529
Punjab	35	44	28	39	817	898
Rajasthan	3408	4167	1239	2374	364	570
Sikkim	7	6	6	6	917	946
Tamil Nadu	554	850	238	578	429	681
Telangana	NA	525	NA	346	NA	659
Tripura	9	17	5	14	633	813
Uttar Pradesh	2760	2247	2194	1596	795	710
Uttarakhand	53	63	33	53	616	836
West Bengal	222	288	165	285	743	989
A & N Islands	1	2	0	1	545	495
D & N Haveli	7	4	6	5	851	1248
Delhi	0	0	1	0	1250	3195
Daman & Diu	1	0	1	0	872	1000
Pondicherry	4	2	1	1	321	263
All India	22782	25970	13570	18987	596	731

Source: Computations are based on figures obtained from the database of 'Directorate of Economics and Statistics, Department of Agriculture, Cooperation and Farmers Welfare, Ministry of Agriculture and Farmers Welfare, Government of India

The increase in pulse production in India during the last one decade is witnessed due to significant rise in area and expansion of yield of pulse crops during this period. The area under pulse crops in India has increased from 22.78 million hectares in TE 2006-07 to 25.97 million hectares in TE 2016-17. In general, the yield level of pulses in India has grown from 596 kg/ha in TE 2006-07 to 731 kg/ha in TE 2016-17. All the

major pulses growing states of India viz. Madhya Pradesh, Maharashtra and Rajasthan have shown rise in their area, production and productivity of pulses crops during the last one decade. It is to be noted that states like Madhya Pradesh, Maharashtra and Rajasthan account for about 55 per cent share in total production of pulses of India. Although Uttar Pradesh also accounts for significant share in pulse crop production of India, there has been decline in area and yield of pulse crops in this state during the last one decade.

1.1.3 Pulse Production in Maharashtra

Among various states, Maharashtra is considered as one of the important states in terms of pulses production in India. The pulse production in Maharashtra has grown from 1.99 million tonnes in TE 2006-07 to 2.57 million tonnes in TE 2016-17, showing 29 per cent rise in pulse production during the last one decade (Table1.1). The rise in pulse production is mainly on account of increase in area as well yield of pulse crops in Maharashtra during the last one decade. However, the share of Maharashtra in total pulse production of India has marginally declined from 14.67 per cent in TE 2006-07 to 13.51 per cent in TE 2016-17. The share of Maharashtra in total area under pulse cultivation of India has also marginally declined from 15.57 per cent in TE 2006-07 to 14.52 per cent in TE 2016-17. Despite marginally declining share of Maharashtra in area and production of pulse crops in India, the state assumes considerable significance as most of the major pulse crops are cultivated in this state, and there has been significant rise in their production due to various measures initiated in more recent times.

It is to be noted that the yield level of most of the foodgrain and cash crops are lower in Maharashtra as against the national average. Though Maharashtra is one of the major pulse growing states of India, most of the pulses have shown lower yield in Maharashtra. However, Maharashtra enjoys marginally higher yield levels for oilseed crops. Besides, the net sown area per cultivator and proportion of net sown area to geographical area are higher in Maharashtra as compared to national average.

Although the major crops cultivated in Maharashtra are jowar, bajra, pulses, oilseeds and cotton, other cereal crops also find place in the cropping pattern of the state. Almost all the cereal crops are cultivated in Maharashtra, though most of them have very low yield level. Majority of cereal crops are cultivated for farmers' subsistence needs. However, in course of time, the farmers have become increasingly price conscious and commercial oriented. This has resulted in significant change in the cropping pattern in Maharashtra in favour of oilseed and horticulture crops. The cropping pattern changes in Maharashtra encompassing the period from 1980-81 to 2016-17 are shown in Table1.2.

The gross cropped area (GCA) in Maharashtra was estimated at 19,642 thousand hectares in 1980-81, which encompassed 7.43 per cent area under rice, 5.41 per cent under wheat, 32.93 per cent under jowar, 7.81 per cent under bajra, 2.30 per cent under other cereals, 55.88 per cent under all cereals, 3.28 per cent under tur, 2.09 per cent under gram, 8.46 per cent under other pulses, 13.82 per cent under all pulses, 69.70 per cent under total foodgrains, 2.30 per cent under groundnut, 2.44 per cent under safflower, 3.08 per cent under other oilseeds, 9.06 per cent under all oilseeds, 1.31 per cent under sugarcane and 12.98 per cent under cotton. The scenario obtaining in Maharashtra in terms of cropping pattern underwent significant changes during the nineties period and thereafter when significant area was allocated to oilseeds crops and, in particular to soyabean. During the early eighties period, soyabean crop did not find place in the cropping pattern of farmers in Maharashtra and it was only during the mid-eighties that farmers started cultivating this high value oilseed crop mainly due to high element of profit involved in its cultivation. The cultivation of soyabean was initially confined to Vidarbha region of Maharashtra. However, in due course of time, the farmers belonging to all the regions of Maharashtra started cultivating soyabean crop with the sole exception of Konkan region where land is grossly unsuitable for soyabean crop cultivation.

Table 1.2: Cropping Pattern Changes in Maharashtra: 1980/81 – 20016/17

(Percent Share in GCA)

Area/Crop	1980-81	1990-91	2000-01	2005-06	2007-08	2008-09	2009-10	2016-17
Rice	7.43	7.31	6.99	6.71	6.96	6.78	6.51	6.61
Wheat	5.41	3.97	3.49	4.14	5.53	4.55	4.78	5.48
Jowar	32.93	28.82	23.56	21.01	18.31	18.13	18.47	15.57
Bajra	7.81	8.88	8.33	6.36	5.66	3.85	4.57	3.60
Other Cereals	2.30	1.98	3.07	3.03	3.82	3.76	4.31	5.29
All Cereals	55.88	50.94	45.44	41.24	40.28	37.08	38.63	36.55
Tur	3.28	4.59	5.07	4.88	5.12	4.49	4.83	6.18
Gram	2.09	3.06	3.13	4.56	5.97	5.09	5.71	8.31
Moong	0.00	0.00	3.30	2.37	2.92	1.90	1.89	1.91
Udid	0.00	0.00	2.66	2.07	2.49	1.44	1.57	1.46
Other Pulses	8.46	7.25	2.30	1.37	1.41	0.84	0.92	0.91
All Pulses	13.82	14.90	16.45	15.21	17.91	13.77	14.93	18.77
Total Foodgrains	69.70	65.84	61.90	56.46	58.19	50.85	53.55	55.32
Groundnut	2.30	4.48	2.17	1.95	2.23	1.57	1.61	1.53
Soyabean	0.00	0.92	5.28	10.41	11.76	13.64	13.35	16.54
Safflower	2.44	2.90	1.37	1.17	1.02	0.83	0.83	0.33
Other Oilseeds	3.08	5.16	2.92	2.66	2.25	1.84	1.47	0.58
All Oilseeds	9.06	12.93	11.84	16.23	16.88	17.72	17.17	18.98
Sugarcane	1.31	2.02	2.75	2.22	4.82	3.42	3.34	2.73
Cotton	12.98	12.45	14.23	12.75	14.10	14.01	15.00	18.14
GCA (in '000' Hectares)	19642 (100.00)	21859 (100.00)	21619 (100.00)	22556 (100.00)	22655 (100.00)	22454 (100.00)	22612 (100.00)	23224 (100.00)

Source: Computations are based on figures obtained from 'Economic Survey of Maharashtra, 2011-12 and 2017-18'

There has been steady increase in GCA of Maharashtra over the last three and a half decades so much so that in 2016-17 it was estimated at 23,224 thousand hectares,

which turned out to be 18.24 per cent higher as compared to GCA noticed in 1980-81. The distribution of GCA across various crops revealed significant shift in cropping pattern over the last three decades in Maharashtra. This is concomitant from the fact that the area under foodgrains as proportion of GCA declined continuously from 69.70 per cent in 1980-81 to 61.90 per cent in 2000-01 and further to 55.32 per cent in 2016-17. Within foodgrain, the area under cereals as proportion of GCA declined from 55.88 per cent in 1980-81 to 36.55 per cent in 2016-17. The decline in area under cereals was mainly due to sharp decline in area under jowar as proportion of GCA, which declined from 32.93 per cent in 1980-81 to as low as 15.57 per cent in 2016-17. However, the area under tur and gram crops as proportion of GCA increased during the period between 1980-81 and 2016-17. The increase in area under tur as proportion of GCA was from 3.28 per cent in 1980-81 to 6.18 per cent in 2016-17. Similarly, the increase in area under gram as proportion of GCA was from 2.09 per cent in 1980-81 to 8.31 per cent in 2016-17. Consequently, the area under all the pulses put together as proportion of GCA increased from 13.82 per cent in 1980-81 to 17.91 per cent in 2007-08 with a further increase to 18.77 per cent in 2016-17.

Unlike decline in area under foodgrains, the area under oilseeds as proportion of GCA has grown significantly. The area under all the oilseeds put together as proportion of GCA increased from 9.06 per cent in 1980-81 to as much as 18.98 per cent in 2016-17. The major reason for the rise in area under oilseeds in Maharashtra has been significant allocation of area under soyabean crop. The area under soyabean crop as proportion of GCA increased from as low as 0.92 per cent in 1990-91 to 16.54 per cent in 2016-17. This is also a reflection to the fact that at present more than 87 per cent of area under oilseeds in Maharashtra is accounted for by soyabean crop alone.

The major crops among pulses that have shown significant expansion in area under their cultivation in Maharashtra are tur and gram. Tur or Pigeon Pea is known for its rich nutritional value. Tur believed to be a native of India spread to other regions in Asia and is currently cultivated in nearly 25 countries. It is also known as red gram. The crop is cultivated on marginal land by resource-poor farmers, who commonly grow traditional medium- and long-duration (5–11 months) landraces. Short-duration pigeon peas (3–4 months) suitable for multiple cropping have recently been developed. Since traditionally the use of inputs like fertilizers, weeding, irrigation, and pesticides, etc. is minimal in tur crop cultivation, the yield levels are low. Greater attention is now being given to managing the crop because it is in high demand at remunerative prices. Pigeon

peas are very drought resistant, so can be grown in areas with less than 650 mm annual rainfall. Gram is the other important pulse crop cultivated in Maharashtra, which is more commonly known as chickpea or Bengal gram. Chickpea is not only used for human consumption but also for animal feeding. While straw of chickpea is considered as excellent fodder for cattle, fresh green leaves and grains of chickpea are used as vegetable. Although India, Pakistan, Ethiopia, Burma and Turkey are the main growing countries of chickpea, India ranks first in the world in terms of production and acreage, followed by Pakistan. The major chickpea/ gram producing states in India encompass Madhya Pradesh, Rajasthan, Uttar Pradesh, Maharashtra, Haryana and Punjab. Chickpea can be made into split pulse (Chana Dal) and flour (Besan). Though it can be grown on variety of soils, sandy loam and clay loam are considered to be most suitable soil for gram cultivation. Chickpea crop grows well under good moisture conditions with ideal temperature between 24^0C and 30^0C, and they are cultivated under both irrigated and rainfed conditions. In fact, chickpea/gram is a winter season crop.

In order to increase pulse production and encourage farmers to adopt superior varieties of seeds, one of the recent developments has been the seed minikits distribution programme. Seed minikits distribution programme was launched in 2016-17 in order to introduce and popularize latest released/pre-released HVYs of pulse crop within 10 years of release, and it encourages farmers towards seed multiplication of various crops at grass root level, including those belonging to below poverty line.

1.1.4 The Aim of Seed Mini-kits Programme

The Seed Mini-kits are specifically meant for introduction and popularization of latest released/pre-released varieties/hybrids not older than 10 years among the farmers free of cost. Various Central Agencies are involved in the delivery of allotted seed minikits who supply these kits to the destinations identified by the beneficiary States within the stipulated time. Seed minikits are distributed for rice, wheat, pulses and nutri-cereals, and the agencies involved in the supply of seed minikits at the national level encompass NSC /HIL / KRIBHCO /NAFED/ IFFCO / IFFDC / Central Multi-state Cooperatives such as NCCF/SSCs etc.

The price of seed minikits is fixed by the NFSM Director at National level with the provision of 100 per cent reimbursement of cost to the agencies involved subject to certification of receipt by the State concerned. The allocation of seed minikits is approved by the NFSM Executive Committee (EC) before commencement of Kharif/Rabi/Summer seasons. The cut off dates of delivery of Seed Minikits consignment by the Central

Agencies to reach the destination is 15th May for kharif season, 1st September for rabi Season, 1st October for TRFA rabi season and 31st January for the summer season. Bill submission date for kharif is before 10th May, 15th October for rabi season and TRFA, and 10th February for summer season. The required leaflets on cultural practices should be kept in the seed Minikits along with Rhizobium /PSB culture wherever it is required in the respective seed packet of Minikits. The cultural practices are supposed to be printed in Hindi, English and local languages for the respective States. The agencies are required to deliver the consignment up to the District headquarters level of the respective State Governments, beyond which the distribution of Seed Minikits is taken care of by the State Department of Agriculture. After receipt of seed minikits at destination place of the district, the distribution of these kits is ensured within 10 days to the appropriately identified farmers by the District Level Agriculture Officer concerned. The purpose of this exercise is to ensure that the identified farmer is capable of raising the crop with care and diligence in such a way that the plot serves as a suitable demonstration unit to other farmers. It is to be noted that only one seed minikit per farmer and not more than 3 minikits in a season and a village are to be distributed. The reimbursement of cost of seed minikits supplied within due date by Central Seed Agencies is done by the Crops Division on receipt of original bills supported with utilization certificate, first and final bill certificate, and proper acknowledgement issued by NFSM State Nodal Officer.

1.1.5 Implementation of Seed Mini-kits Programme

NFSM-Pulses: It is one of the components of the centrally sponsored scheme of National Food Security Mission and is under implementation since *Rabi* 2007-08. This component has undergone a number of changes since its inception and finally has taken the shape of sole centrally sponsored scheme on pulses covering all the districts in 14 states by merging all pulses components of another centrally sponsored scheme namely Integrated Scheme on Oilseeds, Pulses, Oil palm and Maize (ISOPOM). Ten districts of Assam and 15 districts of Jharkhand have also been included under NFSM-Pulses.

A3P: Accelerated Pulses Production Programme (under NFSM) is another step forward for vigorous implementation of the pulse development under the NFSM-Pulses. A3P has been conceptualized to take up the active propagation of key technologies such as Integrated Nutrient Management (INM) and Integrated Pest Management (IPM) in a manner that creates catalyzing impact by assuring farmers of the higher returns from the identified pulse crops. A3P will have a strong mechanism of monitoring of the programme. Close monitoring of the physical achievements in terms of provision of input

minikits, seed minikits and overseeing the activities of the technical assistants is to be done by the District Food Security Mission Executive Committee (DFSMEC). **Directorate of Pulses Development (DPD)** is the nodal agency for allocation and monitoring of supply of pulses minikits to states. However, Commodity Development Directorate in-charge of concerned pulses states provides the information on seed supply position to DPD. (NFSM, A3P Operational guidelines)

Eligibility:

- Minikits are distributed to farmers on the basis of priority to Scheduled caste, Schedule tribe, small, marginal and below poverty line farmers.
- 10% of total cost of minikit will be charged as token money from the farmers.
- Minikits are given to Women farmers even if land owner is her husband/father/father in laws.
- One minikit is given to only one woman in a family.
- If in a Gram Panchayat, Schedule caste and Schedule tribal farmers are not available or negligible then only minikits are to be distributed to general category women farmers.
- Minikits are distributed to those farmers who were not benefited during last three years.
- Priority will be given to those farmers having irrigation facilities.

Application Process:

- For any query regarding minikits anyone can contact to Agriculture Supervisor of concerned Gram Panchayat.
- Agriculture supervisor may prepare a list of three times more women farmers with the consultation of Gram Panchayat's Sarpanch and other elected leaders and minikits will be distributed by lottery system. The **time Line is** 15 days before sowing and the **Dealing Authorities at different levels** are given below:
- **Gram Panchayat level:** Agriculture Supervisor
- **Panchayat samiti level:** Assistant Agriculture officers.
- **Sub District level:** Assistant Director Agriculture (Ext).
- **District level:** Dy. Director Agriculture (Ext).

Seed Minikit Distribution of Pulses*:*

In order to promote quick spread of new varieties of pulses, minikits of pulses seed varieties not older than 10 years are provided free of cost to farmers. National and state seed producing agencies supply minikits to State Government for distribution amongst farmers. Allocation of minikits is made to all farmers in contiguous area of at least 25 hectares. The size of minikits is 16 kg of gram, 8 kg seed of lentil and 4 kg each for moong, urad and pigeon pea. This quantity would be sufficient to plant 0.2 ha. In

addition, under this package, Karnataka state governments is also providing, a pamphlet regarding package of practice (POP) and phosphate solubilizing bacteria (PSB) culture of 100 grams per packet per mini kit to pulse farmers.

Table 1.3: Pulses status in India as per area sown

Pulses	State wise status for India (2016-17, DES)		District wise status for Maharashtra (2017-18, DES)	
	1st	2nd and 3rd	1st	2nd and 3rd
Tur/ Pigeon pea	Maharashtra	Karnataka	Yavatmal	Amravati and Latur
Urad / Black gram	Uttar Pradesh	Andhra Pradesh and Rajasthan (Karnataka stands 7th)	Nanded	Beed and Jalgaon
Bengal Gram / Gram	Maharashtra	Rajasthan and Karnataka	Latur	Ahmednagar and Osmanabad
Green gram / Moong	Rajasthan	Maharashtra and Karnataka	Ahmednagar	Hingoli and Parbhani

Source: 1) Computations are based on figures obtained from the database of 'Directorate of Economics and Statistics, Department of Agriculture, Cooperation and Farmers Welfare, Ministry of Agriculture and Farmers Welfare, Government of India
2) Figures are based on figures obtained from the 'Statistical Division, Commissionerate of Agriculture, Government of Maharashtra, Central Building, Pune'

The price of seed minikits is fixed by National Food Security Mission-Executive Committee (NFSM-EC) and the cost is reimbursed to the agencies on certification of receipt by the State Government. The State Government is required to educate/provide training to the farmers to multiply seed mini-kits seeds for further use. Table 1.3 provides information relating to pulses status in India while crop-wise, season-wise, state-wise and agency wise details of seed minikit/varieties are given in Appendix 1 to 4.

1.2 Need for the Study

The latest released / pre-release varieties/ hybrids not older than 10 years are popularized through distribution of seed minikits free of cost to the farmers. The required leaflets on cultural practices are to be kept in the seed Minikits along with Rhizobium / PSB culture wherever it is required in the respective seed packet of Minikits. The purpose is to ensure, that the identified farmer is capable of raising the crop with care & diligence such that the plot serves as a good demonstration to other farmers. As the programme is under progress for last three to four years, it is required to see the various aspects of implementation of this programme. How efficiently the distribution of seeds is taking place? We need to check whether the scheme is relevant and useful from the viewpoint of farmers. It is also important to examine whether seed minikits have any significant impact on productivity and how much area is being cropped under such seeds. Therefore, keeping the importance in mind, the present study is proposed to examine the need, application, pertinence and efficiency in distribution of seed minikits.

1.3 Objectives of the Study

The objectives of the study are as follows:

1. To assess the relevance and the requirement of seed mini-kits among the farmers
2. To compare the productivity of pulse crops using seed minikits with the control farmers/non users
3. To suggest policy measures to address the efficiency issues in application/distribution of seed mini-kits.

1.4 Methodology of the Study

At present, there are 33 pulse-growing districts in the state of Maharashtra. The major pulse crops grown in Maharashtra encompass tur or pigeon pea/ red gram, urad or black gram, gram or Bengal gram/ chick pea and mung or green gram. All these pulse crops are cultivated in almost all the districts of Maharashtra. However, major area allocated under pulse crops is noticed to be in various districts belonging to Vidarbha and Marathwada regions of Maharashtra. While the crops cultivated in Vidarbha and Marathwada regions are mainly rainfed under unirrigated conditions, Western Maharashtra region shows cultivation of crops under irrigated conditions due to strong presence of irrigation infrastructure. The Vidarbha region of Maharashtra comprises of 11 districts namely Amravati, Akola, Bhandara, Buldhana, Chandrapur, Gadchiroli, Gondia, Nagpur, Wardha, Washim and Yavatmal, whereas Marathwada region encompasses eight districts namely Aurangabad, Beed, Jalna, Osmanabad, Latur, Nanded, Parbhani and Hingoli. The districts covered under Western Maharashtra region include Kolhapur, Pune, Sangli, Satara, Solapur, Ahmednagar, Dhule, Jalgaon, Nandurbar, and Nashik. The districts belonging to Konkan region have different identity and they are hilly and marked with heavy rainfall, which include Greater Mumbai, Thane, Raigad, Sindhudurg and Ratnagiri. There has been considerable regional diversity in Maharashtra. This stems from the fact that though the proportion of gross irrigated area to gross cropped area is 17-18 per cent in Maharashtra, this proportion varies from 4-5 per cent in Vidarbha region to 80 per cent in Western Maharashtra region. The Marathwada region shows about 18 per cent of its gross cropped area under irrigation. Therefore, agriculture sector in Maharashtra is largely dependent on monsoon.

In order to assess relevance and distribution efficiency of Seed Minikits programme for pulse crops in Maharashtra, it was decided to select two reference crops from two sampled districts from the State with one belonging to the region having irrigation facilities and other one from the region where crops are cultivated under

rainfed/unirrigated or dryland conditions. The selection of crops and districts was based on the highest number of seed minikits distribution during the reference period of 2017-18. Since it was decided to select one irrigated and one unirrigated/rainfed/dryland district for two pulse crops, the study covered the district of Ahmednagar (irrigated) for the reference crop gram and Yavatmal (unirrigated) for the reference crop tur based on the highest number of seed minikits distribution during 2017-18.

From each of the selected sampled districts, a sample of 100 seed minikits beneficiary farmers and 50 non-beneficiary farmers was selected as extension and control groups for each of the selected gram and tur crops using random sampling method. Thus, the study covered 150 sampled farmers for the reference crop gram selected from Ahmednagar district with 100 beneficiary and 50 non-beneficiary farmers. Similarly, the study covered 150 sampled farmers for the reference crop tur selected from Yavatmal district with 100 beneficiary and 50 non-beneficiary farmers. In all, the study covered 300 farmers from two sampled districts selected for reference crops of gram and tur with 200 beneficiary and 100 non-beneficiary farmers. However, under each of the reference crops of gram and tur, a sample of 150 farmers was selected with 100 beneficiary and 50 non-beneficiary farmers.

The selected 150 farmers under each of the reference crops of gram and tur selected from Ahmednagar and Yavatmal districts, respectively, with 100 beneficiary and 50 non-beneficiary farmers using random sampling method were further categorized as marginal (less than 1 hectare), small (1 to 2 hectares), medium (2-4 hectares) and large (above 4 hectares). The distribution of sampled beneficiary and non-beneficiary farmers across various landholding size categories selected randomly for each of the reference crops from two sampled districts is presented in Table 1.4.

Table 1.4: Distribution of Sampled Beneficiary and Non-Beneficiary Farmers for Gram and Tur Crops

H.H. Category	Gram Crop – Ahmednagar District (Irrigated)			Tur Crop – Yavatmal District (Unirrigated)			Total Beneficiary	Total Non-Beneficiary
	Beneficiary	Non-Beneficiary	Total	Beneficiary	Non-Beneficiary	Total		
Marginal	28	8	36	17	4	21	45	12
Small	42	22	64	58	30	88	100	52
Medium	22	11	33	15	8	23	37	19
Large	8	9	17	10	8	18	18	17
Total	100	50	150	100	50	150	200	100

Note: 1) The sampled beneficiary and non-beneficiary from Ahmednagar district for gram crop were drawn from the villages of Chandgaon, Diskal, Gurav Pimpri, Thitewadi, Chimbhale, Hangewadi, Belwandi, Loni Venkanath, Mhase, and Pargaon Sudrik belonging to Taluka of Karjat and Shrigonda.

2) The sampled beneficiary and non-beneficiary from Yavatmal district for tur crop were drawn from the villages of Rani Amravati, Dudhagaon, Mahagaon, Shendri, Ujona, Wadgaon Andh, Chikhali Kanoba, Elgunda, Manglur, Yelgunda, and Ashwinpur belonging to Taluka of Babhulgaon, Darwa, Ner and Pasad.

The number of sampled beneficiary farmers selected for gram crop from Ahmednagar district encompassed 28 in marginal category, 42 in small, 22 in medium and 8 in large category with a sum of 100 beneficiary farmers drawn from the district of Ahmednagar. The non-beneficiary farmers selected for gram crop from Ahmednagar district included 8 in marginal category, 22 in small, 11 in medium and 9 in large category with a sum of 50 non-beneficiary farmers drawn from the district of Ahmednagar. Similarly, the number of sampled beneficiary farmers selected for tur crop from Yavatmal district encompassed 17 in marginal category, 58 in small, 15 in medium and 10 in large category with a sum of 100 beneficiary farmers drawn from the district of Yavatmal. The non-beneficiary farmers selected for tur crop from Yavatmal district included 4 in marginal category, 30 in small, 8 in medium and 8 in large category with a sum of 50 non-beneficiary farmers drawn from the district of Yavatmal.

Thus, altogether 200 sampled beneficiary farmers were selected from the districts of Ahmednagar and Yavatmal for gram and tur crops put together, which encompassed 45 in marginal, 100 in small, 37 in medium and 18 in large category. Similarly, altogether 100 sampled non-beneficiary farmers were selected from the districts of Ahmednagar and Yavatmal for gram and tur crops put together, which encompassed 12 in marginal, 52 in small, 19 in medium and 17 in large category.

It is to be noted that while the district of Yavatmal falls under moderate rainfall zone and belongs to Vidarbha region of Maharashtra, the district of Ahmednagar is known mainly as a drought prone area and has an uneven rainfall, but considered as an irrigated district belonging to Western Maharashtra.

In order to see whether seed minikits are being used to replicate seed and use the reproduced seed to expand area in the forthcoming years, effort was made to include the cases of seed minikits distribution in the last two years. Therefore, in order to select households, the seed minikits distribution list was collected for the year 2017-18 and 2018-19. While selecting the households, the samples were included for both these years. The relevant information was collected on area sown; productivity and resources used for the seed minikits pulse crops as well as the reproduced seed pulse crops.

It is to be noted that seed minikits in Maharashtra are mainly distributed for various pulse crops such as red gram, Bengal gram and green gram. The information relating to distribution of seed minikits for various pulse crops across various districts of Maharashtra encompassing the period between 2016-17 and 2018-19 is brought out in Table 1.5, which also shows total seed minikits distributed under each pulse crop.

Table 1.5: District wise Distribution of Seed Minikits in Maharashtra (Numbers)

District	Red Gram				Bengal Gram				Green Gram				Grand Total
	2016-17	2017-18	2018-19	Total	2016-17	2017-18	2018-19	Total	2016-17	2017-18	2018-19	Total	
Thane	-	3	-	3	-	40	-	40	-	-	-	-	43
Palghar	-	19	10	29	-	34	-	34	-	-	-	-	63
Raigad	-	10	-	10	-	28	-	28	-	-	-	-	38
Ratnagiri	-	4	-	4	-	-	-	-	-	-	-	-	4
Sindhudurg	-	0	-	0	-	-	-	-	-	-	-	-	-
Nashik	-	50	140	190	420	907	520	1847	600	-	-	600	2637
Dhule	-	75	170	245	200	761	440	1401	1100	-	50	1150	2796
Nandurbar	50	138	170	358	200	470	-	670	700	-	30	730	1758
Jalgaon	50	140	290	480	367	1012	580	1959	2100	-	110	2210	4649
Ahmednagar	50	50	180	280	1040	2343	1350	4733	600	-	-	600	5613
Pune	-	27	50	77	550	1172	700	2422	198	-	-	198	2697
Solapur	25	196	320	541	430	846	0	1276	10	-	-	10	1827
Satara	-	20	9	29	-	660	400	1060	-	-	-	-	1089
Sangli	50	58	100	208	235	584	350	1169	-	-	-	-	1377
Kolhapur	-	13	20	33	0	197	-	197	-	-	-	-	230
Aurangabad	100	399	610	1109	490	998	580	2068	300	-	-	300	3477
Jalna	250	499	790	1539	280	621	360	1261	1800	-	110	1910	4710
Beed	150	574	980	1704	480	1369	790	2639	300	-	-	300	4643
Latur	800	1080	1860	3740	850	1295	1050	3195	1000	-	-	1000	7935
Osmanabad	300	999	1520	2819	870	1730	0	2600	950	-	-	950	6369
Nanded	150	702	1180	2032	630	1330	770	2730	1700	-	-	1700	6462
Parbhani	250	701	1130	2081	319	1277	720	2316	2200	-	-	2200	6597
Hingoli	100	372	670	1142	700	1593	950	3243	1200	-	-	1200	5585
Buldhana	150	400	1100	1650	691	1401	-	2092	2300	-	-	2300	6042
Akola	150	497	990	1637	910	2100	1210	4220	2700	-	-	2700	8557
Washim	150	441	870	1461	760	1570	-	2330	1700	-	-	1700	5491
Amravati	300	684	1880	2864	1060	2421	1400	4881	2700	-	-	2700	10445
Yavatmal	300	1115	1880	3295	470	1238	-	1708	700	-	-	700	5703
Wardha	-	572	1190	1762	350	757	440	1547	50	-	-	50	3359
Nagpur	-	481	1010	1491	830	1710	990	3530	90	-	-	90	5111
Bhandara	-	82	180	262	120	280	150	550	-	-	-	-	812
Gondia	-	50	110	160	60	145	-	205	-	-	-	-	365
Chandrapur	-	295	610	905	350	764	-	1114	-	-	-	-	2019
Gadchiroli	-	46	50	96	30	125	-	155	-	-	-	-	251
State Total	3375	10792	20069	34236	13692	31778	13750	59220	24998	-	300	25298	118754

Note: Figures are obtained from 'Director of Agriculture (Extn. & Trg.), Commissionerate of Agriculture, Maharashtra State, Government of Maharashtra, Sakhar Sankul, Pune'

The estimates brought out in Table 1.5 clearly showed that the highest number of seed minikits for red gram during the reference year 2017-18 was distributed in the district of Yavatmal of Maharashtra. Similarly, the highest number of seed minikits for Bengal gram during the reference year 2017-18 was distributed in the district of Ahmednagar of Maharashtra. Therefore, these two districts of Maharashtra were selected for the present investigation.

1.5 Overview

India is the largest producer as well as consumer and importer of pulses in the world. Despite the importance of pulse crops in the dietary pattern of India, the production of pulses remained stagnant at around 12-14 million tonnes during the period between 1970 and 2008, which could be attributed to lack of technological breakthrough in pulse cultivation and thereby low productivity of pulse crops in India. Since pulses are mainly cultivated on marginal and sub-marginal lands under rainfed conditions with low input usage, and as their production is exposed to weather-related yield risks, a breakthrough in production and yield expansion could not be achieved. Therefore, various projects and programmes with respect to pulses were launched during various plan periods. Important among these were All India Coordinated Pulses Improvement Project *(*AICPIP), National Pulses Development Programme (NPDP), Technology Mission on Pulses (TMOP), Centrally Sponsored Integrated Scheme of Oilseeds, Pulses, Oil palm and Maize *(*ISOPOM*),* etc. However, these policies and programmes hardly led to any improvement in pulses production of India. In order to raises pulses production by 2 million tonnes by the end of 2011-12, the existing pulses related programmes were replaced by NFSM-pulses.

In fact, the Central Government has launched the National Food Security Mission (NFSM) as a Central sector scheme in mission-mode aimed at increasing foodgrains production by at least 20 million tonnes by the end of Eleventh Plan. In fact, the National Development Council (NDC) in its 53rd meeting held on 29th May, 2007 resolved to launch a Food Security Mission for rice, wheat and pulses, especially for raising the production levels by 10 million tonnes for rice, 8 million tonnes for wheat and 2 million tonnes for pulses by the end of the Eleventh Five Year Plan (2011-12). In view of achieving these targets and operationalising the resolution taken by NDC, the 'National Food Security Mission (NFSM)' was launched in 2007-08 as a Centrally Sponsored Scheme. The NFSM comprises of three components, which include (a) NFSM – Rice, (b) NFSM – Wheat, and (c) NFSM – Pulses.

The NFSM programme showed an overwhelming success and achieved the targeted additional production of rice, wheat and pulses. The Mission continued during 12th Five Year Plan with new targets of additional production of 25 million tonnes of foodgrains comprising of 10 million tonnes rice, 8 million tonnes of wheat, 4 million tonnes of pulses and 3 million tonnes of coarse cereals by the end of 12th Five Year Plan. The NFSM programme was found to be a successful proposition even during the 12th Plan, which encouraged continuation of the Mission since the experience and feedback of various implementing States showed positive impact of the programme with rise in area and production of pulses. Further, based on the experience and performance of NFSM during 12th Plan, it was decided to continue the programme beyond 12th Five Year Plan, i.e. 2017-18 to 2019-20, which is coterminous with Fourteenth Finance Commission (FFC) period with new targets to achieve 13 million tonnes of additional foodgrains production in India comprising of 5 million tonnes of rice, 3 million tonnes of wheat, 3 million tonnes of pulses and 2 million tonnes Coarse Cereals by 2019-20.

In order to increase pulse production and encourage farmers to adopt superior varieties of seeds, one of the recent developments has been the seed minikits distribution programme. Seed minikits distribution programme was launched in 2016-17 in order to introduce and popularize latest released/pre-released HVYs of pulse crop within 10 years of release, and it encourages farmers towards seed multiplication of various crops at grass root level, including those belonging to below poverty line. Seed minikits are distributed for rice, wheat, pulses and nutri-cereals, and the agencies involved in the supply of seed minikits at the national level encompass NSC /HIL / KRIBHCO /NAFED/ IFFCO / IFFDC / Central Multi-state Cooperatives such as NCCF/SSCs etc. Since the programme is under progress for last three to four years, it is necessary to assess various aspects of implementation of this programme, especially the efficiency and the distributional aspects of seeds. Equally important is to check the relevance and usefulness of the scheme from the farmers' point of view. The other relevant aspects to examine are the significance and impact of seed minikits in raising productivity of crops, and the extent of area being cropped under such seeds. Therefore, in the light of this backdrop and keeping in mind the importance of pulse crops, the present study is proposed to examine the need, application, pertinence and efficiency in the distribution of seed minikits for pulse crops in the state of Maharashtra.

The study covered two major pulse crops from two sampled districts of Maharashtra with one having irrigation facilities and other one governed by rainfed conditions. The selection of crops and districts was based on the highest number of seed minikits distribution during the reference period of 2017-18. Thus, the study covered the district of Ahmednagar (irrigated) for the reference crop gram and Yavatmal (unirrigated) for the reference crop tur based on the highest number of seed minikits distribution under each of the reference crop during the reference period. From each of the selected sampled districts, a sample of 100 seed minikits beneficiary farmers and 50 non-beneficiary farmers was selected as extension and control groups for each of the selected gram and tur crops using random sampling method. The sampled beneficiary and non-beneficiary farmers were subsequently categorized as marginal, small, medium and large. Thus, altogether 200 sampled beneficiary and 100 non-beneficiary farmers were selected from the districts of Ahmednagar and Yavatmal for gram and tur crops. The relevant information was collected on area sown; productivity and resources used for the seed minikits pulse crops as well as the reproduced seed pulse crops.

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CHAPTER – II

PRODUCTION OF PULSES IN MAHARASHTRA

This chapter provides an insight into the estimates relating to area, production and productivity of various important crops cultivated in the state of Maharashtra encompassing the period between 1980-81 and 2018-19. Although structural changes as well as growth estimates with respect to area, production and productivity have been evaluated in general for all the important crops cultivated in the state of Maharashtra, the primary focus is on evaluating these estimates for various pulses crops, in particular, cultivated across various districts and regions/divisions of the State during the period from 1980-81 to 2018-19, and also evaluating share of different districts in pulses crops acreage and production in the State during the given period of time. This chapter also evaluates trends with respect to broad quantitative parameters of agricultural sector of the State viz. Gross Cropped Area (GCA), Geographical Area, Cultivable Area, Pulse Cropped Area, Share of Cultivable Area in Geographical Area, Share of Pulse Cropped Area in Cultivable Area and GCA, etc., especially for the period between 2004-05 and 2016-17, besides providing growth trend estimates relating area, production productivity of various crops cultivated in the State. The major thrust of this chapter is, therefore, on providing information relating to trend estimates for pulses vis-à-vis other crops cultivated in the state of Maharashtra, especially during the past three to four decades.

2.1 Pulse Production in Maharashtra – District Level Analysis

The state of Maharashtra is the second largest producer of pulses in India with 2.6 million tonnes of production and 3.8 million hectares of area under its cultivation. Pulse crops are chiefly cultivated in various districts belonging to Vidarbha and Marathwada regions of Maharashtra under rainfed/unirrigated conditions, and these districts show considerable yield gap in pulse crops. Certain districts including Akola and Jalgaon are the major processing and trading hubs. In fact, there are 12 states in India accounting for more than 90 per cent of pulse production of the country, which encompass Madhya Pradesh, Rajasthan, Maharashtra, Uttar Pradesh, Karnataka and Andhra Pradesh, followed by Gujarat, Jharkhand, Tamil Nadu, and Chhattisgarh. Among these states, Maharashtra accounts for the major share in tur and gram crop production of India. Although foodgrain production in Maharashtra has remained by and large constant over the last three decades, there is steady increase in pulse crop production in the state in the face of decline in course cereal production during this period (Table 2.1).

Table 2.1: Area and Production of Major Crops in Maharashtra (Area in '00' Hectares; Production in '00' Metric Tonnes)

Year	Rice		Course Cereals		Pulses		Foodgrains		Oilseeds		Black Gram		Red Gram		Bengal Gram		Green Gram	
	Area	Prod.	Area	Prod.	Area	Prod.	Area	Prod.	Area	Prod.	Area	Prod.	Area	Prod.	Area	Prod.	Area	Prod.
TE 90-91	15647	24549	86908	71307	32947	16234	144138	121599	27686	18001	4534	2018	9473	5711	6516	3624	7365	2981
TE 91-92	15712	22698	84059	68065	32193	13773	139833	112693	26009	16002	4265	1693	9839	4938	5756	2981	7372	2561
TE 92-93	15805	22840	82615	70814	32414	14113	138153	115557	25657	15738	4381	2077	10100	4565	5647	2875	7540	3142
TE 93-94	15739	23416	81728	71775	33052	16639	137472	120101	25636	17162	4735	2494	10146	5625	5621	3284	7673	3640
TE 94-95	15675	24401	81562	77469	34785	19087	139497	130970	27161	19491	5088	2918	10279	6130	6680	4118	7854	4075
TE 95-96	15617	25275	79751	69282	34700	18513	137827	123673	27552	20486	5186	2674	10324	6180	7143	4399	7491	3487
TE 96-97	15437	25808	78620	72099	34414	17958	136438	126910	26822	20564	5274	2686	10450	6100	7263	4350	7071	3126
TE 97-98	15252	25839	78568	69543	33923	16414	135623	121283	26636	20213	5298	2616	10332	5557	7117	3776	6592	2773
TE 98-99	15106	25346	76638	70049	34744	18509	135203	124444	26721	21590	5426	2942	10329	6335	7691	4368	6590	3074
TE 99-00	15119	25029	73125	62028	35408	19019	133055	117333	26867	22437	5478	2752	10277	6853	8412	4780	6622	2955
TE 00-01	15159	23520	72645	62092	35917	20611	133055	118364	26571	23827	5675	2751	10581	7912	8686	5206	6912	3175
TE 01-02	15176	23987	72285	58013	35628	19462	131611	112884	25460	23026	5832	2502	10513	7685	8191	4830	7086	2898
TE 02-03	15163	21563	72385	57083	35579	19001	130446	107677	24853	22261	5975	2626	10579	7382	7806	4279	7230	3001
TE 03-04	15224	24465	68401	54195	35012	19864	125656	107989	25436	25003	6002	3109	10412	7469	7826	4309	7117	3437
TE 04-05	15206	22785	67850	54613	34563	18902	124569	105562	28577	26577	5771	2955	10601	7094	8071	4361	6893	3207
TE 05-06	15170	25501	67234	54184	34176	18719	124425	108721	32486	30075	5332	2581	10734	7145	8818	5308	6300	2691
TE 06-07	15168	24620	68861	58844	35482	19884	129242	117308	36153	32754	4963	2050	10988	7550	10528	6988	5876	2177
TE 07-08	15395	27501	66697	63446	37719	24402	131199	133825	37873	40133	5074	2395	11272	8942	12273	9153	5892	2641
TE 08-09	15425	26229	63107	63158	36590	23299	126807	131854	38938	37084	4592	2066	10967	8318	12682	9382	5535	2364
TE 09-10	15229	24949	60869	63638	35283	23792	122361	130842	39016	34066	4137	1792	10869	8667	12627	10013	5050	2050
TE 10-11	15026	23879	60425	64456	35220	24033	121830	130597	38305	34550	3864	1820	11345	8334	12909	10628	4694	2068
TE 11-12	15102	25750	58295	65654	35901	26197	119978	135797	37381	41315	3997	2319	12094	9221	12681	10906	4714	2560
TE 12-13	15389	28652	54678	60033	35523	25888	115488	131233	36601	48933	4020	2639	12495	9509	12158	10083	4726	2791
TE 13-14	15686	30044	52382	58720	34241	25374	111280	128062	38448	48295	3529	2231	11960	9704	12430	10418	4315	2218
TE 14-15	15709	30370	53376	55166	34629	23276	113316	122099	40147	40828	3237	1707	11884	7978	13604	11186	3924	1653
TE 15-16	15530	28827	53893	50885	35366	20182	114810	112456	41960	31030	2988	1199	11961	6106	14629	10883	3706	1180
TE 16-17	15298	30403	54583	50607	37717	25656	118432	121676	42715	31858	3000	1121	12942	9623	15995	12685	3751	1378

Source: Computations are based on figures obtained from the 'Statistical Division, Commissionerate of Agriculture, Government of Maharashtra, Central Building, Pune'

The state of Maharashtra has shown significant fluctuation in foodgrain production in due course of time, which declined from 12.16 million tonnes in TE 1990-91 to 10.77 million tonnes in TE 2003-04 with an increase in the same to 13.58 million tonnes in TE 2011-12, and a further decline in the same to 11.25 million tonnes in TE 2015-16. Consequently, there has not been any gain in foodgrain production in Maharashtra over time. The area under foodgrain crops has been steadily declining over the last three decades and the gain in production is only due to rise in yield of foodgrain crops during this period (Table 2.1). The decline in foodgrain production in Maharashtra is chiefly due to continuous decline in area as well as production of course cereals during the last three decades. Unlike decline in area and production of course cereals, there has been steady increase in production of pulse crops in Maharashtra, which increased from 1.62 million tonnes in TE 1990-91 to 2.06 million tonnes in TE 2000-01, and further to 2.40 million tonnes in TE 2010-11 and to 2.57 million tonnes in TE 2016-17, showing 58.64 per cent rise in the same during the period between TE 1990-91 and TE 2016-17. The major reason for rise in pulse crop production in Maharashtra during the last three decades is the expansion in yield levels of these crops since area under pulse crops in the state has not increased significantly during this period. The area under pulse crops in Maharashtra is noticed to increase from 3.29 million hectares in TE 1990-91 to 3.59 million hectares in TE 2000-01, and further to 3.77 million hectares in TE 2016-17, showing 14.59 per cent rise in the same during the last three decades.

Among various pulse crops cultivated in Maharashtra, gram or Bengal gram/ Chickpea and tur or red gram/ pigeon pea have shown dramatic increase in their production during the last three decades. The production of Bengal gram in Maharashtra has grown 3.62 lakh MT in TE 1990-91 to as much as 12.69 lakh MT in TE 2016-17, showing three and half folds rise in the same during the last three decades. Not only production but even area under Bengal gram in the state increased from 6.52 lakh hectares in TE 1990-91 to as much as 16.00 lakh hectares in TE 2016-17, showing nearly two and half folds rise in the same during the last three decades. The production of Red gram in the state has also grown by leaps and bound from 5.37 lakh MT in TE 1990-91 to 9.62 lakh MT in TE 2016-17. The area under Red gram in Maharashtra has increased moderately from 9.47 lakh hectares in TE 1990-91 to 12.94 lakh hectares in TE 2016-17. However, black gram and green gram in Maharashtra have not only shown decline in production but also area under the crop during the given period of time. Therefore, the increase in pulse production in Maharashtra during the last three decades is chiefly

accounted for by substantial increase in production of Bengal gram and Red gram, which in turn is due to significant rise in their area as well productivity during this period.

One of the major reasons for significant rise in pulse production in Maharashtra has been the interventions under NFSM-Pulses programme. In addition to this, a continuous rise in minimum support price (MSP) for pulses has also acted as a catalyst in augmenting pulse production in the state. The interventions initiated for pulses encompass wide range of activities like Cluster Demonstrations on improved package of Practices, Demonstration on cropping system, Cropping system based training of farmers, Seed Distribution of HYVs, Integrated Nutrient Management (INM), Integrated Pest Management (IPM) covering distribution of plant protection chemicals and weedicides, Resource Conservation Technologies and Tools that include Power Sprayers, Manual Sprayer, Zero till seed drills, multi crop planter, Ridge furrow planters, Rotavators, Chiseller, Tractor mounted sprayer and Multi-crop Thresher, Efficient Water Application Tools with focus on sprinkler sets, pump sets, pipe for carrying water from source to the field and mobile rain guns, specialized projects for high productivity areas, support to institute/ organizations including NGOs in remote areas, value chain integration of small producers, assistance to Custom Hiring Centres, marketing support for pulses, etc. These initiatives have paid rich dividends in terms of enhancing production as well as acreage under pulse crops in Maharashtra.

It is to be noted that a number of new initiatives have been included under NFSM during 2016-17 for enhancing pulses production and productivity, which include distribution of seed minikits of newer varieties of pulses free of cost to farmers, production of quality seed, creation of seed hubs at SAU and KVKs, strengthening of bio-fertilizers and bio agent labs at SAUs/ICAR Institutes, cluster front line demonstration by KVKs and rise in breeder seed production at ICAR institutes/SAUs.

It could also be discerned from Table 2.1 that oilseed crops have also shown significant production as well as area expansion during the last three decades. While the area under oilseed crops in Maharashtra has increased from 2.8 million hectares in TE 1990-91 to 4.27 million hectares in TE 2016-17, the increase in production is from 1.80 million tonnes in TE 1990-91 to 3.19 million tonnes in TE 2016-17.

In order to further evaluate performance of pulse sector in Maharashtra, structural changes in area, production and yield of pulse crops cultivated across different districts and regions/divisions of the state during the period between TE 1992-93 and TE 2016-17 are brought out in Table 2.2.

The estimates shown in Table 2.2 reveal a moderate rise in area under pulse crops in Maharashtra, which increased from 32.41 lakh hectares in TE 1992-93 to 35.48 lakh hectares in TE 2006-07, and further to 37.72 lakh hectares in TE 2016-17. Various divisions belonging to Maharashtra have also shown moderate rise in area under pulse crops during the last two and a half decades. However, variations are noticed in terms of share of different divisions in total area under pulse crops in Maharashtra (Table 2.3).

Table 2.2: Structural Changes in Area, Production and Yield of Pulse Crop in Maharashtra: 1990-91 to 2016-17

(Area in '00' Hectares; Production in '00' MT Tonnes; Yield in Kg/Ha)

Districts/Divisions	Area			Production			Yield		
	TE 1992-93	TE 2006-07	TE 2016-17	TE 1992-93	TE 2006-07	TE 2016-17	TE 1992-93	TE 2006-07	TE 2016-17
Thane	174.33	198.52	167.00	90.33	127.78	112.00	518.16	643.66	670.66
Raigad	111.33	137.67	162.33	46.33	67.23	111.00	416.17	488.35	683.78
Ratnagiri	42.33	75.33	50.00	17.00	36.04	33.13	401.57	478.36	662.67
Sindhudurg	28.00	61.33	28.67	9.33	29.03	18.67	333.33	473.37	651.16
Konkan Division	356.00	472.86	409.00	163.00	260.08	266.00	457.87	550.02	650.37
Nashik	1055.00	947.67	706.67	464.33	620.36	436.33	440.13	654.62	617.45
Dhule	1528.00	690.33	700.67	775.00	382.44	622.20	507.20	554.00	888.01
Nandurbar	-	804.33	549.33	-	362.50	308.33	-	450.68	561.29
Jalgaon	1857.67	1815.00	1324.67	1077.33	1137.24	977.00	579.94	626.58	737.54
Nashik Division	4440.67	4257.33	3282.00	2316.67	2502.54	2443.67	521.69	587.82	744.57
Ahmednagar	969.67	1197.33	1951.67	384.67	678.47	1141.67	396.70	566.65	584.97
Pune	830.00	845.53	982.00	344.67	465.96	740.00	415.26	551.09	753.56
Solapur	1183.00	840.33	906.67	331.00	436.83	448.33	279.80	519.83	494.49
Pune Division	2982.67	2883.20	3840.33	1060.33	1581.26	2329.67	355.50	548.44	606.63
Satara	719.67	806.33	801.67	301.33	398.43	475.67	418.71	494.13	593.35
Sangli	917.00	869.00	631.00	391.00	485.16	386.33	426.39	558.30	612.26
Kolhapur	331.33	253.00	149.00	172.00	151.96	93.67	519.11	600.61	628.64
Kolhapur Division	1968.00	1928.33	1581.67	864.33	1035.55	955.33	439.19	537.02	604.00
Aurangabad	1667.33	1011.67	1050.67	640.33	674.67	694.67	384.05	666.89	661.17
Jalna	1565.67	1390.00	1544.33	605.67	745.45	800.33	386.84	536.29	518.24
Beed	1297.67	1120.67	1860.67	424.00	741.45	901.67	326.74	661.62	484.59
Aurangabad Division	4530.67	3522.33	4455.33	1670.00	2161.57	2396.67	368.60	613.67	537.93
Latur	1583.67	2104.00	2445.67	504.33	1060.90	2383.00	318.46	504.23	974.38
Osmanabad	1508.33	2225.33	2046.67	430.33	1133.78	847.67	285.30	509.49	414.17
Nanded	1092.33	1890.00	2129.33	429.33	986.96	1243.67	393.04	522.20	584.06
Parbhani	2316.00	1819.67	1682.67	806.33	745.44	762.33	348.16	409.66	453.05
Hingoli	-	939.00	1673.00	-	601.05	1572.00	-	640.10	939.63
Latur Division	6500.33	8978.00	9978.00	2170.33	4528.13	6808.00	333.88	504.36	682.30
Buldhana	2033.33	2443.00	1612.67	1041.33	1154.55	971.33	512.13	472.59	602.32
Akola	2647.33	1733.33	1846.67	1326.67	993.02	1600.33	501.13	572.89	866.61
Washim	-	1664.67	1247.33	-	1055.20	657.33	-	633.88	526.99
Amravati	1770.33	2171.33	2752.33	949.67	1345.21	2169.67	536.43	619.53	788.30
Yavatmal	1819.00	1972.67	2396.67	1022.33	1388.93	1789.33	562.03	704.09	746.59
Amravati Division	8270.00	9985.00	9856.00	4340.00	5936.91	7188.00	524.79	594.58	729.30
Wardha	751.67	826.00	1086.67	469.67	584.86	858.33	624.83	708.06	789.88
Nagpur	989.67	1142.33	1352.33	455.67	667.72	1226.67	460.42	584.52	907.07
Bhandara	561.67	283.33	413.33	202.33	140.67	250.33	360.24	496.47	605.65
Gondia	-	185.67	247.00	-	83.19	133.67	-	448.04	541.16
Chandrapur	765.67	803.33	946.67	303.33	324.13	655.67	396.17	403.49	692.61
Gadchiroli	297.00	214.33	269.33	97.00	76.96	134.00	326.60	359.06	497.52
Nagpur Division	3365.67	3455.00	4314.00	1528.00	1877.52	3259.33	454.00	543.42	755.52
Total Maharashtra	32414.00	35482.05	37716.67	14112.67	19883.56	25656.00	435.39	560.38	680.23

Source: Computation are based on the figures/data obtained from 'Statistical Division, Commissionerate of Agriculture, Government of Maharashtra, Pune'

Table 2.3: Share of Districts in Total Area and Production of Pulse Crop in Maharashtra: 1990-91 to 2016-17

(in per cent)

Districts/Divisions	Area			Production		
	TE 1992-93	TE 2006-07	TE 2016-17	TE 1992-93	TE 2006-07	TE 2016-17
Thane	0.54	0.56	0.44	0.64	0.64	0.44
Raigad	0.34	0.39	0.43	0.33	0.34	0.43
Ratnagiri	0.13	0.21	0.13	0.12	0.18	0.13
Sindhudurg	0.09	0.17	0.08	0.07	0.15	0.07
Konkan Division	1.10	1.33	1.08	1.15	1.31	1.04
Nashik	3.25	2.67	1.87	3.29	3.12	1.70
Dhule	4.71	1.95	1.86	5.49	1.92	2.43
Nandurbar	0.00	2.27	1.46	0.00	1.82	1.20
Jalgaon	5.73	5.12	3.51	7.63	5.72	3.81
Nashik Division	13.70	12.00	8.70	16.42	12.59	9.52
Ahmednagar	2.99	3.37	5.17	2.73	3.41	4.45
Pune	2.56	2.38	2.60	2.44	2.34	2.88
Solapur	3.65	2.37	2.40	2.35	2.20	1.75
Pune Division	9.20	8.13	10.18	7.51	7.95	9.08
Satara	2.22	2.27	2.13	2.14	2.00	1.85
Sangli	2.83	2.45	1.67	2.77	2.44	1.51
Kolhapur	1.02	0.71	0.40	1.22	0.76	0.37
Kolhapur Division	6.07	5.43	4.19	6.12	5.21	3.72
Aurangabad	5.14	2.85	2.79	4.54	3.39	2.71
Jalna	4.83	3.92	4.09	4.29	3.75	3.12
Beed	4.00	3.16	4.93	3.00	3.73	3.51
Aurangabad Division	13.98	9.93	11.81	11.83	10.87	9.34
Latur	4.89	5.93	6.48	3.57	5.34	9.29
Osmanabad	4.65	6.27	5.43	3.05	5.70	3.30
Nanded	3.37	5.33	5.65	3.04	4.96	4.85
Parbhani	7.15	5.13	4.46	5.71	3.75	2.97
Hingoli	0.00	2.65	4.44	0.00	3.02	6.13
Latur Division	20.05	25.30	26.46	15.38	22.77	26.54
Buldhana	6.27	6.89	4.28	7.38	5.81	3.79
Akola	8.17	4.89	4.90	9.40	4.99	6.24
Washim	0.00	4.69	3.31	0.00	5.31	2.56
Amravati	5.46	6.12	7.30	6.73	6.77	8.46
Yavatmal	5.61	5.56	6.35	7.24	6.99	6.97
Amravati Division	25.51	28.14	26.13	30.75	29.86	28.02
Wardha	2.32	2.33	2.88	3.33	2.94	3.35
Nagpur	3.05	3.22	3.59	3.23	3.36	4.78
Bhandara	1.73	0.80	1.10	1.43	0.71	0.98
Gondia	0.00	0.52	0.65	0.00	0.42	0.52
Chandrapur	2.36	2.26	2.51	2.15	1.63	2.56
Gadchiroli	0.92	0.60	0.71	0.69	0.39	0.52
Nagpur Division	10.38	9.74	11.44	10.83	9.44	12.70
Total Maharashtra	100.00	100.00	100.00	100.00	100.00	100.00

Source: Computation are based on the figures/data obtained from 'Statistical Division, Commissionerate of Agriculture, Government of Maharashtra, Pune'

It is to be noted that Amravati, Latur, Nagpur, Aurangabad and Pune divisions account for almost 86 per cent share in total area under pulse crop of Maharashtra with Amravati and Latur division alone accounting for 53 per cent share in total area under pulse crops of the state. The share of Latur division in total area under pulse crop of Maharashtra has increased from 20 per cent in TE 1992-93 to 26 per cent in TE 2016-17.

Similarly, the share of Amravati division in total area under pulse crop of Maharashtra has increased from 26 per cent in TE 1992-93 to 28 per cent in TE 2006-07 with a decline in the same to again 26 per cent in TE 2016-17. The division of Nagpur has also shown a marginal increase in its share of pulse crop area of Maharashtra, which increased from 10 per cent in TE 1992-93 to 11 per cent in TE 2016-17. However, the division of Aurangabad showed a fluctuation in its share of pulse crop area of Maharashtra, which declined from 14 per cent in TE 1992-93 to 10 per cent in TE 2006-07 with a rise in the same to 12 per cent in TE 2016-17. A similar trend was noticed in case of Pune division, which showed a marginal decline in its share of pulse crop area of Maharashtra from 9 per cent in TE 1992-93 to 8 per cent in TE 2006-07 with a rise in the same to 10 per cent in TE 2016-17. The divisions of Nasik and Kolhapur have shown steady fall in their share in total pulse crop area of Maharashtra during the last two and a half decades.

In fact, the districts belonging to divisions of Latur, Amravati and Nagpur have shown significant rise in area under pulse crops not only in absolute terms but also in terms of their share in total pulse crop area of Maharashtra during the last two and a half decades (Table 2.2 and 2.3). On the other hand, the districts belonging to divisions of Nasik and Kolhapur have shown a declining trend not only in terms of absolute area under pulse crops but also in terms of their share in total pulse crop area of Maharashtra during the last two and a half decades. Thus, despite the fact that the area under pulse crop in Maharashtra has increased moderately during the last two and a half decades, there are considerable variations in area under tur crop across various districts/regions/ divisions of the state during this period.

Unlike moderate rise in area under pulse crops, the production of pulse crops in Maharashtra has increased from 14.11 lakh MT in TE 1992-93 to 19.88 lakh MT in TE 2006-07, and further to 25.66 MT in TE 2016-17, showing thereby 82 per cent rise in pulse crop production during the last two and a half decades with the period between TE 1992-93 and TE 2006-07 showing the major increase in this respect. The regions/divisions that have contributed significantly towards rise in pulse crop production of Maharashtra are Latur, Amravati, Nagpur and Aurangabad. During the period between TE 1992-93 and TE 2016-17, the pulse crop production is noticed to have increased from 4.34 lakh MT to 7.19 lakh MT in Amravati division, 2.17 lakh MT to 6.81 lakh MT in Latur division, 1.53 lakh MT to 3.26 lakh MT in Nagpur division, and 1.67 lakh MT to 2.40 lakh MT in Aurangabad division.

Although the division of Amravati accounts for the major share in pulse crop production of Maharashtra, the division of Latur has shown sharper increase in its share in pulse crop production of the state. This is concomitant from the fact that while the share of Amravati division in pulse crop production of Maharashtra remained constant at around 30 per cent between TE 1992-93 and TE 2016-17, the share of Latur division in this respect increased by leaps and bounds from 15.38 per cent to 26.54 per cent during the same period (Table 2.3). The share of Nagpur division in pulse crop production has marginally increased from 10.83 per cent in TE 1992-93 to 12.70 per cent in TE 2016-17, while Aurangabad division shows a marginal fall in the same from 11.83 per cent to 9.34 per cent during the same period. The divisions of Nasik and Kolhapur have shown sharp decline in their share in to total pulse production of Maharashtra, which declined from 16.42 per cent to 9.42 per cent for Nasik and 6.12 per cent to 3.72 per cent for Kolhapur during the period between TE 1992-93 and TE 2016-17. However, the division of Pune shows an increase in its share of pulse production in Maharashtra, which marginally increased from 7.51 per cent to 9.08 per cent between TE 1992-93 and TE 2016-17. The other divisions/regions like Konkan has marginal presence in terms of its contribution towards total pulse crop production of the state. In the state of Maharashtra, the districts that have significant contribution towards total pulse crop production are Yavatmal, Amravati, Akola, Latur, Hingoli, Nanded, Buldhana, Osmanabad, Wardha, Nagpur and Ahmednagar.

It is to be noted that there has not been any significant rise in area under pulse crops in Maharashtra during the last two decades. The substantial increase in pulse crop production in Maharashtra during the last two and a half decades is, therefore, due to perceptible increase in yield level of pulse crops during this period, which has increased from 435.39 kg/ha in TE 1992-93 to as much as 560.38 kg/ha in TE 2006-07, and further to 680.23 kg/ha in TE 2016-17. The districts belonging to Latur and Amravati divisions of Maharashtra have shown tremendous increase in their yield levels of pulse crops. For instance, during the period between TE 1992-93 and TE 2016-17, the yield level of pulse crops has increased from 318 kg/ha to 974 kg/ha in Latur district, 285 kg/ha to 414 kg/ha in Osmanabad district, 393 kg/ha to 584 kg/ha in Nanded district, 348 kg/ha to 453 kg/ha in Parbhani district, 512 kg/ha to 602 kg/ha in Buldana district, 501 kg/ha to 867 kg/ha in Akola district, 536 kg/ha to 788 kg/ha in Amravati district and 562 kg/ha to 747 kg/ha in Yavatmal district. Some of the districts belonging to Nagpur division have also shown significant rise in their yield level of pulse crops, and important among these are Wardha,

Nagpur, Bhandara and Chandrapur districts. During the period between TE 1992-93 and TE 2016-17, the yield level of pulse crops has increased from 625 kg/ha to790 kg/ha in Wardha district, 460 kg/ha to 907 kg/ha in Nagpur district, 6360 kg/ha to 606 kg/ha in Bhandara district, and 396 kg/ha to 693 kg/ha in Chandrapur district. The other districts like Ahmednagar and Pune belonging to Pune division and Dhule, Jalgaon, Satara, Kolhapur and Aurangabad belonging to Nasik, Pune and Aurangabad divisions have also shown perceptible increase in their yield levels of pulse crops during the period between TE 1992-93 and TE 2016-17.

2.2 Share of Pulse at District Level in Gross Cropped Area

The course of time has seen the state of Maharashtra showing not only rise in area under various pulse crops but also rise in share of pulse cropped area in total cultivable as well as gross cropped area. The estimates relating to geographical area, cultivable area, share of cultivable in geographical area, area under pulse crops and proportion of pulse cropped area to cultivable area during the last one decade for various districts and divisions of Maharashtra are brought out in Table 2.4. Similar estimates with respect to gross cropped area are shown in Table 2.5.

Although cultivable area in Maharashtra has marginally declined and there is near stagnant area under cultivation as proportion of geographical area during the last one decade, the area under pulse crops and proportion of pulse cropped area to cultivable area have increased during this period in the state. The districts that have shown significant rise in their pulse cropped area as proportion of cultivable area during the last one decade belong to the divisions of Nagpur, Latur, Aurangabad and Pune. On the other hand, various districts belonging to the divisions of Nasik and Kolhapur have shown decline in their pulse cropped area as proportion of cultivable area during the same period. The districts belonging to Amravati division have shown by and large constant share of pulse cropped area in their total cultivable area during the given period of time. The estimates clearly show that during the period between TE 2006-07 and TE 2016-17, the increase in pulse cropped area as proportion of cultivable area is from 15 per cent to 19 per cent in Nagpur division, 28 per cent to 32 per cent in Latur division, 14 per cent to 18 per cent in Aurangabad division and 8 per cent to 11 per cent in Pune division. As against this, the decline in pulse cropped area as proportion of cultivable area during the same period is from 16 per cent to 12 per cent in Nasik division and 10 per cent to 8 per cent in Kolhapur division. In general, pulse cropped area as proportion of cultivable area has increased from 17 per cent to 18 per cent in Maharashtra during the last one decade.

Unlike marginal decline in cultivable area, the gross cropped area (GCA) in Maharashtra has increased by 2.79 per cent during the period between TE 2006-07 and TE 2016-17. The increase in GCA in Maharashtra is mainly contributed by significant rise in the same in districts belonging to the divisions of Aurangabad, Nagpur and Latur.

Table 2.4: District wise Geographical, Cultivable and Pulses Crop Area in Maharashtra

(Area in '00' Hectares)

District	Geographical area	Cultivable area during		% age cultivable area to geographical area		Area under Pulse crops		% age Pulses area to cultivable area	
		TE	TE	TE	TE	TE	TE	TE	TE
		2006-07	2016-17	2006-07	2016-17	2006-07	2016-17	2006-07	2016-17
Mumbai Sub	380	-	-	-	-	-	-	-	-
Thane	9337	3321	3247	35.57	34.78	199	167	5.98	5.14
Raigad	6869	3095	3083	45.05	44.89	138	162	4.45	5.26
Ratnagiri	8164	5493	5559	67.29	68.09	75	50	1.37	0.90
Sindhudurg	5040	3486	3486	69.17	69.17	61	29	1.76	0.82
Konkan Div	29790	15395	15376	51.68	51.62	473	409	3.07	2.66
Nasik	15634	10157	10142	64.97	64.87	948	707	9.33	6.97
Dhule	7330	4566	4510	62.29	61.53	690	701	15.12	15.53
Nandurbar	7050	3063	2957	43.45	41.95	804	549	26.26	18.58
Jalgaon	11639	8738	8727	75.07	74.98	1815	1325	20.77	15.18
Nasik Div	41653	26523	26336	63.68	63.23	4257	3282	16.05	12.46
Ahmednagar	17020	13553	13547	79.63	79.59	1197	1952	8.83	14.41
Pune	15620	10586	9178	67.77	58.76	846	982	7.99	10.70
Solapur	14878	13274	13257	89.22	89.10	840	907	6.33	6.84
Pune Div.	47518	37413	35981	78.74	75.72	2883	3840	7.71	10.67
Satara	10580	6818	6816	64.45	64.43	806	802	11.83	11.76
Sangli	8610	7189	7157	83.50	83.12	869	631	12.09	8.82
Kolhapur	7765	5066	5065	65.24	65.23	253	149	4.99	2.94
Kolhapur Div	26955	19074	19038	70.76	70.63	1928	1582	10.11	8.31
Aurangabad	10077	8164	8113	81.02	80.51	1012	1051	12.39	12.95
Jalna	7726	7148	7155	92.52	92.61	1390	1544	19.45	21.58
Beed	10686	9420	9437	88.15	88.31	1121	1861	11.90	19.72
Aurangabad Div	28489	24732	24704	86.81	86.72	3522	4455	14.24	18.03
Latur	7157	6524	6495	91.15	90.75	2104	2446	32.25	37.65
Osmanabad	7485	7015	6979	93.72	93.24	2225	2047	31.72	29.33
Nanded	10331	8425	8383	81.55	81.14	1890	2129	22.43	25.40
Parbhani	6311	5745	5747	91.03	91.06	1820	1683	31.68	29.28
Hingoli	4661	4007	3975	85.97	85.28	939	1673	23.43	42.09
Latur Div	35945	31715	31580	88.23	87.86	8978	9978	28.31	31.60
Buldhana	9671	7399	7354	76.50	76.05	2443	1613	33.02	21.93
Akola	5429	4545	4512	83.72	83.10	1733	1847	38.13	40.93
Washim	5131	4102	4087	79.95	79.65	1665	1247	40.58	30.52
Amravati	12217	8147	8142	66.68	66.64	2171	2752	26.65	33.81
Yavatmal	13519	9444	9527	69.86	70.47	1973	2397	20.89	25.16
Amravati Div	45967	33637	33621	73.18	73.14	9985	9856	29.68	29.32
Wardha	6289	4732	4636	75.25	73.72	826	1087	17.45	23.44
Nagpur	9864	6396	6401	64.84	64.89	1142	1352	17.86	21.13
Bhandara	5373	2773	2024	51.62	59.19	283	413	10.22	20.42
Gondia	3906	1448	2153	37.06	36.75	186	247	12.83	11.47
Chandrapur	10918	5304	5306	48.58	48.60	803	947	15.15	17.84
Gadchiroli	14916	2541	2541	17.04	17.03	214	269	8.43	10.60
Nagpur Div	51266	23194	23061	45.24	44.98	3455	4314	14.90	18.71
State Total	307583	211683	209698	68.82	68.18	35482	37717	16.76	17.99

Source: Computations are based on figures/data obtained from the 'Statistical Division, Commissionerate of Agriculture, Department of Agriculture, Government of Maharashtra, Central Building, Pune'

Table 2.5: District wise Share of Pulse Crop Area in Gross Cropped Area of Maharashtra

(Area in '00' Hectares)

District	Geographical Area	Gross Cropped Area during		Area under Pulse Crops		% age Pulses Area to Gross Cropped Area	
		TE	TE	TE	TE	TE	TE
		2006-07	2016-17	2006-07	2016-17	2006-07	2016-17
Mumbai Sub	380	-	-	-	-	-	-
Thane	9337	2504	2451	199	167	7.93	6.81
Raigad	6869	2155	2144	138	162	6.39	7.57
Ratnagiri	8164	2555	2630	75	50	2.95	1.90
Sindhudurg	5040	1590	1591	61	29	3.86	1.80
Konkan Div	29790	8804	8816	473	409	5.37	4.64
Nasik	15634	9783	9978	948	707	9.69	7.08
Dhule	7330	4973	5383	690	701	13.88	13.02
Nandurbar	7050	3392	3578	804	549	23.71	15.35
Jalgaon	11639	14090	11888	1815	1325	12.88	11.14
Nasik Div	41653	32238	30827	4257	3282	13.21	10.65
Ahmednagar	17020	14616	14527	1197	1952	8.19	13.43
Pune	15620	11631	10547	846	982	7.27	9.31
Solapur	14878	11221	11908	840	907	7.49	7.61
Pune Div.	47518	37468	36982	2883	3840	7.70	10.38
Satara	10580	6669	6748	806	802	12.09	11.88
Sangli	8610	7210	7517	869	631	12.05	8.39
Kolhapur	7765	7979	6071	253	149	3.17	2.45
Kolhapur Div	26955	21858	20270	1928	1582	8.82	7.80
Aurangabad	10077	10702	11051	1012	1051	9.45	9.51
Jalna	7726	7305	8755	1390	1544	19.03	17.64
Beed	10686	9044	10328	1121	1861	12.39	18.02
Aurangabad Div	28489	27051	30134	3522	4455	13.02	14.79
Latur	7157	7248	7277	2104	2446	29.03	33.61
Osmanabad	7485	7163	8470	2225	2047	31.07	24.16
Nanded	10331	8236	8999	1890	2129	22.95	23.66
Parbhani	6311	8552	8795	1820	1683	21.28	19.13
Hingoli	4661	5218	5762	939	1673	18.00	29.04
Latur Div	35945	36416	39304	8978	9978	24.65	25.39
Buldhana	9671	8375	9421	2443	1613	29.17	17.12
Akola	5429	5274	6817	1733	1847	32.87	27.09
Washim	5131	5460	5305	1665	1247	30.49	23.51
Amravati	12217	10815	9840	2171	2752	20.08	27.97
Yavatmal	13519	9765	9926	1973	2397	20.20	24.15
Amravati Div	45967	39690	41308	9985	9856	25.16	23.86
Wardha	6289	3867	4581	826	1087	21.36	23.72
Nagpur	9864	5973	6526	1142	1352	19.12	20.72
Bhandara	5373	2865	2541	283	413	9.89	16.27
Gondia	3906	1414	2421	186	247	13.13	10.20
Chandrapur	10918	5459	5347	803	947	14.72	17.71
Gadchiroli	14916	1830	2147	214	269	11.71	12.55
Nagpur Div	51266	21408	23562	3455	4314	16.14	18.31
State Total	307583	224933	231202	35482	37717	15.77	16.31

Source: Computations are based on figures/data obtained from the 'Statistical Division, Commissionerate of Agriculture, Department of Agriculture, Government of Maharashtra, Central Building, Pune'

The districts of Aurangabad division of Maharashtra have shown about 11 per cent rise in GCA between TE 2006-07 and TE 2016-17 whereas districts of Nagpur are marked with 10 per cent rise in the same during the same period. The Districts belonging

to Amravati and Latur have shown 4-8 per cent increase in their GCA during the period between TE 2006-07 and TE 2016-17. As against this, while districts belonging to Kolhapur division have shown about 7 per cent decline in GCA between TE 2006-07 and TE 2016-17, this decline in GCA for districts of Nasik is about 4 per cent during the same period. Even districts belonging to Pune division have shown marginal decline in their GCA during the given period of time. However, the increase in GCA for districts belonging to Aurangabad, Nagpur, Latur and Amravati has more than compensated the decline in GCA for districts of Nasik, Kolhapur and Pune. Consequently, the GCA in Maharashtra has increased during the last one decade.

An increase in pulse cropped area coupled with rise in GCA over time has resulted in marginal rise in share of pulse cropped area in GCA of the state during the period between TE 2006-07 and TE 2016-17. The share of pulse cropped area in GCA of the state has marginally increased from 15.77 per cent in TE 2006-07 to 16.31 per cent in TE 2016-17. The major districts that have shown a rise in their pulse cropped area as proportion of their GCA belong to the divisions of Nagpur, Aurangabad and Pune. Between TE 2006-07 and TE 2016-17, the share of pulse cropped area in GCA is found to have increased from 16 per cent to 18 per cent in Nagpur division, 13 per cent to 15 per cent in Aurangabad division, and 8 per cent to 10 per cent in Pune division. The divisions of Latur and Amravati have shown by and large constant pulse cropped area as proportion of their GCA. Some of the divisions of Maharashtra like Kolhapur and Nasik have shown a decline in their pulse cropped area as proportion of their GCA. Incidentally, all the districts belonging to Pune division of Maharashtra have shown an increase in their pulse cropped area as proportion of their GCA. This is despite the fact that GCA of Pune division has marginally fallen over time. Therefore, an increase in share of pulse cropped area in GCA in Pune division is mainly due to sharp increase in area under pulse crop cultivation during the given period of time. In general, the districts that have shown an increase in their share of pulse cropped area in GCA during the period between TE 2006-07 and TE 2016-17 are Ahmednagar, Pune, Beed, Latur, Nanded, Hingoli, Amravati, Yavatmal, Wardha, Bhandara, and Chandrapur. These districts are the major contributors of pulse production in Maharashtra.

2.3 Share of Individual Pulses in total Pulses in Maharashtra

The state of Maharashtra has shown interesting trends in terms of area and production of various foodgrain crops during the last one decade or so. While area under

all foodgrain crops put together has marginally fallen during the period between TE 2006-07 and TE 2016-17, the production of these crops increased during this period in Maharashtra. The decline in area under foodgrains between TE 2006-07 and TE 2016-17 is mainly due to sharp decline in area under course cereals since area under main cereals and pulses have increased with pulses showing sharper rise in their acreage during this period. The estimates presented in Table 2.6 and Table 2.7 clearly show 8.34 per cent decline in area under foodgrains during the period between TE 2006-07 and TE 2016-17, which is seen to have been caused by 20.73 per cent decline in area under course cereals during this period. On the other hand, while area under pulse crops in Maharashtra has increased by 6.30 per cent between TE 2006-07 and TE 2016-17, the rise in area under wheat is 11.35 per cent during the same period. The area under rice in Maharashtra has grown by nearly 1 per cent during the same period.

It is to be noted that the course cereals in Maharashtra have not only shown decline in area under their cultivation in absolute terms but also in terms of their share in foodgrain area. The course cereals in Maharashtra accounted for as much as 53 per cent share in foodgrain area in TE 2006-07, which declined to 46 per cent in TE 2016-17. As against this, the share of pulse crops in foodgrain area of the state has increased from 27 per cent in TE 2006-07 to 32 per cent in TE 2016-17. Similarly, the share of wheat cropped area in foodgrains has increased from nearly 8 per cent in TE 2006-17 to 9 per cent in TE 2016-17. Therefore, decline in share of course cereal cropped area in foodgrains is mainly compensated by rise in share of pulse cropped area in Maharashtra.

Although foodgrain production in Maharashtra has increased by 3.72 per cent during the period between TE 2006-07 and TE 2016-17, the increase is mainly on account of sharp increase in production of pulses and main cereals since course cereals have again shown a decline in their production during this period. While the production of pulse crops in Maharashtra increased by 29 per cent between TE 2006-07 and TE 2016-17, this increase for rice is noticed to be of the order of 23 per cent and that for wheat it is to the tune of nearly 8 per cent during the same period. Contrary to rise in pulse and main cereal production, the course cereal production in Maharashtra has declined by 14 per cent during the period between TE 2006-07 and TE 2016-17.

The share of course cereals in foodgrain production in the state has also gone down from 50 per cent in TE 2006-07 to 42 per cent in TE 2016-17. The declining share of course cereals is found to be compensated by rising shares of pulses and main cereals in foodgrain production of the state during the last one decade (Table 2.6 and Table 2.7).

Table 2.6: Area and Production of Major Crops at District Level in Maharashtra (TE 2006-07) (Area in '00' Hectares; Production in '00' Metric Tonnes)

District	Rice/Paddy		Course Cereals		Wheat		Pulses		Foodgrains		Black Gram		Red Gram		Bengal Gram		Green Gram	
	Area	Prod.	Area	Prod.	Area	Prod.	Area	Prod.	Area	Prod.	Area	Prod.	Area	Prod.	Area	Prod.	Area	Prod.
Mumbai	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thane	1402	3011	279	207	2	2	199	128	1882	3348	52	48	29	17	40	27	10	5
Raigad	1316	3022	147	102	0	0	138	67	1601	3192	7	6	11	6	16	11	2	1
Ratnagiri	782	1979	242	248	0	0	75	36	1099	2263	4	4	6	3	0	0	2	1
Sindhudurg	788	2242	36	38	0	0	61	29	885	2309	4	3	0	0	0	0	1	1
Nashik	500	595	4142	3833	701	1119	948	620	6291	6167	122	109	95	69	432	287	92	75
Dhule	51	42	1931	1967	241	396	690	382	2913	2787	93	45	88	46	186	127	235	129
Nadurbar	203	192	1000	1004	124	237	804	362	2131	1795	174	71	237	96	159	107	160	64
Jalgaon	2	3	2551	4460	418	855	1815	1137	4786	6454	592	264	288	209	529	493	380	164
Ahmednagar	81	53	8215	4330	1154	1855	1197	678	10648	6917	49	23	121	51	754	512	128	55
Pune	653	759	6100	3679	622	1106	846	466	8221	6011	24	18	38	25	483	327	70	31
Solapur	4	1	7582	3919	595	704	840	437	9021	5061	67	35	210	86	431	270	35	22
Satara	442	799	3196	2583	401	733	806	398	4846	4513	51	23	55	24	273	193	53	25
Sangli	180	375	3612	2834	283	465	869	485	4944	4160	81	53	132	57	294	192	66	30
Kolhapur	1101	2718	580	829	95	196	253	152	2029	3896	29	17	30	13	96	77	28	13
Aurangabad	2	1	4023	5210	460	789	1012	675	5496	6675	46	27	400	263	432	324	93	56
Jalna	2	1	3122	3569	258	388	1390	745	4772	4703	176	80	535	346	169	117	423	184
Beed	22	10	4989	3570	423	466	1121	741	6555	4788	80	55	499	401	345	200	80	54
Latur	180	70	1824	2144	319	346	2104	1061	4427	3621	619	118	700	582	500	305	244	44
Osmanabad	177	66	3598	2566	335	302	2225	1134	6335	4068	487	193	880	473	624	379	199	79
Nanded	159	81	2034	1985	365	422	1890	987	4447	3475	507	195	537	381	505	287	320	118
Parbhani	82	30	2864	2121	417	485	1820	745	5183	3381	157	39	571	264	505	276	557	155
Hingoli	55	18	821	749	409	637	939	601	2225	2004	163	70	241	222	334	229	192	75
Buldhana	0	0	1495	1757	369	426	2443	1155	4307	3338	620	225	609	392	492	308	714	228
Akola	0	0	879	1696	167	303	1733	993	2779	2993	155	49	544	399	482	386	547	158
Washim	3	1	532	594	110	148	1665	1055	2311	1799	379	201	502	422	424	266	358	166
Amravati	94	46	970	1114	176	259	2171	1345	3411	2764	62	18	930	748	541	427	607	139
Yavatmal	16	7	1078	963	180	195	1973	1389	3247	2553	131	47	1242	1002	353	251	241	87
Wardha	2	2	209	176	199	265	826	585	1236	1028	4	2	550	438	260	139	7	4
Nagpur	453	584	426	346	486	549	1142	668	2508	2146	17	7	525	329	524	301	19	7
Bhandara	1731	2260	3	3	98	87	283	141	2115	2491	2	1	75	49	53	28	3	2
Gondia	1833	2061	4	4	30	20	186	83	2054	2167	3	1	49	32	31	13	1	1
Chandrapur	1386	1706	289	179	283	197	803	324	2762	2406	4	2	241	90	234	117	8	4
Gadchiroli	1465	1885	88	67	9	8	214	77	1777	2037	2	1	20	13	29	11	2	1
State Total	15168	24620	68861	58844	9731	13960	35482	19884	129242	117308	4963	2050	10988	7550	10528	6988	5876	2177

Source: Computations are based on figures obtained from the 'Statistical Division, Commissionerate of Agriculture, Government of Maharashtra, Central Building, Pune'

Table 2.7: Area and Production of Major Crops at District Level in Maharashtra (TE 2016-17) (Area in '00' Hectares; Production in '00' Metric Tonnes)

District	Rice/Paddy		Course Cereals		Wheat		Pulses		Foodgrains		Black Gram		Red Gram		Bengal Gram		Green Gram	
	Area	Prod.	Area	Prod.	Area	Prod.	Area	Prod.	Area	Prod.	Area	Prod.	Area	Prod.	Area	Prod.	Area	Prod.
Mumbai	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thane	1331	3368	217	160	0	0	167	112	1712	3641	41	26	25	15	37	31	2	0
Raigad	1181	3333	91	75	0	0	162	111	1434	3519	3	2	15	8	6	5	1	0
Ratnagiri	729	2103	166	197	0	0	50	33	945	2334	1	1	5	2	0	0	1	0
Sindhudurg	671	2109	28	43	0	0	29	19	727	2170	1	1	5	3	0	0	1	0
Nashik	709	1112	3388	6366	705	1233	707	436	5509	9147	39	22	63	30	468	325	72	39
Dhule	29	44	2320	3131	410	760	701	622	3460	4557	84	33	119	60	278	454	199	65
Nadurbar	208	186	933	1360	200	366	549	308	1890	2221	116	45	147	55	195	171	68	29
Jalgaon	0	0	2804	6351	482	836	1325	977	4611	8263	296	166	170	124	550	634	299	149
Ahmednagar	125	152	6920	4914	528	874	1952	1142	9524	7082	131	53	135	87	1368	900	276	86
Pune	634	1196	3571	3159	676	1344	982	740	5863	6438	22	15	20	9	680	643	138	35
Solapur	3	0	7032	3809	472	537	907	448	8414	4795	95	43	223	96	473	271	48	22
Satara	509	855	2751	2530	345	605	802	476	4407	4466	40	22	19	5	313	244	72	33
Sangli	183	392	3409	3537	258	556	631	386	4481	4872	97	58	76	22	259	214	84	48
Kolhapur	1128	3377	548	1031	44	98	149	94	1869	4599	7	6	14	4	67	57	12	7
Aurangabad	22	10	3490	3300	440	675	1051	695	5002	4680	13	5	461	308	517	356	51	24
Jalna	0	0	1663	1624	175	243	1544	800	3383	2667	221	90	466	278	377	276	474	154
Beed	3	1	5084	2547	514	442	1861	902	7461	3892	197	55	740	345	844	478	65	20
Latur	43	8	1294	971	497	395	2446	2383	4279	3756	103	38	1185	1639	1019	657	129	47
Osmanabad	85	14	2249	980	165	71	2047	848	4547	1913	280	75	761	320	863	419	112	26
Nanded	6	5	1316	671	408	383	2129	1244	3860	2303	443	82	784	446	639	636	261	78
Parbhani	1	0	2570	1460	220	242	1683	762	4473	2464	153	27	621	300	528	323	374	110
Hingoli	0	0	654	305	358	330	1673	1572	2685	2207	124	37	548	383	720	1085	212	61
Buldhana	0	0	867	1143	792	1022	1613	971	3270	3137	121	59	734	357	610	487	134	64
Akola	0	0	122	144	166	237	1847	1600	2135	1981	119	54	548	689	967	765	213	92
Washim	0	0	124	89	314	387	1247	657	1685	1133	90	45	535	249	535	325	79	35
Amravati	59	25	281	281	693	895	2752	2170	3786	3371	74	30	1115	804	1286	1214	265	116
Yavatmal	0	0	460	240	416	474	2397	1789	3273	2504	69	26	1350	1064	890	671	87	28
Wardha	0	0	67	34	138	192	1087	858	1291	1084	2	0	786	590	297	268	1	0
Nagpur	851	1244	46	33	1057	1457	1352	1227	3306	3961	13	2	652	725	659	489	12	4
Bhandara	1888	3284	2	2	111	132	413	250	2414	3669	1	0	116	107	115	61	1	0
Gondia	1931	3923	10	8	22	17	247	134	2210	4082	1	0	65	60	48	27	4	1
Chandrapur	1429	1587	89	73	216	197	947	656	2681	2514	2	1	390	396	285	153	6	2
Gadchiroli	1539	2074	22	37	10	11	269	134	1841	2256	0	0	46	41	100	47	0	0
State Total	15298	30403	54583	50607	10835	15010	37717	25656	118432	121676	3000	1121	12942	9623	15995	12685	3751	1378

Source: Computations are based on figures obtained from the 'Statistical Division, Commissionerate of Agriculture, Government of Maharashtra, Central Building, Pune'

During the period between TE 2006-07 and TE 2016-17, while the share of pulses in foodgrain production of Maharashtra increased from 17 per cent to 21 per cent, the rise in this share for rice crop was from 21 per cent to 25 per cent with wheat crop showing by and large a constant share of 12 per cent in foodgrain production. Thus, course cereals have shown a sharp decline in their share in the face of significant rise in share of pulses and main cereals in foodgrain production of Maharashtra.

A further analysis drawn from Table 2.6 and Table 2.7 in terms share of various pulse crops in total area and production of pulses for different districts and divisions of Maharashtra and presented in Table 2.8 and Table 2.9 shows considerable variations in shares of individual major pulse crops in total pulses in Maharashtra.

The major pulse crops cultivated in Maharashtra encompass black gram, red gram, Bengal gram and green gram though some other pulses like horse gram (Kulthi), Masoor pulse (red lentil), Moth bean (Matki), etc. also find place in total pulse cropped area of the state. Among various pulse crops cultivated in Maharashtra, red gram and Bengal gram account for the major share in total pulse cropped area, followed by green gram and black gram. These four major pulse crops are cultivated in almost all the districts of Maharashtra with considerable variations in terms of acreage under the crop. While red gram and Bengal are chiefly/prominently cultivated in districts belonging to Amravati, Latur, Nagpur, Aurangabad and Pune divisions of Maharashtra, black gram and green gram mainly find place in pulse cropped area of districts belonging to Latur, Aurangabad, Kolhapur and Nasik divisions of the state. Since Latur and Amravati divisions alone account for 53 per cent share in total pulse cropped area of Maharashtra, these two divisions assume considerable importance.

It is to be noted that more than 98 per cent of pulse cropped area of Latur and Amravati divisions of Maharashtra is under four major pulse crops such as black gram, red gram, Bengal gram and green gram, and the area under these four major pulse crops has undergone considerable change during the last one decade or so. This is concomitant from the fact that during the period between TE 2006-07 and TE2016-17, the share of area under red gram and Bengal gram in total pulse cropped area of Latur division of Maharashtra increased from 60 per cent to 77 per cent in the face of decline in share of area under black gram and green gram in total pulse cropped area of the division from 38 per cent to 22 per cent. Similarly, in the division of Amravati, the share of red and Bengal gram in total pulse cropped area of the division has grown from 61 per cent to 87 per cent in the face of decline in share of black and green gram in total pulse cropped area from 38

per cent to as low as 13 per cent during the same period of time. These estimates clearly show that the major pulse cultivating divisions of Maharashtra are now mainly focusing on red and Bengal gram cultivation in place of black and green gram cultivation. In the division of Nagpur, the share of red and Bengal gram in total pulse cropped area has also grown from 75 per cent to 83 per cent during the last one decade.

Table 2.8: Share of Individual Pulses in Total Pulse Cropped Area of Maharashtra

(Area in '00' Hectares)

Districts	Total Pulse Area		Black Gram		Red Gram		Bengal Gram		Green Gram	
	2006-07	2016-17	2006-07	2016-17	2006-07	2016-17	2006-07	2016-17	2006-07	2016-17
			Share (%)							
Thane	199	167	26.13	24.55	14.57	14.97	20.10	22.16	5.03	1.20
Raigad	138	162	5.07	1.85	7.97	9.26	11.59	3.70	1.45	0.62
Ratnagiri	75	50	5.33	2.00	8.00	10.00	0.00	0.00	2.67	2.00
Sindhudurg	61	29	6.56	3.45	0.00	17.24	0.00	0.00	1.64	3.45
Kokan Div.	473	409	14.16	11.25	9.73	13.20	11.84	10.51	3.17	0.98
Nashik	948	707	12.87	5.52	10.02	8.91	45.57	66.20	9.70	10.18
Dhule	690	701	13.48	11.98	12.75	16.98	26.96	39.66	34.06	28.39
Nadurbar	804	549	21.64	21.13	29.48	26.78	19.78	35.52	19.90	12.39
Jalgaon	1815	1325	32.62	22.34	15.87	12.83	29.15	41.51	20.94	22.57
Nashik Div.	4257	3282	23.04	16.30	16.61	15.20	30.68	45.43	20.34	19.44
Ahmednagar	1197	1952	4.09	6.71	10.11	6.92	62.99	70.08	10.69	14.14
Pune	846	982	2.84	2.24	4.49	2.04	57.09	69.25	8.27	14.05
Solapur	840	907	7.98	10.47	25.00	24.59	51.31	52.15	4.17	5.29
Pune Div.	2883	3840	4.86	6.46	12.80	9.84	57.86	65.65	8.08	12.03
Satara	806	802	6.33	4.99	6.82	2.37	33.87	39.03	6.58	8.98
Sangli	869	631	9.32	15.37	15.19	12.04	33.83	41.05	7.59	13.31
Kolhapur	253	149	11.46	4.70	11.86	9.40	37.94	44.97	11.07	8.05
Kolhapur Div.	1928	1582	8.35	9.10	11.26	6.95	34.39	40.46	7.62	10.62
Aurangabad	1012	1051	4.55	1.24	39.53	43.86	42.69	49.19	9.19	4.85
Jalna	1390	1544	12.66	14.31	38.49	30.18	12.16	24.42	30.43	30.70
Beed	1121	1861	7.14	10.59	44.51	39.76	30.78	45.35	7.14	3.49
Aurangabad Div.	3522	4455	8.57	9.67	40.72	37.42	26.86	39.01	16.92	13.22
Latur	2104	2446	29.42	4.21	33.27	48.45	23.76	41.66	11.60	5.27
Osmanabad	2225	2047	21.89	13.68	39.55	37.18	28.04	42.16	8.94	5.47
Nanded	1890	2129	26.83	20.81	28.41	36.82	26.72	30.01	16.93	12.26
Parbhani	1820	1683	8.63	9.09	31.37	36.90	27.75	31.37	30.60	22.22
Hingoli	939	1673	17.36	7.41	25.67	32.76	35.57	43.04	20.45	12.67
Latur Div.	8978	9978	21.53	11.05	32.62	39.08	27.49	37.78	16.85	10.89
Buldhana	2443	1613	25.38	7.50	24.93	45.51	20.14	37.82	29.23	8.31
Akola	1733	1847	8.94	6.44	31.39	29.67	27.81	52.36	31.56	11.53
Washim	1665	1247	22.76	7.22	30.15	42.90	25.47	42.90	21.50	6.34
Amravati	2171	2752	2.86	2.69	42.84	40.52	24.92	46.73	27.96	9.63
Yavatmal	1973	2397	6.64	2.88	62.95	56.32	17.89	37.13	12.21	3.63
Amravati Div.	9985	9856	13.48	4.80	38.33	43.44	22.95	43.51	24.71	7.88
Wardha	826	1087	0.48	0.18	66.59	72.31	31.48	27.32	0.85	0.09
Nagpur	1142	1352	1.49	0.96	45.97	48.22	45.88	48.74	1.66	0.89
Bhandara	283	413	0.71	0.24	26.50	28.09	18.73	27.85	1.06	0.24
Gondia	186	247	1.61	0.40	26.34	26.32	16.67	19.43	0.54	1.62
Chandrapur	803	947	0.50	0.21	30.01	41.18	29.14	30.10	1.00	0.63
Gadchiroli	214	269	0.93	0.00	9.35	17.10	13.55	37.17	0.93	0.00
Nagpur Div.	3455	4314	0.93	0.46	42.23	47.64	32.74	34.89	1.16	0.56
State Total	35482	37717	13.99	7.95	30.97	34.31	29.67	42.41	16.56	9.95

Note: The estimates with respect to shares of individual pulses in total pulse cropped area are presented for major pulses like black gram, red gram, Bengal gram and green gram. There are also some other pulse crops cultivated in Maharashtra which encompass horse gram (Kulthi), Masoor pulse (red lentil), Moth bean (Matki), etc.

Source: Computations are based on figures obtained from the 'Statistical Division, Commissionerate of Agriculture, Government of Maharashtra, Central Building, Pune'

Table 2.9: Share of Individual Pulses in Total Pulse Production in Maharashtra

(Production in '00' Metric Tonnes)

Districts	Total Pulse Prod.		Black Gram		Red Gram		Bengal Gram		Green Gram	
	2006-07	2016-17	2006-07	2016-17	2006-07	2016-17	2006-07	2016-17	2006-07	2016-17
			Share (%)							
Thane	128	112	37.50	23.21	13.28	13.39	21.09	27.68	3.91	0.00
Raigad	67	111	8.96	1.80	8.96	7.21	16.42	4.50	1.49	0.00
Ratnagiri	36	33	11.11	3.03	8.33	6.06	0.00	0.00	2.78	0.00
Sindhudurg	29	19	10.34	5.26	0.00	15.79	0.00	0.00	3.45	0.00
Kokan Div.	260	266	23.46	11.28	10.38	10.53	14.62	13.16	3.08	0.38
Nashik	620	436	17.58	5.05	11.13	6.88	46.29	74.54	12.10	8.94
Dhule	382	622	11.78	5.31	12.04	9.65	33.25	72.99	33.77	10.45
Nadurbar	362	308	19.61	14.61	26.52	17.86	29.56	55.52	17.68	9.42
Jalgaon	1137	977	23.22	16.99	18.38	12.69	43.36	64.89	14.42	15.25
Nashik Div.	2503	2444	19.58	10.88	16.78	11.05	40.51	64.81	17.26	11.58
Ahmednagar	678	1142	3.39	4.64	7.52	7.62	75.52	78.81	8.11	7.53
Pune	466	740	3.86	2.03	5.36	1.22	70.17	86.89	6.65	4.73
Solapur	437	448	8.01	9.60	19.68	21.43	61.78	60.49	5.03	4.91
Pune Div.	1581	2330	4.74	4.72	10.25	8.24	70.15	77.85	6.83	6.09
Satara	398	476	5.78	4.62	6.03	1.05	48.49	51.26	6.28	6.93
Sangli	485	386	10.93	15.03	11.75	5.70	39.59	55.44	6.19	12.44
Kolhapur	152	94	11.18	6.38	8.55	4.26	50.66	60.64	8.55	7.45
Kolhapur Div.	1036	955	8.88	9.11	9.07	3.25	44.59	53.93	6.56	9.21
Aurangabad	675	695	4.00	0.72	38.96	44.32	48.00	51.22	8.30	3.45
Jalna	745	800	10.74	11.25	46.44	34.75	15.70	34.50	24.70	19.25
Beed	741	902	7.42	6.10	54.12	38.25	26.99	52.99	7.29	2.22
Aurangabad Div.	2162	2397	7.54	6.26	46.72	38.80	29.65	46.31	13.60	8.26
Latur	1061	2383	11.12	1.59	54.85	68.78	28.75	27.57	4.15	1.97
Osmanabad	1134	848	17.02	8.84	41.71	37.74	33.42	49.41	6.97	3.07
Nanded	987	1244	19.76	6.59	38.60	35.85	29.08	51.13	11.96	6.27
Parbhani	745	762	5.23	3.54	35.44	39.37	37.05	42.39	20.81	14.44
Hingoli	601	1572	11.65	2.35	36.94	24.36	38.10	69.02	12.48	3.88
Latur Div.	4528	6808	13.58	3.82	42.45	45.36	32.60	45.83	10.40	4.73
Buldhana	1155	971	19.48	6.08	33.94	36.77	26.67	50.15	19.74	6.59
Akola	993	1600	4.93	3.38	40.18	43.06	38.87	47.81	15.91	5.75
Washim	1055	657	19.05	6.85	40.00	37.90	25.21	49.47	15.73	5.33
Amravati	1345	2170	1.34	1.38	55.61	37.05	31.75	55.94	10.33	5.35
Yavatmal	1389	1789	3.38	1.45	72.14	59.47	18.07	37.51	6.26	1.57
Amravati Div.	5937	7188	9.10	2.99	49.92	44.02	27.59	48.16	13.09	4.67
Wardha	585	858	0.34	0.00	74.87	68.76	23.76	31.24	0.68	0.00
Nagpur	668	1227	1.05	0.16	49.25	59.09	45.06	39.85	1.05	0.33
Bhandara	141	250	0.71	0.00	34.75	42.80	19.86	24.40	1.42	0.00
Gondia	83	134	1.20	0.00	38.55	44.78	15.66	20.15	1.20	0.75
Chandrapur	324	656	0.62	0.15	27.78	60.37	36.11	23.32	1.23	0.30
Gadchiroli	77	134	1.30	0.00	16.88	30.60	14.29	35.07	1.30	0.00
Nagpur Div.	1878	3259	0.75	0.12	50.64	58.91	32.48	32.07	0.96	0.25
State Total	19884	25656	10.31	4.37	37.97	37.51	35.14	49.44	10.95	5.37

Note: The estimates with respect to shares of individual pulses in total pulse production are presented for major pulses like black gram, red gram, Bengal gram and green gram. There are also some other pulse crops cultivated in Maharashtra which encompass horse gram (Kulthi), Masoor pulse (red lentil), Moth bean (Matki), etc.

Source: Computations are based on figures obtained from the 'Statistical Division, Commissionerate of Agriculture, Government of Maharashtra, Central Building, Pune'

At present, the division of Nagpur shows as much as 83 per cent of pulse cropped area under red and Bengal gram and only one per cent area under black and green gram. These estimates clearly show that about 16 per cent of pulse cropped area of Nagpur division is under some other pulse crops. Another division showing significant proportion of pulse cropped area under red and Bengal gram is Aurangabad. The Aurangabad

division of Maharashtra showed about 68 per cent of pulse cropped area under red and Bengal gram in TE 2006-07, which increased to 76 per cent in TE 2016-17. Unlike Latur and Amravati divisions, the division of Aurangabad shows only marginal decline in area under black and green gram as proportion of its total pulse cropped area, which declined from 25 per cent in TE 2006-07 to 23 per cent in TE 2016-17. The other divisions of Maharashtra like Pune, Nasik and Kolhapur show highest proportions of their pulse cropped area under Bengal gram.

The division of Pune showed about 58 per cent of its pulse cropped area under Bengal gram in TE 2006-07, which increased to 66 per cent in TE 2016-17. The Ahmednagar district of Pune division showed about 63 per cent of its pulse cropped area under Bengal gram in TE 2006-07, which further increased to 70 per cent in TE 2016-17. The area under red gram as proportion of total pulse cropped area in Pune division was only 13 per cent in TE 2006-07, which further decline to 10 per cent in TE 2016-17. On the other hand, the area under black and green gram as proportion of total pulse cropped area of Pune division increased from 13 per cent to 18 per cent during the period between TE 2006-07 and TE 2016-17. The division of Nasik showed 31 per cent of its pulse cropped area under Bengal gram in TE 2006-07, which increased to as much as 45 per cent in TE 2016-17. The division of Nasik followed a trend similar to Pune division and showed a decline in red gram area as proportion of its total pulse cropped area from 17 per cent to 15 per cent between TE 2006-07 and TE 2016-17. The area under black and green gram as proportion of its total pulse cropped area of Nasik division also declined from 43 per cent to 35 per cent during the same period. In the division of Kolhapur, the area under Bengal gram as proportion of its total pulse cropped area increased from 34 per cent to 40 per cent between TE 2006-07 and TE 2016-17. On the other hand, area under black and green gram as proportion of total pulse cropped area increased from 16 per cent in TE 2006-07 to 20 per cent in TE 20016-17.

Thus, the estimates shown in Table 2.8 presented us with several interesting observations. The estimates not only showed higher area allocation under red and Bengal gram but also rise in share of these crops in total pulse cropped area for the divisions of Latur, Amravati, Nagpur and Aurangabad during the last one decade. The districts belonging to the divisions of Latur, Amravati, Nagpur and Aurangabad showed an increase in their area under red and Bengal gram as proportion of their pulse cropped area from 60 per cent to more than 76 per cent during the period between TE 2006-07 and TE 2016-17 in the face of decline in their share of total pulse cropped area under black and

green gram, showing a considerable shift in area under black and green gram to red and Bengal gram during the last one decade. The estimates also showed the division of Pune to have as much as 58 per cent of its pulse cropped area under Bengal gram in TE 2006-07 with a rise in the same to 66 per cent in TE 2016-17. Similarly, the divisions of Nasik and Kolhapur showed a rise in their area under Bengal gram as proportion of their pulse cropped area from 31-34 per cent in TE 2006-07 to 40-45 per cent in TE 2016-17. As against the divisions of Latur, Amravati, Nagpur and Aurangabad, the divisions of Pune, Nasik and Kolhapur did not show very significant area under red gram as proportions of their total pulse cropped area during the last one decade or so. However, the division of Nasik showed significant proportions of its total pulse cropped area under black and green gram with a decline in the same during the last one decade. The area under black and green gram as proportion of total pulse cropped area was also not very significant for the divisions of Pune and Kolhapur.

Area under pulse crop is one end of the spectrum, the other end being production of these crops and the changes in share of individual pulse crops in total pulse crop production over time for various districts and divisions of Maharashtra. The course of time saw a rise in share of red and Bengal gram in total pulse crop production for the districts belonging to Latur, Amravati, Nagpur and Aurangabad divisions, which increased from 75-83 per cent in TE 2006-07 to 85-92 per cent in TE 2016-17 (Table 2.9). As against rise in share of red and Bengal gram, the share of black and green gram in total pulse crop production declined from 21-24 per cent in TE 2006-07 to 8-15 per cent in TE 2016-17, especially for the districts belonging to Latur, Amravati, and Aurangabad divisions. Thus, the increase in share of red and Bengal gram in total pulse crop production over time for the districts belonging to Latur, Amravati, and Aurangabad divisions is noticed in the face of decline in their share of black and green gram in total pulse crop production. The districts belonging to Nagpur division showed insignificant share of black and green gram in total pulse crop production during the last one decade. In the division of Pune, Bengal gram showed a rise in its share from 70 per cent to 78 per cent in the face of declining share of red gram from 10 per cent to 8 per cent in total pulse crop production during the period between TE 2006-07 and TE 2016-17. However, the share of black and green gram in total pulse crop production of Pune division remained by and large same and hovered at around 5-6 per cent. The share of Bengal gram in total pulse crop production also increased for Nasik and Kolhapur division with an increase in the same from 41-45 per cent to 54-65 per cent during the last one decade. As against

this, the share of black gram in total pulse crop production of Nasik division declined from 20 per cent to 11 per cent and for green gram this decline was from 17 per cent to 12 per cent during the past one decade. However, the division of Kolhapur showed by and large same share of black and green gram in total pulse crop production which hovered at around 8-9 per cent during the last one decade.

An analysis drawn from Table 2.9 showed significantly high and rising share of red and Bengal gram in total pulse production in majority of districts belonging to Latur, Amravati, Nagpur and Aurangabad divisions of Maharashtra during the last one decade or so. Among these two pulse crops, Bengal gram in particular showed significantly high and rising share in total pulse production even in the districts belonging to Nasik, Pune and Kolhapur divisions. The share of Bengal gram in total pulse production is noticed to be as high as 76 per cent in Ahmednagar district during TE 2016-17, whereas red gram showed the highest share of 75 per cent in total pulse production in Wardha district during TE 2006-07. The estimates also showed falling share of black and green gram in total pulse production for the districts belonging to Latur, Amravati, Nagpur, Nasik and Aurangabad divisions of Maharashtra during the last one decade or so. Further, the estimates showed very marginal share of black and green gram in total pulse production in almost all the districts of Nasik division. Even Pune and Kolhapur divisions of Maharashtra showed very low share of black and green gram in their total pulse production. In general, red and Bengal gram alone accounted for major share among various pulse crops cultivated in Maharashtra with a rise in their share from 73 per cent to 87 per cent in total pulse production during the last one decade.

2.4 Area, Production and Yield of Pulses in Maharashtra – District Level Analysis

The estimates relating to area, production and yield of major pulse crops cultivated in various districts of Maharashtra coupled with share of various districts in area and production of individual pulse crops for the period TE 2006-07 and TE 2016-17 are presented in Table 2.10 and Table 2.11, respectively.

The estimates presented in Table 2.10, Table 2.11, and also in Table 2.2 clearly show that though majority of districts of Maharashtra cultivate pulse crops, the area and production of these pulses is mainly concentrated in rainfed districts of Latur and Amravati divisions and to some extent in districts of Pune, Nasik and Aurangabad divisions. The major pulse cultivating districts in the state are Latur, Osmanabad, Nanded, Parbhani, Buldana, Akola, Amravati, Yavatmal, and Ahmednagar, which account for more than 50 percent share in area and production of pulse crops of the state.

Table 2.10: Area, Production and Yield of Pulse Crops at District Level in Maharashtra (TE 2006-07) (Area in '00' Hectares; Production in '00' Metric Tonnes; Yield in Kg/Ha)

District	Black Gram			Red Gram			Bengal Gram			Green Gram			Black Gram		Red Gram		Bengal Gram		Green Gram	
	Area	Prod.	Yield	Area	Prod.	Yield	Area	Prod.	Yield	Area	Prod.	Yield	Area	Prod.	Area	Prod.	Area	Prod.	Area	Prod.
													Share (%)							
Thane	52	48	923	29	17	586	40	27	675	10	5	500	1.05	2.34	0.26	0.23	0.38	0.39	0.17	0.23
Raigad	7	6	857	11	6	545	16	11	688	2	1	500	0.14	0.29	0.10	0.08	0.15	0.16	0.03	0.05
Ratnagiri	4	4	1000	6	3	500	0	0	-	2	1	500	0.08	0.20	0.05	0.04	0.00	0.00	0.03	0.05
Sindhudurg	4	3	750	0	0	-	0	0	-	1	1	1000	0.08	0.15	0.00	0.00	0.00	0.00	0.02	0.05
Nashik	122	109	893	95	69	726	432	287	664	92	75	815	2.46	5.32	0.86	0.91	4.10	4.11	1.57	3.45
Dhule	93	45	484	88	46	523	186	127	683	235	129	549	1.87	2.20	0.80	0.61	1.77	1.82	4.00	5.93
Nadurbar	174	71	408	237	96	405	159	107	673	160	64	400	3.51	3.46	2.16	1.27	1.51	1.53	2.72	2.94
Jalgaon	592	264	446	288	209	726	529	493	932	380	164	432	11.93	12.88	2.62	2.77	5.02	7.05	6.47	7.53
Ahmednagar	49	23	469	121	51	421	754	512	679	128	55	430	0.99	1.12	1.10	0.68	7.16	7.33	2.18	2.53
Pune	24	18	750	38	25	658	483	327	677	70	31	443	0.48	0.88	0.35	0.33	4.59	4.68	1.19	1.42
Solapur	67	35	522	210	86	410	431	270	626	35	22	629	1.35	1.71	1.91	1.14	4.09	3.86	0.60	1.01
Satara	51	23	451	55	24	436	273	193	707	53	25	472	1.03	1.12	0.50	0.32	2.59	2.76	0.90	1.15
Sangli	81	53	654	132	57	432	294	192	653	66	30	455	1.63	2.59	1.20	0.75	2.79	2.75	1.12	1.38
Kolhapur	29	17	586	30	13	433	96	77	802	28	13	464	0.58	0.83	0.27	0.17	0.91	1.10	0.48	0.60
Aurangabad	46	27	587	400	263	658	432	324	750	93	56	602	0.93	1.32	3.64	3.48	4.10	4.64	1.58	2.57
Jalna	176	80	455	535	346	647	169	117	692	423	184	435	3.55	3.90	4.87	4.58	1.61	1.67	7.20	8.45
Beed	80	55	688	499	401	804	345	200	580	80	54	675	1.61	2.68	4.54	5.31	3.28	2.86	1.36	2.48
Latur	619	118	191	700	582	831	500	305	610	244	44	180	12.47	5.76	6.37	7.71	4.75	4.36	4.15	2.02
Osmanabad	487	193	396	880	473	538	624	379	607	199	79	397	9.81	9.41	8.01	6.26	5.93	5.42	3.39	3.63
Nanded	507	195	385	537	381	709	505	287	568	320	118	369	10.22	9.51	4.89	5.05	4.80	4.11	5.45	5.42
Parbhani	157	39	248	571	264	462	505	276	547	557	155	278	3.16	1.90	5.20	3.50	4.80	3.95	9.48	7.12
Hingoli	163	70	429	241	222	921	334	229	686	192	75	391	3.28	3.41	2.19	2.94	3.17	3.28	3.27	3.45
Buldhana	620	225	363	609	392	644	492	308	626	714	228	319	12.49	10.98	5.54	5.19	4.67	4.41	12.15	10.47
Akola	155	49	316	544	399	733	482	386	801	547	158	289	3.12	2.39	4.95	5.28	4.58	5.52	9.31	7.26
Washim	379	201	530	502	422	841	424	266	627	358	166	464	7.64	9.80	4.57	5.59	4.03	3.81	6.09	7.63
Amravati	62	18	290	930	748	804	541	427	789	607	139	229	1.25	0.88	8.46	9.91	5.14	6.11	10.33	6.38
Yavatmal	131	47	359	1242	1002	807	353	251	711	241	87	361	2.64	2.29	11.30	13.27	3.35	3.59	4.10	4.00
Wardha	4	2	500	550	438	796	260	139	535	7	4	571	0.08	0.10	5.01	5.80	2.47	1.99	0.12	0.18
Nagpur	17	7	412	525	329	627	524	301	574	19	7	368	0.34	0.34	4.78	4.36	4.98	4.31	0.32	0.32
Bhandara	2	1	500	75	49	653	53	28	528	3	2	667	0.04	0.05	0.68	0.65	0.50	0.40	0.05	0.09
Gondia	3	1	333	49	32	653	31	13	419	1	1	1000	0.06	0.05	0.45	0.42	0.29	0.19	0.02	0.05
Chandrapur	4	2	500	241	90	373	234	117	500	8	4	500	0.08	0.10	2.19	1.19	2.22	1.67	0.14	0.18
Gadchiroli	2	1	500	20	13	650	29	11	379	2	1	500	0.04	0.05	0.18	0.17	0.28	0.16	0.03	0.05
State Total	4963	2050	413	10988	7550	687	10528	6988	664	5876	2177	370	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00

Source: Computations are based on figures obtained from the 'Statistical Division, Commissionerate of Agriculture, Government of Maharashtra, Central Building, Pune'

Table 2.11: Area, Production and Yield of Pulse Crops at District Level in Maharashtra (TE 2016-17) (Area in '00' Hectares; Production in '00' Metric Tonnes; Yield in Kg/Ha)

District	Black Gram			Red Gram			Bengal Gram			Green Gram			Black Gram		Red Gram		Bengal Gram		Green Gram	
	Area	Prod.	Yield	Area	Prod.	Yield	Area	Prod.	Yield	Area	Prod.	Yield	Area	Prod.	Area	Prod.	Area	Prod.	Area	Prod.
													Share (%)							
Thane	41	26	634	25	15	600	37	31	838	1.67	0.33	198	1.37	2.32	0.19	0.16	0.23	0.24	0.04	0.02
Raigad	3	2	667	15	8	533	6	5	833	0.68	0.01	15	0.10	0.18	0.12	0.08	0.04	0.04	0.02	0.00
Ratnagiri	1	1	1000	5	2	400	0	0	-	0.68	0.01	15	0.03	0.09	0.04	0.02	0.00	0.00	0.02	0.00
Sindhudurg	1	1	1000	5	3	600	0	0	-	0.88	0.11	125	0.03	0.09	0.04	0.03	0.00	0.00	0.02	0.01
Nashik	39	22	564	63	30	476	468	325	694	72	39	542	1.30	1.96	0.49	0.31	2.93	2.56	1.92	2.83
Dhule	84	33	393	119	60	504	278	454	1633	199	65	327	2.80	2.94	0.92	0.62	1.74	3.58	5.31	4.72
Nadurbar	116	45	388	147	55	374	195	171	877	68	29	426	3.87	4.01	1.14	0.57	1.22	1.35	1.81	2.10
Jalgaon	296	166	561	170	124	729	550	634	1153	299	149	498	9.87	14.81	1.31	1.29	3.44	5.00	7.97	10.81
Ahmednagar	131	53	405	135	87	644	1368	900	658	276	86	312	4.37	4.73	1.04	0.90	8.55	7.09	7.36	6.24
Pune	22	15	682	20	9	450	680	643	946	138	35	254	0.73	1.34	0.15	0.09	4.25	5.07	3.68	2.54
Solapur	95	43	453	223	96	430	473	271	573	48	22	458	3.17	3.84	1.72	1.00	2.96	2.14	1.28	1.60
Satara	40	22	550	19	5	263	313	244	780	72	33	458	1.33	1.96	0.15	0.05	1.96	1.92	1.92	2.39
Sangli	97	58	598	76	22	289	259	214	826	84	48	571	3.23	5.17	0.59	0.23	1.62	1.69	2.24	3.48
Kolhapur	7	6	857	14	4	286	67	57	851	12	7	583	0.23	0.54	0.11	0.04	0.42	0.45	0.32	0.51
Aurangabad	13	5	385	461	308	668	517	356	689	51	24	471	0.43	0.45	3.56	3.20	3.23	2.81	1.36	1.74
Jalna	221	90	407	466	278	597	377	276	732	474	154	325	7.37	8.03	3.60	2.89	2.36	2.18	12.64	11.18
Beed	197	55	279	740	345	466	844	478	566	65	20	308	6.57	4.91	5.72	3.59	5.28	3.77	1.73	1.45
Latur	103	38	369	1185	1639	1383	1019	657	645	129	47	364	3.43	3.39	9.16	17.03	6.37	5.18	3.44	3.41
Osmanabad	280	75	268	761	320	420	863	419	486	112	26	232	9.33	6.69	5.88	3.33	5.40	3.30	2.99	1.89
Nanded	443	82	185	784	446	569	639	636	995	261	78	299	14.77	7.31	6.06	4.63	3.99	5.01	6.96	5.66
Parbhani	153	27	176	621	300	483	528	323	612	374	110	294	5.10	2.41	4.80	3.12	3.30	2.55	9.97	7.98
Hingoli	124	37	298	548	383	699	720	1085	1507	212	61	288	4.13	3.30	4.23	3.98	4.50	8.55	5.65	4.43
Buldhana	121	59	488	734	357	486	610	487	798	134	64	478	4.03	5.26	5.67	3.71	3.81	3.84	3.57	4.64
Akola	119	54	454	548	689	1257	967	765	791	213	92	432	3.97	4.82	4.23	7.16	6.05	6.03	5.68	6.68
Washim	90	45	500	535	249	465	535	325	607	79	35	443	3.00	4.01	4.13	2.59	3.34	2.56	2.11	2.54
Amravati	74	30	405	1115	804	721	1286	1214	944	265	116	438	2.47	2.68	8.62	8.35	8.04	9.57	7.06	8.42
Yavatmal	69	26	377	1350	1064	788	890	671	754	87	28	322	2.30	2.32	10.43	11.06	5.56	5.29	2.32	2.03
Wardha	2	0	0	786	590	751	297	268	902	1	0	0	0.07	0.00	6.07	6.13	1.86	2.11	0.03	0.00
Nagpur	13	2	154	652	725	1112	659	489	742	12	4	333	0.43	0.18	5.04	7.53	4.12	3.85	0.32	0.29
Bhandara	1	0	0	116	107	922	115	61	530	1	0	0	0.03	0.00	0.90	1.11	0.72	0.48	0.03	0.00
Gondia	1	0	0	65	60	923	48	27	563	4	1	250	0.03	0.00	0.50	0.62	0.30	0.21	0.11	0.07
Chandrapur	2	1	500	390	396	1015	285	153	537	6	2	333	0.07	0.09	3.01	4.12	1.78	1.21	0.16	0.15
Gadchiroli	0	0	-	46	41	891	100	47	470	0	0	-	0.00	0.00	0.36	0.43	0.63	0.37	0.00	0.00
State Total	3000	1121	374	12942	9623	744	15995	12685	793	3751	1378	367	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00

Source: Computations are based on figures obtained from the 'Statistical Division, Commissionerate of Agriculture, Government of Maharashtra, Central Building, Pune'

The state of Maharashtra showed an increase in area and production of pulse crops with an increase in area from 35.48 lakh hectares to 37.72 lakh hectares and production expansion from 19.88 lakh MT to 25.66 lakh MT during the period between TE 2006-07 and TE 2016-17. The productivity of pulse crops increased from 560 kg/ha to 680 kg/ha during the same period. The area allocation estimates showed that about 14 per cent of pulse cropped area in Maharashtra was under black gram, 31 per cent under red gram, 30 per cent under Bengal gram and 17 per cent under green gram in TE 2006-07, whereas these proportion in TE 2016-17 stood at 8 per cent for black gram, 34 per cent for red gram, 42 per cent for Bengal gram, and 10 per cent for green gram. On the other hand, about 10 per cent of total pulse production in Maharashtra was accounted for by black gram, 38 per cent by red gram, 35 per cent by Bengal gram, and 11 per cent by green gram in TE 2006-07, while these proportion in TE 2016-17 turned out to be 4 per cent for black gram, 38 per cent for red gram, 49 per cent for Bengal gram and 5 per cent for green gram. These estimates clearly showed a shift in area allocation from black and green gram to red and Bengal gram during the period between TE 2006-07 and TE 2016-17. Consequently, the production volume of red and Bengal gram increased in the face of decline in production of black and green gram during the same period.

Among various pulse crops cultivated in Maharashtra, black gram showed an area of 4.96 lakh hectares under its cultivation in TE 2006-07, which declined to 3.0 lakh hectares in TE 2016-17. The production of black gram in the state declined from 2.05 lakh MT to 1.12 lakh MT during the period between TE 2006-07 and TE 2016-17. The major black gram cultivating districts during TE 2006-07 were found to be Jalgaon, Jalna, Latur, Osmanabad, Nanded, Hingoli, Buldana, and Washim, which put together accounted for 71 per cent area and 66 per cent production of black gram of the state. However, the scenario changed slightly during TE 2016-17 when the districts of Jalgaon, Ahmednagar, Solapur, Sangli, Jalna, Beed, Latur, Osmanabad, Nanded, Parbhani, Hingoli, Buldana, Akola, and Washim showed significantly higher area allocation and production of black gram with their combined share of 82 per cent in area and 79 per cent in production of black gram of the state.

The area allocation under red gram in Maharashtra was found to be 10.99 lakh hectares in TE 2006-07, which increased to 12.94 lakh hectares in TE 2016-17. Consequently, the production of red gram in the state increased from 7.55 lakh MT in TE 2006-07 to 9.62 lakh MT in TE 2016-17. Even the average yield level of red gram increased from 687 kg/ha to 744 kg/ha during the period between TE 2006-07 and TE

2016-17. During the period between TE 2006-07 and TE 2016-17, the major red gram cultivating districts were noticed to be Aurangabad, Jalna, Beed, Latur, Osmanabad, Nanded, Parbhani, Hingoli, Buldhana, Akola, Washim, Amravati, Yavatmal, Wardha and Nagpur, which put together accounted for 84 per cent share in area and 88 per cent share in production of red gram of the state in TE 2006-07, and 87 per cent share in area and 88 per cent share in production of red gram of the state in TE 2016-17. Among various districts, while the district of Yavatmal showed the highest area and production of red gram in TE 2006-07, the scenario changed in TE 2016-17 when the district of Latur showed the highest production of red gram and the district of Yavatmal showed the highest area under red gram as against other districts of Maharashtra.

The area allocation under Bengal gram in Maharashtra increased sharply from 10.52 lakh hectares in TE 2006-07 to 16.00 lakh hectares in TE 2016-17. The expansion in production of Bengal gram in Maharashtra was much sharper and it increased 6.99 lakh MT in TE 2006-07 to 12.69 lakh MT in TE 2016-17. It is not only area and production but even average yield of Bengal gram in Maharashtra increased from 687 kg/ha to 793 kg/ha during the period between TE 2006-07 and TE 2016-17.The districts showing significantly high area allocation and production of Bengal gram in Maharashtra were Jalgaon, Ahmednagar, Pune, Jalna, Beed, Latur, Osmanabad, Nanded, Parbhani, Hingoli, Buldhana, Akola, Washim, Amravati, Yavatmal, and Nagpur. The combined share of these 16 districts was 74 per cent in total area allocation under Bengal gram of the state in TE 2006-07, which increased to 79 per cent in TE 2016-17. Similarly, these 16 major districts showed about 75 per cent share in total Bengal gram production of the state in TE 2006-07, which increased to about 79 per cent in TE 2016-17. Among various districts of Maharashtra, the district of Ahmednagar showed the highest area as well production of Bengal gram during TE 2016-17.

The area allocation under green gram in Maharashtra was estimated at 5.88 lakh hectares in TE 2006-07 with a decline in the same to 3.75 lakh hectares in TE 2016-17, showing a sharp decline in area under green gram. The production of green gram in Maharashtra also declined over time with a decline in the same from 2.18 lakh MT to 1.38 lakh MT between TE 2006-07 and TE 2016-17. However, the yield level of green gram in Maharashtra declined only marginally from 370 kg/ha to 367 kg/ha during the same period. The districts showing significantly high area allocation and production of green gram in Maharashtra encompassed Jalgaon, Ahmednagar, Jalna, Nanded, Parbhani, Hingoli, Buldana, Akola, Washim, Amravati and Yavatmal. These 11 major districts

showed a combined share of 76 per cent in green gram cropped area of Maharashtra in TE 2006-07 with a decline in the same to 71 per cent in TE 2016-17. The share of these 11 districts in green gram production of the state remained same at about 70 per cent during the period between TE 2006-07 and Te 2016-17. Among various districts of Maharashtra, the district of Buldana showed the highest area as well production of green gram during TE 2006-07 and the district of Jalna during TE 2016-17.

Thus, an analysis drawn from Table 2.10 and Table 2.11 with respect to changes in area, production and yield of various pulse crops over time revealed several interesting observations. The state of Maharashtra showed an increase in pulse cropped area from 35.48 lakh hectares to 37.72 lakh hectares and production expansion from 19.88 lakh MT to 25.66 lakh MT during the period between TE 2006-07 and TE 2016-17. The increase in area and production of pulse crops was chiefly due to significant increase in area and production of red and Bengal gram in the face of decline in area and production of black and green gram during the same period. The major districts of cultivating various pulse crops mainly belonged to rainfed regions of Vidarbha and Marathwada regions and to some extent irrigated region of western Maharashtra, and they mainly encompassed the districts of Aurangabad, Jalna, Beed, Latur, Osmanabad, Nanded, Parbhani, Hingoli, Buldhana, Akola, Washim, Amravati, Yavatmal, Wardha and Nagpur. These districts accounted for about 85 per cent area and production of red gram and 75-80 per cent area and production of Bengal gram of the state during the period between TE 2006-07 and TE 2016-17. The major black and green gram cultivating districts comprised of Jalgaon, Ahmednagar, Solapur, Sangli, Jalna, Beed, Latur, Osmanabad, Nanded, Parbhani, Hingoli, Buldana, Akola, Washim, Amravati and Yavatmal, which put together showed about 70-75 per cent share in area allocation as well as production of black and green gram of Maharashtra during the period between TE 2006-07 and TE 2016-17. However, the state of Maharashtra showed about 40 per cent decline in area 45 per cent fall in production of black gram, and about 36 per cent decline in area as well as production of green gram during the last one decade. Unlike fall in area and production of black and green gram, there was 18 per cent rise in area and 27 per cent increase in production of red gram in Maharashtra during the last one decade. Similarly, Bengal gram in Maharashtra showed about 52 per cent rise in area and 82 per cent increase in production during the same period. Consequently, there was overall expansion in production of pulses in Maharashtra, which was caused not only on account of rise in area but also due to significant rise in yield of red and Bengal gram in the state.

2.5 Growth Trends in Pulses and Other Crops in Maharashtra

The foodgrain crops in Maharashtra have shown differing growth rates in area, production and yield during the last four decades. The annual average growth rate estimates with respect to area and yield of various foodgrain crops for different time periods viz. from 1980-81 to 1989-90, 1990-91 to 1999-2000, 2000-01 to 2009-10, 2010-11 to 2016-17, 2010-11 to 2017-18, and 2010-11 to 2018-18 are shown in Table 2.12. These estimates represent growth in area and yield of various foodgrain crops in Maharashtra for the 1980s, 1990s, and 2000s period as well as annual average growth in the same in more recent times.

The estimates presented in Table 2.12 clearly showed highly fluctuating growth in area and yield of various foodgrains in Maharashtra during the last four decades. The general trend showed a steady annual increase in yield level of foodgrains in Maharashtra during the 1980s, 1990s and 2000s period and a declining rate of growth in the same in more recent times. However, the area under foodgrains showed a marginal annual increase during the 1980s but annual decline in the same during 1990s and 2000s, and an annual increase in the same again in more recent times. Within foodgrain crops, rice crop in Maharashtra showed a steady annual decline in area in the face of annual increase in yield level during the 1990s, 2000s and in more recent times. Nonetheless, wheat crop in Maharashtra showed a steady annual increase in area as well as yield level during the last four decades with the exception of annual decline in yield level of the same in more recent times. The course cereals showed discouraging trend in terms of rate of annual growth in area and yield. The course cereals showed a declining growth in area during the last three decades with annual decline in the same being sharper in more recent times. Further, though the yield level of course cereals increased during 1990s and 2000s period, the more recent time was found to be marked with annual decline in the same.

In general, pulse crops in Maharashtra showed 2-4 per cent annual growth in area 3-5 annual growth in yield level during the last four decades with some exceptional periods when area and yield level of the same declined marginally. Among various pulse crops in Maharashtra, Bengal gram in particular has shown 5-8 per cent annual growth in area during the last four decades. The yield level of Bengal gram is also noticed to have grown at 1-5 per cent annually during 1980s, 1990s and 2000s period with a marginal annual decline in the same in more recent times. Similarly, the area under red gram in Maharashtra increased with an annual growth rate of 1-5 per cent during the last four decades. However, the yield level of red gram though increased at an annual compound

growth rate of 2-6 per cent during 1980s, 1990s and 2000s period, a marginal annual decline in the same was also noticed in more recent times.

Unlike Bengal and red gram, black gram in Maharashtra showed 2-7 per cent annual growth in area and yield during 1980s and 1990s period but thereafter a steady decline in the same was noticed with annual decline being 2-6 per cent in area and 2-12 per cent in yield level of the crop. Similarly, green gram in Maharashtra showed about 4 per cent annual growth in area during the 1980s period but thereafter area under green gram declined continuously at an annual growth rate of 2-6 per cent. Although yield level of green gram increased at an annual growth rate of 2-7 per cent during 1980s and 1990s period, a steady decline in the same was noticed during the 2000s period and thereafter with annual decline in the same estimated at 2-11 per cent.

Thus, the estimates showed highly fluctuating decadal growth rates in area and yield of various foodgrain in Maharashtra during the last four decades. While the general trend showed a steady annual increase in yield level of foodgrains in Maharashtra during the 1980s, 1990s and 2000s period and a declining rate of growth in the same in more recent times, the area under foodgrains showed a marginal annual increase during the 1980s but annual decline in the same during 1990s and 2000s, and an annual increase in the same again in more recent times. Among various foodgrains, pulse crops in Maharashtra showed 2-4 per cent annual growth in area and 3-5 annual growth in yield level during the last four decades with some exceptional periods when area and yield level of the same declined marginally. Bengal gram in particular showed 5-8 per cent annual growth in area during the last four decades. The yield level of Bengal gram increased at an annual growth rate of 1-5 per cent during 1980s, 1990s and 2000s period with a marginal annual decline in the same in more recent times. Similarly, red gram in Maharashtra in Maharashtra showed 1-5 per cent annual growth in area and 2-6 annual growth in yield during 1980s, 1990s and 2000s period though a marginal decline in yield of the same was also witnessed in more recent times. Unlike Bengal and red gram, black gram in Maharashtra showed 2-7 per cent annual growth in area and yield during 1980s and 1990s period but thereafter a steady and sharp annual decline in the same was noticed in area and yield. Similarly, green gram in Maharashtra showed 2-6 per cent annual decline in area and 2-11 per cent decline in yield, especially after the 1980s and 1990s period. Therefore, perceptible increase in area and yield of pulses in Maharashtra was achieved only on account of reasonable annual growth in area and yield of Bengal and red gram during the last four decades.

Table 2.12: Growth Rate in Area and Yield Rate of Major Crops in Maharashtra (%)

Period	Rice/Paddy		Course Cereals		Wheat		Pulses		Foodgrains		Black Gram		Red Gram		Bengal Gram		Green Gram	
	Area	Yield	Area	Yield	Area	Yield	Area	Yield	Area	Yield	Area	Yield	Area	Yield	Area	Yield	Area	Yield
1980-81 to 1989-90*	0.37 (0.90)	-0.79 (0.50)	0.31 (1.49)	1.62 (0.71)	-2.97 (3.63)	2.55 (1.66)	2.76 (4.67)	4.59 (3.51)	0.61 (3.00)	1.33 (0.78)	1.30 (2.23)	7.13 (5.03)	4.49 (7.15)	2.58 (1.85)	6.28 (4.78)	4.32 (1.81)	3.68 (3.59)	6.92 (5.67)
1990-91 to 1999-00*	-0.63 (6.09)	2.11 (3.51)	-1.76 (3.95)	1.12 (0.55)	3.42 (2.60)	1.72 (0.88)	1.13 (2.81)	3.57 (1.30)	-0.59 (1.92)	1.62 (0.95)	3.27 (5.51)	2.16 (0.68)	0.35 (2.01)	5.82 (1.79)	5.59 (3.48)	1.24 (0.61)	-1.95 (3.13)	2.36 (0.66)
2000-01 to 2009-10*	-0.02 (0.12)	1.41 (0.82)	-2.17 (4.18)	4.01 (4.78)	6.50 (3.64)	2.92 (2.44)	-0.20 (0.24)	3.16 (2.45)	-0.78 (1.43)	3.51 (4.33)	-5.89 (3.94)	-2.32 (0.97)	0.36 (0.74)	1.77 (1.13)	7.33 (5.63)	5.42 (4.85)	-5.73 (4.68)	-2.56 (0.93)
2010-11 to 2016-17*	-0.07 0.16)	2.36 (1.34)	-0.49 (0.36)	-4.16 (0.88)	1.08 (0.28)	-4.11 (1.22)	1.44 (0.69)	-1.84 (0.28)	0.31 (0.20)	-2.21 (0.56)	-6.27 (2.63)	-12.04 (1.82)	1.07 (0.75)	-1.44 (0.13)	6.25 (2.05)	-1.66 (0.40)	-4.57 (1.58)	-11.07 (1.44)
2010-11 to 2017-18*	-0.56 (1.30)	1.41 (1.00)	-0.29 (0.29)	-1.75 (0.46)	1.64 (0.56)	-1.81 (0.63)	2.90 (1.63)	0.22 (0.04)	0.87 (0.71)	-0.90 (0.29)	-4.06 (1.82)	-10.81 (2.15)	1.51 (1.38)	1.59 (0.18)	8.26 (3.23)	0.02 (0.01)	-2.83 (1.18)	-8.71 (1.46)
2010-11 to 2018-19*	-0.12 (0.28)	-1.92 (1.69)	-3.83 (1.75)	-1.43 (0.48)	-2.80 (0.83)	-2.32 (1.03)	1.57 (1.00)	-0.88 (0.22)	-1.33 (0.85)	-0.72 (0.30)	-1.95 (0.91)	-8.86 (2.16)	0.75 (0.79)	-0.28 (0.04)	4.74 (1.72)	-0.41 (0.16)	-2.14 (1.12)	-6.74 (1.40)
2012-13 to 2013-14**	3.1	-1.34	7.38	40.16	30.98	-5.75	9.95	13.35	9.28	17.94	-7.19	4.14	-5.96	9.34	33.94	20.54	-0.12	-5.05
2013-14 to 2014-15**	-3.35	-1.92	-0.62	-27.23	3.8	-14.87	-6.57	-38.83	-2.45	-22.39	-17.31	-46.03	6.04	-67.78	-6.07	-17.34	-26.82	-42.52
2014-15 to 2015-16**	-3.11	-9.17	-3.44	-31.39	-14.64	-12.07	3.82	-17.94	-2.28	-22.16	3.29	-35.67	2.19	23.06	1.03	-29.31	16.09	-29.18
2015-16 to 2016-17**	2.16	35.19	8.16	90.66	39.64	61.56	23	160.2	14.6	80.51	18.33	152.87	16.09	305.07	33.79	86.79	21.42	208.7
2016-17 to 2017-18**	-5.5	-19.31	-3.66	-4.1	-10.57	-4.81	5.02	-23.46	-1.62	-13.7	3.76	-36.24	-4.22	-37.51	15.8	-8.85	-2.75	-37.25
2017-18 to 2018-19**	10.1	16.76	-42.78	-13.24	-49.96	-23.02	-23.35	-26.53	-30.32	-7.26	12.91	11.8	-12	-37.81	-42.14	-16.83	-4.76	4.82

Note: 1) * The growth rates for the decennial period are based on semi log time trend and the figures in parentheses are respective 't' values

2) ** Growth rates are based on annual averages

An attempt has also been made to assess the absolute change as well annual change in area and production of various foodgrain crops across various districts of Maharashtra encompassing the period between TE 2006-07 and TE 2016-17, and the estimates in this respect are brought out in Table 2.13 and Table 2.14, respectively.

The general trend in Maharashtra showed about 8 per cent decline in area and 4 per cent increase in production of foodgrains in Maharashtra between TE 2006-07 and TE 2016-17, which was mainly caused by a sharp decline in area and production of course cereals since main cereals and pulses showed remarkable increase in area and production during the last one decade. The pulse crops in particular showed about 29 per cent rise in production and 6 per cent increase in area during the last one decade. Between TE 2006-07 and TE 2016-17, while red gram in Maharashtra showed about 18 per cent increase in area and 27 per cent rise in production, Bengal gram was marked with as much as 52 per cent increase in area and 82 per cent rise in production. As against rise in area and production of red and Bengal gram, there was about 40-45 decline in area and production of black and green gram during the last one decade. Therefore, significant expansion in area and production of pulses in Maharashtra was chiefly contributed by rise in area and production of red and Bengal gram.

The estimates shown in Table 2.14 further revealed significant variations in terms annual changes in area and production of various pulse crops cultivated across different districts of Maharashtra during the period between TE 2006-07 and TE 2016-17. In general, pulse crops in Maharashtra showed about 1 per cent annual increase in area and 3 per cent rise in Production. Among various pulse crops, the annual increase in area was found to be 2 per cent for red gram and 5 per cent for Bengal gram in the face of 4 per cent annual decline in area under black and green gram during the last one decade. On the other hand, the annual increase in production was estimated at 3 per cent for red gram and 8 per cent for Bengal gram in the face of 4-5 per cent annual decline in production of black and green gram during the last one decade. The major districts showing significant area and production expansion of pulses belonged to Vidarbha and Marathwada regions of Maharashtra, which also account for the bulk of red and Bengal gram production of Maharashtra. In case of red gram, the districts belonging to Vidarbha and Marathwada regions showed about 5-6 per cent annual increase in area and more than 7 per cent annual increase in production during the last one decade. On the other hand, Bengal gram showed about 5-10 per cent annual increase in area and 10-15 per cent rise in production in major districts belonging to Vidarbha, Marathwada and Western Maharashtra.

Table 2.13:: Growth Rate in Area and Production of Major Crops at District Level in Maharashtra % (TE 2006-07 to TE 2016-17): Total % Increase/Decrease

District	Rice/Paddy		Course Cereals		Wheat		Pulses		Foodgrains		Black Gram		Red Gram		Bengal Gram		Green Gram	
	Area	Prod.	Area	Prod.	Area	Prod.	Area	Prod.	Area	Prod.	Area	Prod.	Area	Prod.	Area	Prod.	Area	Prod.
Mumbai	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thane	-5.06	11.86	-22.22	-22.71	100.00	100.00	-16.08	-12.50	-9.03	8.75	-21.15	-45.83	-13.79	-11.76	-7.50	14.81	-80.00	100.00
Raigad	-10.26	10.29	-38.10	-26.47	-	-	17.39	65.67	-10.43	10.24	-57.14	-66.67	36.36	33.33	-62.50	-54.55	-50.00	0.00
Ratnagiri	-6.78	6.27	-31.40	-20.56	-	-	-33.33	-8.33	-14.01	3.14	-75.00	-75.00	-16.67	-33.33	-	-	-50.00	00.00
Sindhudurg	-14.85	-5.93	-22.22	13.16	-	-	-52.46	-34.48	-17.85	-6.02	-75.00	-66.67	-	-	-	-	0.00	00.00
Nashik	41.80	86.89	-18.20	66.08	0.57	10.19	-25.42	-29.68	-12.43	48.32	-68.03	-79.82	-33.68	-56.52	8.33	13.24	-21.74	-48.00
Dhule	-43.14	4.76	20.15	59.18	70.12	91.92	1.59	62.83	18.78	63.51	-9.68	-26.67	35.23	30.43	49.46	257.48	-15.32	-49.61
Nadurbar	2.46	-3.13	-6.70	35.46	61.29	54.43	-31.72	-14.92	-11.31	23.73	-33.33	-36.62	-37.97	-42.71	22.64	59.81	-57.50	-54.69
Jalgaon	100.00	100.00	9.92	42.40	15.31	-2.22	-27.00	-14.07	-3.66	28.03	-50.00	-37.12	-40.97	-40.67	3.97	28.60	-21.32	-9.15
Ahmednagar	54.32	186.79	-15.76	13.49	-54.25	-52.88	63.07	68.44	-10.56	2.39	167.35	130.43	11.57	70.59	81.43	75.78	115.63	56.36
Pune	-2.91	57.58	-41.46	-14.13	8.68	21.52	16.08	58.80	-28.68	7.10	-8.33	-16.67	-47.37	-64.00	40.79	96.64	97.14	12.90
Solapur	-25.00	100.00	-7.25	-2.81	-20.67	-23.72	7.98	2.52	-6.73	-5.26	41.79	22.86	6.19	11.63	9.74	0.37	37.14	0.00
Satara	15.16	7.01	-13.92	-2.05	-13.97	-17.46	-0.50	19.60	-9.06	-1.04	-21.57	-4.35	-65.45	-79.17	14.65	26.42	35.85	32.00
Sangli	1.67	4.53	-5.62	24.81	-8.83	19.57	-27.39	-20.41	-9.36	17.12	19.75	9.43	-42.42	-61.40	-11.90	11.46	27.27	60.00
Kolhapur	2.45	24.25	-5.52	24.37	-53.68	-50.00	-41.11	-38.16	-7.89	18.04	-75.86	-64.71	-53.33	-69.23	-30.21	-25.97	-57.14	-46.15
Aurangabad	1000.00	900.00	-13.25	-36.66	-4.35	-14.45	3.85	2.96	-8.99	-29.89	-71.74	-81.48	15.25	17.11	19.68	9.88	-45.16	-57.14
Jalna	100.00	100.00	-46.73	-54.50	-32.17	-37.37	11.08	7.38	-29.11	-43.29	25.57	12.50	-12.90	-19.65	123.08	135.90	12.06	-16.30
Beed	-86.36	-90.00	1.90	-28.66	21.51	-5.15	66.01	21.73	13.82	-18.71	146.25	0.00	48.30	-13.97	144.64	139.00	-18.75	-62.96
Latur	-76.11	-88.57	-29.06	-54.71	55.80	14.16	16.25	124.60	-3.34	3.73	-83.36	-67.80	69.29	181.62	103.80	115.41	-47.13	6.82
Osmanabad	-51.98	-78.79	-37.49	-61.81	-50.75	-76.49	-8.00	-25.22	-28.22	-52.97	-42.51	-61.14	-13.52	-32.35	38.30	10.55	-43.72	-67.09
Nanded	-96.23	-93.83	-35.30	-66.20	11.78	-9.24	12.65	26.04	-13.20	-33.73	-12.62	-57.95	46.00	17.06	26.53	121.60	-18.44	-33.90
Parbhani	-98.78	100.00	-10.27	-31.16	-47.24	-50.10	-7.53	2.28	-13.70	-27.12	-2.55	-30.77	8.76	13.64	4.55	17.03	-32.85	-29.03
Hingoli	100.00	100.00	-20.34	-59.28	-12.47	-48.19	78.17	161.56	20.67	10.13	-23.93	-47.14	127.39	72.52	115.57	373.80	10.42	-18.67
Buldhana	-	-	-42.01	-34.95	114.63	139.91	-33.97	-15.93	-24.08	-6.02	-80.48	-73.78	20.53	-8.93	23.98	58.12	-81.23	-71.93
Akola	-	-	-86.12	-91.51	-0.60	-21.78	6.58	61.13	-23.17	-33.81	-23.23	10.20	0.74	72.68	100.62	98.19	-61.06	-41.77
Washim	100.00	100.00	-76.69	-85.02	185.45	161.49	-25.11	-37.73	-27.09	-37.02	-76.25	-77.61	6.57	-41.00	26.18	22.18	-77.93	-78.92
Amravati	-37.23	-45.65	-71.03	-74.78	293.75	245.56	26.76	61.34	10.99	21.96	19.35	66.67	19.89	7.49	137.71	184.31	-56.34	-16.55
Yavatmal	100.00	100.00	-57.33	-75.08	131.11	143.08	21.49	28.80	0.80	-1.92	-47.33	-44.68	8.70	6.19	152.12	167.33	-63.90	-67.82
Wardha	100.00	100.00	-67.94	-80.68	-30.65	-27.55	31.60	46.67	4.45	5.45	-50.00	100.00	42.91	34.70	14.23	92.81	-85.71	100.00
Nagpur	87.86	113.01	-89.20	-90.46	117.49	165.39	18.39	83.68	31.82	84.58	-23.53	-71.43	24.19	120.36	25.76	62.46	-36.84	-42.86
Bhandara	9.07	45.31	-33.33	-33.33	13.27	51.72	45.94	77.30	14.14	47.29	-50.00	100.00	54.67	118.37	116.98	117.86	-66.67	100.00
Gondia	5.35	90.34	150.00	100.00	-26.67	-15.00	32.80	61.45	7.59	88.37	-66.67	100.00	32.65	87.50	54.84	107.69	300.00	0.00
Chandrapur	3.10	-6.98	-69.20	-59.22	-23.67	0.00	17.93	102.47	-2.93	4.49	-50.00	-50.00	61.83	340.00	21.79	30.77	-25.00	-50.00
Gadchiroli	5.05	10.03	-75.00	-44.78	11.11	37.50	25.70	74.03	3.60	10.75	100.00	100.00	130.00	215.38	244.83	327.27	100.00	100.00
State Total	0.86	23.49	-20.73	-14.00	11.35	7.52	6.30	29.03	-8.36	3.72	-39.55	-45.32	17.78	27.46	51.93	81.53	-36.16	-36.70

Source: Computations are based on figures obtained from the 'Statistical Division, Commissionerate of Agriculture, Government of Maharashtra, Central Building, Pune'

Table 2.14: Growth Rate in Area and Production of Major Crops at District Level in Maharashtra % (TE 2006-07 to TE 2016-17): Annual % Increase/Decrease

District	Rice/Paddy		Course Cereals		Wheat		Pulses		Foodgrains		Black Gram		Red Gram		Bengal Gram		Green Gram	
	Area	Prod.	Area	Prod.	Area	Prod.	Area	Prod.	Area	Prod.	Area	Prod.	Area	Prod.	Area	Prod.	Area	Prod.
Mumbai	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thane	-0.51	1.19	-2.22	-2.27	-10.00	-10.00	-1.61	-1.25	-0.90	0.88	-2.12	-4.58	-1.38	-1.18	-0.75	1.48	-8.00	-10.00
Raigad	-1.03	1.03	-3.81	-2.65	-	-	1.74	6.57	-1.04	1.02	-5.71	-6.67	3.64	3.33	-6.25	-5.45	-5.00	-10.00
Ratnagiri	-0.68	0.63	-3.14	-2.06	-	-	-3.33	-0.83	-1.40	0.31	-7.50	-7.50	-1.67	-3.33	-	-	-5.00	-10.00
Sindhudurg	-1.48	-0.59	-2.22	1.32	-	-	-5.25	-3.45	-1.79	-0.60	-7.50	-6.67	-	-	-	-	0.00	-10.00
Nashik	4.18	8.69	-1.82	6.61	0.06	1.02	-2.54	-2.97	-1.24	4.83	-6.80	-7.98	-3.37	-5.65	0.83	1.32	-2.17	-4.80
Dhule	-4.31	0.48	2.01	5.92	7.01	9.19	0.16	6.28	1.88	6.35	-0.97	-2.67	3.52	3.04	4.95	25.75	-1.53	-4.96
Nadurbar	0.25	-0.31	-0.67	3.55	6.13	5.44	-3.17	-1.49	-1.13	2.37	-3.33	-3.66	-3.80	-4.27	2.26	5.98	-5.75	-5.47
Jalgaon	-10.00	-10.00	0.99	4.24	1.53	-0.22	-2.70	-1.41	-0.37	2.80	-5.00	-3.71	-4.10	-4.07	0.40	2.86	-2.13	-0.91
Ahmednagar	5.43	18.68	-1.58	1.35	-5.42	-5.29	6.31	6.84	-1.06	0.24	16.73	13.04	1.16	7.06	8.14	7.58	11.56	5.64
Pune	-0.29	5.76	-4.15	-1.41	0.87	2.15	1.61	5.88	-2.87	0.71	-0.83	-1.67	-4.74	-6.40	4.08	9.66	9.71	1.29
Solapur	-2.50	-10.00	-0.73	-0.28	-2.07	-2.37	0.80	0.25	-0.67	-0.53	4.18	2.29	0.62	1.16	0.97	0.04	3.71	0.00
Satara	1.52	0.70	-1.39	-0.21	-1.40	-1.75	-0.05	1.96	-0.91	-0.10	-2.16	-0.43	-6.55	-7.92	1.47	2.64	3.58	3.20
Sangli	0.17	0.45	-0.56	2.48	-0.88	1.96	-2.74	-2.04	-0.94	1.71	1.98	0.94	-4.24	-6.14	-1.19	1.15	2.73	6.00
Kolhapur	0.25	2.42	-0.55	2.44	-5.37	-5.00	-4.11	-3.82	-0.79	1.80	-7.59	-6.47	-5.33	-6.92	-3.02	-2.60	-5.71	-4.62
Aurangabad	100.00	90.00	-1.32	-3.67	-0.43	-1.44	0.39	0.30	-0.90	-2.99	-7.17	-8.15	1.53	1.71	1.97	0.99	-4.52	-5.71
Jalna	-10.00	-10.00	-4.67	-5.45	-3.22	-3.74	1.11	0.74	-2.91	-4.33	2.56	1.25	-1.29	-1.97	12.31	13.59	1.21	-1.63
Beed	-8.64	-9.00	0.19	-2.87	2.15	-0.52	6.60	2.17	1.38	-1.87	14.63	0.00	4.83	-1.40	14.46	13.90	-1.88	-6.30
Latur	-7.61	-8.86	-2.91	-5.47	5.58	1.42	1.63	12.46	-0.33	0.37	-8.34	-6.78	6.93	18.16	10.38	11.54	-4.71	0.68
Osmanabad	-5.20	-7.88	-3.75	-6.18	-5.07	-7.65	-0.80	-2.52	-2.82	-5.30	-4.25	-6.11	-1.35	-3.23	3.83	1.06	-4.37	-6.71
Nanded	-9.62	-9.38	-3.53	-6.62	1.18	-0.92	1.26	2.60	-1.32	-3.37	-1.26	-5.79	4.60	1.71	2.65	12.16	-1.84	-3.39
Parbhani	-9.88	-10.00	-1.03	-3.12	-4.72	-5.01	-0.75	0.23	-1.37	-2.71	-0.25	-3.08	0.88	1.36	0.46	1.70	-3.29	-2.90
Hingoli	-10.00	-10.00	-2.03	-5.93	-1.25	-4.82	7.82	16.16	2.07	1.01	-2.39	-4.71	12.74	7.25	11.56	37.38	1.04	-1.87
Buldhana	-	-	-4.20	-3.49	11.46	13.99	-3.40	-1.59	-2.41	-0.60	-8.05	-7.38	2.05	-0.89	2.40	5.81	-8.12	-7.19
Akola	-	-	-8.61	-9.15	-0.06	-2.18	0.66	6.11	-2.32	-3.38	-2.32	1.02	0.07	7.27	10.06	9.82	-6.11	-4.18
Washim	-10.00	-10.00	-7.67	-8.50	18.55	16.15	-2.51	-3.77	-2.71	-3.70	-7.63	-7.76	0.66	-4.10	2.62	2.22	-7.79	-7.89
Amravati	-3.72	-4.57	-7.10	-7.48	29.38	24.56	2.68	6.13	1.10	2.20	1.94	6.67	1.99	0.75	13.77	18.43	-5.63	-1.65
Yavatmal	-10.00	-10.00	-5.73	-7.51	13.11	14.31	2.15	2.88	0.08	-0.19	-4.73	-4.47	0.87	0.62	15.21	16.73	-6.39	-6.78
Wardha	-10.00	-10.00	-6.79	-8.07	-3.07	-2.75	3.16	4.67	0.44	0.54	-5.00	-10.00	4.29	3.47	1.42	9.28	-8.57	-10.00
Nagpur	8.79	11.30	-8.92	-9.05	11.75	16.54	1.84	8.37	3.18	8.46	-2.35	-7.14	2.42	12.04	2.58	6.25	-3.68	-4.29
Bhandara	0.91	4.53	-3.33	-3.33	1.33	5.17	4.59	7.73	1.41	4.73	-5.00	-10.00	5.47	11.84	11.70	11.79	-6.67	-10.00
Gondia	0.53	9.03	15.00	10.00	-2.67	-1.50	3.28	6.14	0.76	8.84	-6.67	-10.00	3.27	8.75	5.48	10.77	30.00	0.00
Chandrapur	0.31	-0.70	-6.92	-5.92	-2.37	0.00	1.79	10.25	-0.29	0.45	-5.00	-5.00	6.18	34.00	2.18	3.08	-2.50	-5.00
Gadchiroli	0.51	1.00	-7.50	-4.48	1.11	3.75	2.57	7.40	0.36	1.08	-10.00	-10.00	13.00	21.54	24.48	32.73	-10.00	-10.00
State Total	0.09	2.35	-2.07	-1.40	1.13	0.75	0.63	2.90	-0.84	0.37	-3.96	-4.53	1.78	2.75	5.19	8.15	-3.62	-3.67

Source: Computations are based on figures obtained from the 'Statistical Division, Commissionerate of Agriculture, Government of Maharashtra, Central Building, Pune'

Although the annual decline in area and production of black gram in Maharashtra was estimated at 4-5 per cent during the last one decade, several black gram cultivating districts showed 5-7 per cent annual decline in area and 5-10 per cent annual decline in production of black gram during the same period. Similarly, the general trend showed about 4 per cent annual decline in area and production of green gram in Maharashtra during the last one decade. Some of the major green gram cultivating districts in Maharashtra showed significantly high rate of annual decline in area and production of green gram. However, the annual decline in area and production of black and green gram was offset by significant annual increase in area and production of red and Bengal gram, resulting in reasonably high production growth of pulses in Maharashtra.

2.6 Summary of the Chapter

The state of Maharashtra is the second largest producer of pulses in India with 2.6 million tonnes of production and 3.8 million hectares of area under its cultivation. Pulse crops are chiefly cultivated in various districts belonging to Vidarbha and Marathwada regions of Maharashtra under rainfed/unirrigated conditions, and these districts show considerable yield gap in pulse crops. Pulse crops are also grown under irrigated conditions in Western Maharashtra. Although the estimates show a steadily decline in area under foodgrain crops in Maharashtra over the last three decades, there has also been some gain in production of these crops which is due to rise in yield of foodgrain crops during this period. The time scale decline in foodgrain production in Maharashtra is chiefly due to continuous decline in area as well as production of course cereals. However, there has been steady increase in production of pulse crops in Maharashtra. The major reason for rise in pulse crop production in Maharashtra during the last three decades is the expansion in yield levels of these crops since area under pulse crops in the state has not increased significantly during this period.

Among various pulse crops cultivated in Maharashtra, gram or Bengal gram/ Chickpea and tur or red gram/ pigeon pea have shown dramatic increase in their production during the last three decades. However, black gram and green gram in Maharashtra have not only shown decline in production but also fall in area under the crop during the given period of time. Therefore, the increase in pulse production in Maharashtra during the last three decades is chiefly accounted for by substantial increase in production of Bengal gram and Red gram, which in turn is due to significant rise in their area as well productivity during this period.

One of the major reasons for significant rise in pulse production in Maharashtra has been the interventions under NFSM-Pulses programme. In addition to this, a continuous rise in minimum support price (MSP) for pulses has also acted as a catalyst in augmenting pulse production in the state. A number of new initiatives have also been included under NFSM during 2016-17 for enhancing pulses production and productivity, which include distribution of seed minikits of newer varieties of pulses free of cost to farmers, production of quality seed, creation of seed hubs at SAU and KVKs, strengthening of bio-fertilizers and bio agent labs at SAUs/ICAR Institutes, cluster front line demonstration by KVKs and rise in breeder seed production at ICAR institutes/SAUs.

It is to be noted that Amravati, Latur, Nagpur, Aurangabad and Pune divisions account for almost 86 per cent share in total area under pulse crop of Maharashtra with Amravati and Latur division alone accounting for 53 per cent share in total area under pulse crops of the state. The districts belonging to divisions of Latur, Amravati and Nagpur have shown significant rise in area under pulse crops not only in absolute terms but also in terms of their share in total pulse crop area of Maharashtra during the last two and a half decades. On the other hand, the districts belonging to divisions of Nasik and Kolhapur have shown a declining trend not only in terms of absolute area under pulse crops but also in terms of their share in total pulse crop area of Maharashtra during the last two and a half decades. Thus, despite the fact that the area under pulse crop in Maharashtra has increased moderately during the last two and a half decades, there are considerable variations in area under tur and gram crops across various districts/regions/ divisions of the state during this period.

Unlike moderate rise in area under pulse crops, the production of pulse crops in Maharashtra has increased by 82 per cent during the last two and a half decades. The regions/divisions that have contributed significantly towards rise in pulse crop production of Maharashtra are Latur, Amravati, Nagpur and Aurangabad. Further, though the division of Amravati accounts for the major share in pulse crop production of Maharashtra, the division of Latur has shown sharper increase in its share in pulse crop production of the state. The substantial increase in pulse crop production in Maharashtra during the last two and a half decades is due to perceptible increase in yield level of pulse crops during this period.

The course of time has seen the state of Maharashtra showing not only rise in area under various pulse crops but also rise in share of pulse cropped area in total cultivable as

well as gross cropped area. The pulse cropped area as proportion of cultivable area in Maharashtra has increased from 17 per cent to 18 per cent in Maharashtra during the last one decade. The gross cropped area (GCA) in Maharashtra has increased by 2.79 per cent during the last one decade. An increase in pulse cropped area coupled with rise in GCA over time has resulted in marginal rise in share of pulse cropped area in GCA of the state, which increased from 15.77 per cent to 16.31 per cent during the last one decade. In general, the districts that have shown an increase in their share of pulse cropped area in GCA over time encompass Ahmednagar, Pune, Beed, Latur, Nanded, Hingoli, Amravati, Yavatmal, Wardha, Bhandara, and Chandrapur. These districts are the major contributors of pulse production in Maharashtra.

The estimates in terms of changes in share of individual pulses in total area and production of pulse crops for various districts/ divisions of Maharashtra over time also presented us with several interesting observations. The estimates not only showed higher area allocation under red and Bengal gram but also rise in share of these crops in total pulse cropped area for major pulse cultivating districts of Maharashtra. The districts belonging to the divisions of Latur, Amravati, Nagpur and Aurangabad showed an increase in their area under red and Bengal gram as proportion of their pulse cropped area from 60 per cent to more than 76 per cent in the face of decline in their share of total pulse cropped area under black and green gram, showing a considerable shift in area under black and green gram to red and Bengal gram during the last one decade. The estimates also showed the division of Pune to have as much as 58 per cent of its pulse cropped area under Bengal gram with a rise in the same to 66 per cent during the last one decade. Similarly, the divisions of Nasik and Kolhapur showed a rise in their area under Bengal gram as proportion of their pulse cropped area from 31-34 per cent to 40-45 per cent during the same period. As against the divisions of Latur, Amravati, Nagpur and Aurangabad, the divisions of Pune, Nasik and Kolhapur did not show very significant area under red gram as proportions of their total pulse cropped area during the last one decade or so. However, the division of Nasik showed significant proportions of its total pulse cropped area under black and green gram with a decline in the same during the last one decade. The area under black and green gram as proportion of total pulse cropped area was also not very significant for the divisions of Pune and Kolhapur.

The estimates also showed significantly high and rising share of red and Bengal gram in total pulse production in majority of districts belonging to Latur, Amravati, Nagpur and Aurangabad divisions of Maharashtra during the last one decade or so.

Among these two pulse crops, Bengal gram in particular showed significantly high and rising share in total pulse production even in the districts belonging to Nasik, Pune and Kolhapur divisions. The share of Bengal gram in total pulse production was noticed to be as high as 76 per cent in Ahmednagar district. On the other hand, red gram showed the highest share of 75 per cent in total pulse production in case of Wardha district. The last one decade also saw a falling share of black and green gram in total pulse production for the districts belonging to Latur, Amravati, Nagpur, Nasik and Aurangabad divisions of Maharashtra. Further, the estimates showed very marginal share of black and green gram in total pulse production in almost all the districts of Nasik division. Even Pune and Kolhapur divisions of Maharashtra showed very low share of black and green gram in their total pulse production. In general, red and Bengal gram alone accounted for major share among various pulse crops cultivated in Maharashtra with a rise in their share from 73 per cent to 87 per cent in total pulse production during the last one decade.

An analysis with respect to changes in area, production and yield of various pulse crops over time also revealed several interesting observations. The state of Maharashtra showed an increase in pulse cropped area from 35.48 lakh hectares to 37.72 lakh hectares and production expansion from 19.88 lakh MT to 25.66 lakh MT during the period between TE 2006-07 and TE 2016-17. The increase in area and production of pulse crops was chiefly due to significant increase in area and production of red and Bengal gram in the face of decline in area and production of black and green gram during the same period. The major districts of cultivating various pulse crops mainly belonged to rainfed regions of Vidarbha and Marathwada regions and to some extent irrigated region of western Maharashtra. These districts accounted for about 85 per cent area and production of red gram and 75-80 per cent area and production of Bengal gram of the state during the last one decade. The major black and green gram cultivating districts showed about 70-75 per cent share in area allocation as well as production of black and green gram of Maharashtra during the last one decade or so. However, the state of Maharashtra showed about 40 per cent decline in area 45 per cent fall in production of black gram, and about 36 per cent decline in area as well as production of green gram during the last one decade. Unlike fall in area and production of black and green gram, there was 18 per cent rise in area and 27 per cent increase in production of red gram in Maharashtra during the last one decade. Similarly, Bengal gram in Maharashtra showed about 52 per cent rise in area and 82 per cent increase in production during the same period. Consequently, there was overall expansion in production of pulses in Maharashtra, which was caused not only

on account of rise in area but also due to significant rise in yield of red and Bengal gram in the state.

The estimates also showed highly fluctuating decadal growth rates in area and yield of various foodgrain in Maharashtra during the last four decades. Among various foodgrains, pulse crops in Maharashtra showed 2-4 per cent annual growth in area 3-5 annual growth in yield level during the last four decades with some exceptional periods when area and yield level of the same declined marginally. Bengal gram in particular showed 5-8 per cent annual growth in area during the last four decades. The yield level of Bengal gram increased at an annual growth rate of 1-5 per cent during 1980s, 1990s and 2000s period with a marginal annual decline in the same in more recent times. Similarly, red gram in Maharashtra in Maharashtra showed 1-5 per cent annual growth in area and 2-6 annual growth in yield during 1980s, 1990s and 2000s period though a marginal decline in yield of the same was also witnessed in more recent times. Unlike Bengal and red gram, black and green gram showed a steady and sharp annual decline in area and yield, especially after the 1980s and 1990s period. Therefore, perceptible increase in area and yield of pulses in Maharashtra was achieved only on account of reasonable annual growth in area and yield of Bengal and red gram during the last four decades.

The general trend in Maharashtra showed about 8 per cent decline in area and 4 per cent increase in production of foodgrains in Maharashtra between TE 2006-07 and TE 2016-17, which was mainly caused by a sharp decline in area and production of course cereals since main cereals and pulses showed remarkable increase in area and production during the last one decade. The pulse crops in particular showed about 29 per cent rise in production and 6 per cent increase in area during the last one decade. Between TE 2006-07 and TE 2016-17, while red gram in Maharashtra showed about 18 per cent increase in area and 27 per cent rise in production, Bengal gram was marked with as much as 52 per cent increase in area and 82 per cent rise in production. As against rise in area and production of red and Bengal gram, there was about 40-45 decline in area and production of black and green gram during the last one decade. Therefore, significant expansion in area and production of pulses in Maharashtra was chiefly contributed by rise in area and production of red and Bengal gram.

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CHAPTER – III

HOUSEHOLD CHARACTERISTICS, CROPPING PATTERN AND VALUE OF OUTPUT OF FARMERS

This chapter mainly deals with the socio-economic profile of the selected farmers encompassing both sampled beneficiary and non-beneficiary farmers of seed minikits for pulse crops since the socio-economic characteristics of farmers have a profound influence on the decision making process and profitability of crop enterprise. The resource endowments have been compared for different categories of farmers with beneficiary and non-beneficiary farmers put together. The information relating to family size and composition, education status, caste composition, land use pattern, cropping pattern, irrigated area, sources of irrigation, etc. has been analysed and discussed for various categories of farmers. The knowledge of the background of the sampled farmers is essential since the viability of any enterprise heavily depends on the favorable attitudinal changes towards adoption of superior technical inputs, which in turn, depends on technical skills and resource position of the farmers. In general, this chapter focuses on demographic profile of selected farmers, characteristics of their operational holdings, structure of tenancy, sources of irrigation, cropping pattern, crop productivity, value of output, production, cost and returns by farm size, etc.

3.1 Socio-economic Characteristics of the Selected Farmers

The socio-economic characteristics of different categories of farmers have been compared with beneficiary and non-beneficiary farmers put together. These characteristics mainly revolve around family size of households, gender of respondents, proportion of respondents belonging to various age groups, education status of households, average members of family doing farming, average years of farming experience of respondents, their caste status, main and subsidiary occupation of respondents, average annual family income, etc. The demographic profile of selected beneficiary and non-beneficiary farmers put together is provided in Table 3.1 The demographic profile of all the gram and tur cultivating beneficiary and non-beneficiary farmers drawn from the districts of Ahmednagar and Yavatmal is shown in Appendix 5, 6, 7 and 8, and overall scenario in this respect for beneficiary and non-beneficiary farmers with gram and tur crops put together is shown in Appendix 9 and Appendix 10.

The study covered 300 sampled beneficiary and non-beneficiary farmers of seed minikits, which encompassed 57 marginal farmers, 152 small, 56 medium and 35 large

farmers. The average family size was noticed to be 4.77 for marginal farmers, 4.84 for small, 5.30 for medium, 5.563 for large and 5.01 for the average category of farmers (Table 3.1). The gender profile of respondents was in favour of male since 98 per cent of these respondents belonged to male and only 2 per cent belonged to female category. The distribution of various respondents across various age groups reveled that 74 per cent of them belonged to 30-60 years of age group, 15 per cent to above 60 years of age group and the remaining 10 per cent to below 30 years of age group. The marginal, small and large category of respondents showed higher proportion of them belonging to 30-60 years of age group. In general, majority of the respondents were more than 30 years of age. The education status of farmers revealed that about 14 per cent of sampled respondents were illiterate, 17 per cent attained education up to primary level, 13 per cent up to middle level, 23 per cent up to secondary level, 19 per cent up to higher secondary level, and remaining 14 of respondents were graduates and above. The small and large category of farmers invariably showed higher education status as compared to marginal and medium category. The estimates relating to demographic profile of farmers further revealed that the average number of members of family doing farming was 3.05 for marginal category, 3.09 for small, 3.25 for medium, 3.20 for large and 3.12 for the average category (Table 3.1). In general, the farmers showed about 27 years of experience in farming. The caste profile showed that about 42 per cent of sampled farmers belonged to OBC category, 28 per cent to ST category, 21 per cent to general category and 9 per cent to SC category, showing significantly higher proportion of them belonging to OBC and ST category. Further, all the category of sampled respondents showed agriculture and allied activity as their main occupation. However, about 15 per cent of farmers showed various other activities as their subsidiary occupation, which encompassed 5 per cent of them showing salary/pension as their subsidiary source of income, another 5 per cent of them showing self business/services activity as their subsidiary source of income, and 6 per cent each of them showing agriculture labour and non-agriculture labour activity as their subsidiary source of income. The marginal category of farmers invariably showed higher proportion of them engaged in agriculture labour and non-agriculture labour activity to substantiate their income. On the other hand, small, medium and large category of farmers showed about 4-6 per cent of them drawing additional income from salary and pensions. The annual income derived from derived from agriculture and allied activities was found to be Rs.91,627 for marginal category, Rs.1,88,466 for small, Rs.3,91,662 for medium, Rs.5,89,619 for large and Rs.2,45,046 for the average category of farmers. The income

from non-agricultural sources was estimated at Rs.89,523 for marginal category, Rs.99,444 for small, Rs.99,600 for medium, Rs.1,05,000 for large and Rs.95,260 for the average category of farmers (Table 3.1). These estimates showed increasing average annual income of selected farmers with the increase in their land holding size.

Table 3.1: Demographic profile of the selected farmers (% of households)

Characteristics		Marginal	Small	Medium	Large	Total
No of HH		57	152	56	35	300
Household size (numbers)		4.77	4.84	5.30	5.63	5.01
Gender of Respondent (%)	Male	98.25	96.71	100.00	100.00	98.00
	Female	1.75	3.29	-	-	2.00
Age of the Respondent (%)	<30	12.28	7.23	14.29	14.29	10.34
	30-60	77.19	75.66	66.07	77.14	74.33
	>60	10.53	17.11	19.64	8.57	15.33
Education status of Respondent, number of years of education (%)	Illiterate	19.30	12.51	16.07	11.43	14.33
	Up to Primary (5)	12.28	19.08	19.64	8.57	16.67
	Up to Middle (8)	15.79	12.50	14.29	8.57	13.00
	Up to Matric (10)	21.05	23.68	23.21	22.86	23.00
	Up to + 2	15.79	20.39	16.07	22.86	19.00
	Up to graduate	12.28	8.55	8.93	20.00	10.67
	Above graduate	3.51	3.29	1.79	5.71	3.33
Average members of family doing farming		3.05	3.09	3.25	3.20	3.12
Average years of farming experience		24.54	28.07	27.57	22.03	26.60
Caste (% of households)	SC	7.02	10.52	10.72	2.85	9.00
	ST	29.82	26.32	33.93	22.86	28.00
	OBC	31.58	43.42	44.64	51.43	42.33
	General	31.58	19.74	10.71	22.86	20.67
Main occupation of respondent (%)	Agriculture and allied	100.00	100.00	100.00	100.00	100.00
	Agricultural labour	-	-	-	-	-
	Non-agricultural labour	-	-	-	-	-
	Self business/services	-	-	-	-	-
	Salaried/pensioners	-	-	-	-	-
	Others	-	-	-	-	-
Subsidiary occupation of respondent (%)	Agriculture and allied	-	-	-	-	-
	Agricultural labour	15.79	1.97	-	-	4.00
	Non-agricultural labour	10.53	0.66	-	-	2.00
	Self business/services	7.02	3.95	5.36	2.86	4.67
	Salaried/pensioners	5.26	4.61	3.57	5.71	4.67
	Others	-	-	-	-	-
Average Annual Income	Agriculture and allied	91627	188466	391662	589619	245046
	Non-agricultural Sources	89523	99444	99600	105000	95260

Note: Percentages have been computed from the total sample size within household category

Thus, the foregoing estimates relating to demographic profile showed that the average family size of sampled farmers was 5.01 which comprised of 3.12 members of family doing farming. The sampled farmers also showed about 27 years of experience in farming. The estimates also revealed that more than 68 per cent of farmers attained education up to middle level and above with proportion of graduate and above being 14 per cent. The caste profile showed significantly higher proportion of farmers belonging to OBC and ST category with 42 per cent of them belonging to OBC and 28 per cent to ST

category. All the respondents also showed agriculture and allied activity as their main occupation. However, about 15 per cent of sampled farmers showed various other activities as their subsidiary occupation, which encompassed 5 per cent of them showing salary/pension as their subsidiary source of income and another 5 per cent of them showing self business/services activity as their subsidiary source of income.

3.2 Characteristics of Operational Holding

Land is the main resource base of the farmer in the production process. The economic and social progress of farmers largely depends on the size of their operational holdings. Keeping in view the significance of land resources, it was thought essential to show the land use pattern of sampled farmers of seed minikits. The estimates relating to the magnitude of owned land, uncultivated land, leased in and out land, net operated area, irrigated area, gross cropped area (GCA) and cropping intensity for various categories of sampled beneficiary and non-beneficiary farmers put together are shown in Table 3.2. These estimates for all the sampled gram and tur cultivating beneficiary and non-beneficiary farmers drawn from the districts of Ahmednagar and Yavatmal and overall scenario in this respect is shown in Appendix 11.

Table 3.2: Characteristics of Operational Holdings (Acres per Household) of Farmers

Farm size	Sample Size	Total Owned land (1)	Total Leased-in Land (2)	Total Leased –out Land (3)	Uncultivated land (4)	Net Operated Area = (1+2-3-4))	Net irrigated Area	GCA	Cropping Intensity (%)
Marginal	57	1.90	0.02	-	0.04	1.88	1.42	2.79	148.40
Small	152	4.10	-	-	0.06	4.04	2.43	4.91	121.53
Medium	56	7.73	-	-	0.51	7.22	4.25	11.64	161.22
Large	35	16.46	-	-	0.49	15.97	10.47	19.24	120.48
Total	300	5.80	0.004	-	0.19	5.61	3.51	7.44	132.62

The average size of owned land holding was estimated at 1.90 acres for marginal category, 4.10 acres for small, 7.13 acres for medium and 16.46 acres for the large category with an overall average of 5.80 acres for the average category of farmers. Although various categories of sampled farmers did not show any leased out land, all of them showed some uncultivated area, which resulted in lower net operated area for these farmers. The net operated area for these farmers was estimated at 1.88 acres for marginal category, 4.04 acres for small, 7.22 acres for medium and 15.97 acres for the large category with an overall average of 5.61 acres for the average category of farmers. In general, about 63 per cent of the net operated area of farmers was found to be irrigated. The intensity of cropping was worked out at 14 per cent in the case of marginal category of farmers, 122 per cent for small category, 161 per cent for medium category and 120

per cent for large category with an average of 133 per cent for the average category of farmers (Table 3.2). Thus, small and large category of sampled farmers, in particular, showed very low cropping intensity.

Thus, the average net operated, irrigated and gross cropped area of sampled farmers was estimated at 5.61 acres, 3.51 acres and 7.44 acres, respectively, which increased with the increase in their land holding size. Although the selected farmers did not show any leased out land and showed very marginal presence of leased in land, medium and large categories of farmers, in particular, showed higher uncultivated area. The estimates also showed that about 63 per cent of the net operated area of farmers was irrigated. The average intensity of cropping of sampled farmers was estimated at 133 per cent, which was higher for marginal and medium category as against small and large category. In general, the proportion of net operated area under irrigation was higher for large category of sampled farmers.

3.3 Sources of Irrigation

Details regarding extent of area under irrigation and sources of irrigation on the farms belonging to sampled beneficiary and non-beneficiary farmers put together are provided separately in Table 3.3. These estimates for all the sampled gram and tur cultivating beneficiary and non-beneficiary farmers drawn from the districts of Ahmednagar and Yavatmal and overall scenario in this respect is shown in Appendix 12.

The estimates showed that about 37 per cent of total operated area of average category of sampled farmers was under dug well irrigation, 7 per cent under boar well irrigation, less than 1 per cent under canal irrigation, 4 per cent under farm pond irrigation, 9 per cent under dug well plus boar well irrigation, 5 per cent under river lift irrigation and remaining 37 per cent remained rainfed (Table 3.3).

Table 3.3: Source of Irrigation of Net Operated Area (%) for Farmers

Farmer Category	Dug well	Boar well	Canal	Farm Pond	Dug well and Boar well	Other (River lift irrigation)	Rain fed area	Average Water Charges (Rs./acre)	Total operated area
Marginal	39.17 (36.6)	18.34 (17.14)	5.30 (4.95)	5.22 (4.88)	8.00 (7.47)	5 .00 (4.67)	26.00 (24.29)	1500	107.03 (100)
Small	247.3 (40.24)	24.99 (4.07)	-	41.39 (6.74)	47.35 (7.71)	7.75 (1.26)	245.72 (39.99)	-	614.5 (100)
Medium	149.96 (37.12)	14.50 (3.59)	-	21.00 (5.2)	33.55 (8.31)	19.08 (4.72)	165.85 (41.06)	-	403.94 (100)
Large	183.50 (32.79)	62.02 (11.1)	-	-	65.03 (11.64)	56.00 (10.02)	192.53 (34.45)	-	558.88 (100)
Total	619.93 (36.80)	119.85 (7.11)	5.30 (0.31)	67.61 (4.01)	153.93 (9.14)	87.83 (5.21)	630.10 (37.40)	1500	1684.5 (100)

Note: Figures in parentheses are percentages to the total operated area

The proportion of dug well irrigated area was the highest for small category and lowest for large category of farmers. The proportion of dug well plus boar well irrigated area by and large increased with the increase in land holding size of farmers. The proportion of river lift irrigated area varied from 1 per cent for small category to 10 per cent for large category. On the contrary, the proportion of farm pond irrigated area by and large remained same and hovered at around 5-7 per cent of net operated area for various categories of farmers. The canal irrigation was noticed only in case of marginal category with canal irrigation charges estimated at Rs.1500 per acre. The proportion of rainfed area varied from 24 per cent in case of marginal category to 41 per cent for medium category. These estimates clearly underscore the fact that the sampled farmers were mainly dependent on dug well, bore well and combination of dug and bore well as their major source of irrigation.

Thus, dug well, bore well and a combination dug and bore well irrigation system dominated on the farms belonging to sampled farmers. The sampled farmers showed river lift and farm pond as the other major sources of irrigation. Further, none of the sampled farmers showed area under canal irrigation with the sole exception of marginal category of farmers. The estimates also showed higher proportion of total operated area as rainfed for the small and medium categories of sampled farmers.

3.4 Cropping Pattern

Cropping pattern assumes considerable significance in determining farmer's net annual income through crop husbandry. Though farmers prefer to grow those crops that yield higher net returns, they are constrained to grow several high value field crops due to varied agro-climatic conditions as well as topography and soil type across various regions or within the same region. In general, the cropping pattern of irrigated area differs from the cropping pattern of un-irrigated area. While high value commercial field crops are usually grown under irrigated conditions, low value subsistence crops find place under rainfed conditions. However, there are several important course cereal, pulses and oilseed crops like *bajra, maize, jowar, mung, tur, gram, soyabean, sunflower, etc.* that find place in terms of output and area allocation even under dry or rainfed conditions.

The information on proportion of gross cropped area allocation under different crops grown under irrigated and rainfed conditions across different seasons by the sampled beneficiary and non-beneficiary farmers put together is provided in Table 3.4. The cropping pattern of all the sampled gram and tur cultivating sampled beneficiary and non-beneficiary farmers drawn from the districts of Ahmednagar and Yavatmal is shown

in Appendix 13, 14, 15 and 16, and overall scenario in this respect for the sampled beneficiary and non-beneficiary farmers with gram and tur crops put together is brought out in Appendix 17 and Appendix 18.

Table 3.4: Cropping pattern of selected farmers (% of GCA for the reference year 2018-19)

Crop	Marginal	Small	Medium	Large	Total
Irrigated Area					
Kharif					
Bajra	14.40	7.16	8.59	2.97	6.83
Cotton	6.45	7.63	9.17	7.80	8.05
Onion	0.63	0.87	0.77	1.48	1.01
Green Gram (mung)	0.63	-	-	-	0.04
Maize	0.31	1.41	1.38	5.05	2.42
Tur	11.48	6.45	3.68	6.98	6.16
Soyabean	4.40	10.48	6.37	15.81	10.45
Udid	-	0.13	-	0.89	0.31
Hulga	-	0.13	0.61	0.45	0.36
Total	38.30	34.26	30.57	41.72	35.72
Rabi					
Gram	22.11	11.15	8.98	13.81	12.10
Wheat	6.29	6.06	5.25	6.90	6.10
Jowar	0.94	2.28	5.83	6.24	4.41
Onion	7.86	3.10	6.44	1.19	3.84
Total	37.20	22.58	26.50	28.14	26.45
Summer					
Groundnut	0.94	0.80	4.30	0.74	1.82
Kadwal	-	0.16	-	-	0.05
Total	0.94	0.96	4.30	0.74	1.87
Perennial					
Lemon	2.04	1.47	1.11	0.67	1.17
Pomegranate	2.52	1.54	0.38	0.45	0.94
Sugarcane	1.70	3.30	3.99	3.26	3.38
Grapes	-	1.81	-	-	0.61
Total	6.26	8.13	5.49	4.38	6.09
Gross Irrigated Area	82.70	65.93	66.86	74.98	70.13
Unirrigated Area					
Kharif					
Bajra	0.63	1.87	5.37	2.97	3.14
Cotton	3.14	11.71	6.83	5.12	7.69
Onion	-	0.13	-	-	0.04
Maize	0.16	0.27	0.31	0.30	0.28
Tur	3.93	6.76	3.68	6.09	5.46
Soyabean	5.66	8.33	4.83	8.02	7.03
Hulga	-	0.20	0.77	0.74	0.52
Sunflower	-	0.07	-	-	0.02
Total	13.52	29.42	22.09	23.68	24.42
Rabi					
Gram	2.83	2.44	0.92	-	1.29
Wheat	-	0.13	-	-	0.04
Jowar	0.94	1.94	6.37	3.56	3.65
Onion	-	1.31	2.22	0.15	1.13
Total	3.77	4.65	8.75	1.34	4.78
Summer					
Groundnut	-	-	2.30	-	0.67
Total	-	-	2.30	-	0.67
Gross unirrigated Area	17.30	34.07	33.14	25.02	29.87
Gross Crop Area	159 (100)	746.92 (100)	651.77 (100)	673.47 (100)	2231.16 (100)

The cropping pattern of sampled beneficiary and non-beneficiary farmers put together was seen to be in favour of cultivating tur, bajra, soyabean, cotton, and maize in kharif season and gram, wheat, jowar and onion in rabi season. On the other hand, crops like sugarcane, lemon, pomegranate and grapes were cultivated as perennial crops by beneficiary farmers. The average category of farmers showed 70 per cent of gross cropped area under irrigation and 30 per cent under rainfed condition. The gross irrigated area of farmers encompassed 36 per cent of gross cropped area in kharif season, 26 per cent in rabi season, 2 per cent in summer season and 6 per cent under perennial crops. On the other hand, gross unirrigated area of farmers encompassed 24 per cent of gross cropped area in kharif season, 5 per cent in rabi season, and 1 per cent under summer crops. During kharif season, the average category of farmers showed 7 per cent of their gross cropped area under bajra, 8 per cent under cotton, 2 per cent under maize, 6 per cent under tur, and 10 per cent under soybean under irrigated condition, and 3 per cent under bajra, 8 per cent under cotton, 5 per cent under tur, and 7 per cent under soybean under unirrigated condition. In rabi season, the average category of farmers showed 12 per cent of their gross cropped area under gram, 6 per cent under wheat, 4 per cent under jowar and 4 per cent under onion under irrigated condition, and 1 per cent under gram, 4 per cent under jowar, and 1 per cent under onion under unirrigated condition (Table 3.4). The sampled farmers also showed 2 per cent of gross cropped area under summer groundnut under irrigated condition and 1 per cent under unirrigated condition. In general, various pulse crops like tur, gram, udid, and mung cultivated during kharif and rabi seasons under irrigated and unirrigated conditions accounted for 25.05 per cent share in the gross cropped area of sampled farmers.

Thus, majority of sampled farmers were found to cultivate various crops under irrigated as against unirrigated conditions since various crops cultivated by them under irrigation accounted for about 70 per cent share in the gross cropped area (GCA). In general, the cropping pattern of sampled farmers was seen to be in favour of cultivating tur, bajra, soyabean, cotton, and maize in kharif season and gram, wheat, jowar and onion in rabi season. Various crops like sugarcane, lemon, pomegranate and grapes were cultivated as perennial crops by beneficiary and non-beneficiary farmers. The estimates also showed that various pulse crops like tur, gram, udid, and mung cultivated during kharif and rabi seasons under irrigated and unirrigated conditions accounted for 25.05 per cent share in the gross cropped area for sampled farmers. Among various pulse crops, gram and tur accounted for the major share in GCA. The estimates further showed that

sugarcane was cultivated as perennial crop and groundnut as summer crop by both beneficiary and non-beneficiary farmers put together.

3.5 Production, Cost and Returns by Farm Size

It has been widely argued that in the typical rural setting, maximization of net return is the ultimate goal of the producer which largely depends on the cost structure to be followed by such enterprising household. However, maximization of profit requires a balance between the increase in the production and various components of costs. In fact, it is the structure of cost and returns that is most crucial not only for the producers but also for the consumers and policy makers since these two key elements provide an effective linkage between the producer and consumers for rational fixation of prices of the produce. It is, therefore, essential to broadly evaluate not only various components of input costs but also output value for various crops cultivated during various seasons by various categories of sampled beneficiary and non-beneficiary farmers of seed minikit.

The sampled farmers were found to cultivate not only various pulses crops but also large number various other crops like bajra, cotton, onion, maize, soybean, sunflower, gram, wheat, jowar, groundnut, lemon, pomegranate, sugarcane and grapes. Since the cropping pattern of sampled farmers included not only various field crops cultivated during various seasons but also perennial crops, the productivity of these crops varied significantly at aggregate level. The aggregate estimates relating to crop production, value of output from main and by produce, cost of production, net and gross returns for various crops cultivated by various farm size categories of beneficiary and non-beneficiary farmers put together are presented in Table 3.5. The estimates relating to crop production, value of output from main and by produce, cost of production, net and gross returns for all the individual crops cultivated during various season by various farm size categories of beneficiary and non-beneficiary farmers are brought out in Appendix 19 to Appendix 44 with Appendix 30, 35, 38, 43 and 44 showing aggregate scenario in this respect for kharif, rabi, summer, perennial and all crops put together.

Table 3.5: Value of Output, Cost and Net Returns for Survey Year – Aggregate of All Crops

Farm Size	Production (quintals/acre)			Value of Output (Rs/acre)	Cost of Production (Rs/acre)			Net Returns (Farm Business Income) (Rs/acre)	Farm Income Rs. Per HH (based on NOA)	
	Irrigated	Rainfed	Total		Material Cost	Labour Cost	Total Cost		Gross	Net
Marginal	22.13	3.67	19.09	28683	4611	5445	10056	18628	53925	35020
Small	37.99	5.17	26.8	32736	4725	5128	9853	22883	132254	92448
Medium	42.96	8.68	31.6	29909	5540	6192	11732	18177	215945	131237
Large	32.45	4.75	25.52	27601	4837	5297	10134	17467	440791	278952
Total	36.34	5.78	27.04	30096	4950	5460	10410	19686	168990	110536

The estimates presented in Table 3.5 showed wide variation in per acre crop production at aggregate level under irrigated and rainfed conditions due mainly to the fact that the sampled farmers not only cultivated various field crops during kharif, rabi and summer seasons but also perennial crops like lemon, pomegranate, sugarcane and grapes under irrigated conditions. The productivity of these perennial crops was significantly high. Not only this, the productivity of sugarcane reported in tonnes per acre was converted into quintals per acre. This resulted in significantly high productivity of all crops at aggregate level. In general, the aggregate productivity of all crops was estimated at 27.04 qtl/ acre for the average category of farmers, which increased with the increase in land holding size of farmers.

The value of output of main and by-produce of all the crops at aggregate level was estimated at Rs.28,683/acre for marginal category, Rs.32,736/acre for small, Rs.29,909/acre for medium and Rs.27,601/acre for the large category with an average of Rs.30,096/acre for the average category of farmers. The cost of production of all the crops at aggregate level on per acre basis was estimated at Rs.10,410, which turned out to be the highest for medium and lowest for small category of farmers. As a result, the net farm business income turned out to be higher for small and lower for medium category of farmers. The net farm business income at aggregate level for all crops put together was worked out at Rs.19,686/acre, which varied from Rs.17,467/acre for large category to Rs.22,883/acre for the small category of farmers. The gross and net farm income of farmers from the net operated area on per household basis with all crops put together increased with the increase in their land holding size, which on an average was estimated at Rs.1,68,990 and Rs.1,10,536, respectively. The labour cost accounted for 52 per cent share in cost of production of all the crops at aggregate level with material input cost accounting for the remaining 48 share in the same.

Thus, the average category of farmers showed 27.04 qtl/acre of crop production at aggregate level with all the crops put together. Although per acre net farm business income at aggregate level was estimated at Rs.19,686, it varied from Rs.17,467 for large category to Rs.22,883 for the small category of farmers. However, the gross and net farm income of farmers from the net operated area on per household basis with all crops put together increased with the increase in their land holding size, which was estimated at Rs.1,68,990 and Rs.1,10,536, respectively, for the average category of farmers.

The disaggregated estimates relating to crop production, value of output from main and by produce, cost of production, net and gross returns for various crops cultivated during kharif, rabi, and summer seasons and also as perennial crops by various farm size categories of beneficiary and non-beneficiary farmers put together are presented in Table 3.6. A further break-up of all the crops into kharif, rabi, summer and perennial presented in Table 3.6 revealed much larger fluctuations in crop production on per acre basis during these seasons due to inclusion of several high value crops, which were marked with very high level of productivity like lemon, sugarcane, pomegranate and grapes. These crops were mainly cultivated under irrigated conditions by the farmers. The value of output as well as cost of production and net returns also turned out to be significantly high not only on per acre basis but also on per household basis.

Table 3.6: Value of Output, Cost and Net Returns for Survey Year – Disaggregate of All Crops

Farm Size	Production (quintals/acre)			Value of Output (main + by-product) (Rs/acre)	Cost of Production (Rs/acre)			Net Returns (Farm Business Income) (Rs/acre)	Farm Income Rs. Per HH (based on GCA)	
	Irrigated	Rainfed	Total		Material Cost	Labour Cost	Total Cost		Gross	Net
Kharif Crops										
Marginal	4.52	3.74	4.33	17684	2722	3778	6500	11184	28046	17737
Small	5.91	4.25	5.14	20127	3054	3601	6655	13472	62980	42157
Medium	5.58	3.78	4.83	18052	3278	4037	7315	10737	110650	65814
Large	7.02	4.84	6.23	21024	3650	4340	7991	13034	264608	164041
Total	6.06	4.29	5.35	19775	3283	3962	7245	12531	88764	56153
Rabi Crops										
Marginal	19.19	3.44	17.74	30589	5441	6192	11632	18957	34963	21667
Small	14.46	10.94	13.86	27527	5290	5766	11056	16472	36834	22041
Medium	21.86	21.98	21.89	31886	6796	8194	14990	16896	130817	69318
Large	8.28	3.14	8.05	23593	4958	5732	10689	12904	133806	73181
Total	14.91	15.76	15.04	28071	5678	6540	12218	15853	65336	36761
Summer Crops										
Marginal	4.33	-	4.33	18050	4667	4167	8833	9217	475	243
Small	5.29	-	5.29	29701	3493	3431	6924	22778	1407	1079
Medium	5.07	5.20	5.12	23533	5140	4935	10074	13458	18070	10334
Large	6.60	-	6.60	35560	6700	6400	13100	22460	5080	3209
Total	5.25	5.20	5.24	25094	5063	4847	9910	15185	4769	2896
Perennial Crops										
Marginal	163.50	-	163.50	117300	16275	15838	32113	85188	20579	14945
Small	243.19	-	243.19	149742	16112	15190	31302	118440	59601	47142
Medium	382.88	-	382.88	138720	19664	15542	35206	103514	88558	66083
Large	434.24	-	434.24	151427	21424	16475	37898	113529	127631	95689
Total	315.62	-	315.62	144816	18214	15610	33823	110992	65529	50224
All Crops										
Marginal	22.13	3.67	19.09	28683	4611	5445	10056	18628	84063	54592
Small	37.99	5.17	26.80	32736	4725	5128	9853	22883	160823	112418
Medium	42.96	8.68	31.60	29909	5540	6192	11732	18177	348095	211549
Large	32.45	4.75	25.52	27601	4837	5297	10134	17467	531125	336120
Total	35.66	6.13	26.90	29969	4968	5485	10452	19516	224398	146034

In general, the aggregate crop production for the average category of farmers was estimated at 5.35 qtl/acre for kharif crops, 15.04 qtl/acre for rabi crops, 5.24 qtl/acre for summer crops and 315.62 qtl/acre for perennial crops with an overall average of 26.90

qtl/acre for all the crops put together (Table 3.6). The farm business income generation by beneficiary and non-beneficiary farmers put together on per acre basis was estimated at Rs.12,531 from kharif crops, Rs.15,853 from rabi crops, Rs.15,185 from summer crops and Rs.1,10,992 from perennial crops with an overall average of Rs.19,516 for all the crops put together. The estimates further revealed that the average aggregate per household farm income generation from gross cropped area estimated at Rs.1,46,034 for the average category of farmers encompassed 38.45 per cent income from kharif crops, 25.17 per cent from rabi, 1.99 per cent from summer and 34.39 per cent from perennial crops. Thus, the sampled farmers generated major income from kharif crops, followed by perennial, rabi and summer crops.

Thus, the disaggregated estimates of crop production for sampled farmers showed large variations across seasons, which varied from 5.24 qtl/acre for summer crops to 315.62 qtl/acre for perennial crops. Similarly, the sampled farmers also showed large variations in net farm business income on per acre basis, which varied from Rs.12,531 from kharif crops to Rs.1,10,992 from perennial crops. The estimates further revealed that the average aggregate per household farm income generation of sampled farmers from gross cropped area encompassed 38.45 per cent income from kharif crops, 25.17 per cent from rabi, 1.99 per cent from summer and 34.39 per cent income from perennial crops. Therefore, the major income generation of sampled farmers was from kharif crops, the non-beneficiary farmers showed higher income generation from perennial crops, followed by perennial, rabi and summer crops.

3.6 Summary of the Chapter

The demographic profile showed that the average family size of sampled farmers was 5.01 which comprised of 3.12 members of family doing farming. The sampled farmers also showed about 27 years of experience in farming. The estimates also revealed that more than 68 per cent of farmers attained education up to middle level and above with proportion of graduate and above being 14 per cent. The caste profile showed significantly higher proportion of farmers belonging to OBC and ST category with 42 per cent of them belonging to OBC and 28 per cent to ST category. All the respondents also showed agriculture and allied activity as their main occupation. However, about 15 per cent of sampled farmers showed various other activities as their subsidiary occupation, which encompassed 5 per cent of them showing salary/pension as their subsidiary source of income and another 5 per cent of them showing self business/services activity as their

subsidiary source of income. The estimates also showed increasing average annual income of selected farmers with the increase in their land holding size.

The average net operated, irrigated and gross cropped area of farmers was estimated at 5.61 acres, 3.51 acres and 7.44 acres, respectively, which increased with the increase in their land holding size. Although the sampled farmers did not show any leased- out land and showed very marginal presence of leased-in land, medium and large categories, in particular, showed higher uncultivated area. The estimates also showed that about 63 per cent of the net operated area of farmers was irrigated. The average intensity of cropping of sampled farmers was estimated at 133 per cent, which was higher for marginal and medium category as against small and large category. In general, the proportion of net operated area under irrigation was higher for large category of farmers.

As for sources of irrigation, dug well, bore well and a combination dug and bore well irrigation system dominated on the farms belonging to sampled farmers. The sampled farmers showed river lift and farm pond as the other major sources of irrigation. Further, none of the sampled farmers showed area under canal irrigation with the sole exception of marginal category of farmers. The estimates also showed higher proportion of total operated area as rainfed for the small and medium categories of sampled farmers

The scenario obtaining in terms of cropping pattern revealed that majority of sampled farmers were found to cultivate various crops under irrigated as against unirrigated conditions since various crops cultivated by them under irrigation accounted for about 70 per cent share in the gross cropped area (GCA). In general, the cropping pattern of sampled farmers was seen to be in favour of cultivating tur, bajra, soyabean, cotton, and maize in kharif season and gram, wheat, jowar and onion in rabi season. Various crops like sugarcane, lemon, pomegranate and grapes were cultivated as perennial crops by beneficiary and non-beneficiary farmers. The estimates also showed that various pulse crops like tur, gram, udid, and mung cultivated during kharif and rabi seasons under irrigated and unirrigated conditions accounted for 25.05 per cent share in the gross cropped area for sampled farmers. Among various pulse crops, gram and tur accounted for the major share in GCA. The estimates further showed that sugarcane was cultivated as perennial crop and groundnut as summer crop by sampled farmers.

The average category of farmers showed 27.04 qtl/acre of crop production at aggregate level with all the crops put together. Although per acre net farm business income at aggregate level was estimated at Rs.19,686, it varied from Rs.17,467 for large category to Rs.22,883 for the small category of farmers. However, the gross and net farm

income of farmers from the net operated area on per household basis with all crops put together increased with the increase in their land holding size, which was estimated at Rs.1,68,990 and Rs.1,10,536, respectively, for the average category of farmers.

The disaggregated estimates of crop production for sampled farmers showed large variations across seasons, which varied from 5.24 qtl/acre for summer crops to 315.62 qtl/acre for perennial crops. Similarly, the sampled farmers also showed large variations in net farm business income on per acre basis, which varied from Rs.12,531 from kharif crops to Rs.1,10,992 from perennial crops. The estimates further revealed that the average aggregate per household farm income generation of sampled farmers from gross cropped area encompassed 38.45 per cent income from kharif crops, 25.17 per cent from rabi, 1.99 per cent from summer and 34.39 per cent income from perennial crops. Therefore, the major income generation of sampled farmers was from kharif crops, followed by perennial, rabi and summer crops.

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CHAPTER – IV

EFFICIENCY OF SEED MINIKITS IN MAHARASHTRA

Having discussed and evaluated in brief the underlying growth trends in area, production and productivity of various important crops cultivated in the state of Maharashtra with focus on various pulses crops and trends in various other quantitative parameters of agricultural sector of the State in chapter II and socio-economic characteristics, cropping pattern, land utilization pattern, irrigation status, etc. of various categories of sampled beneficiary and non-beneficiary farmers in chapter III, this chapter mainly examines the efficiency of distribution of seed minikits in the state of Maharashtra with the help of various quantitative and qualitative parameters. Initially this chapter compares the productivity of various crops cultivated across various seasons under irrigation and unirrigated conditions between beneficiary and non-beneficiary farmers, and subsequently evaluates/compares the extent of profit involved in the cultivation of various crops with focus on pulse crops for beneficiary and non-beneficiary farmers based on field level production and cost of cultivation estimates. This chapter subsequently delves into assessing efficiency in the distribution of seed minikits and its usage by beneficiary farmers; their awareness and perceptions regarding seed minikits and the scheme with extension to examining various other relevant and related aspects viz. documents required for availing seed minikits, criteria of farmer selection, financial details of seed minikits, details of seed minikits provided for pulse crops, content of the seed minikits, sources of purchase of seed minikits, quantity of pulses marketed through various channels, farmers opinion regarding distribution of seed minikits, both in qualitative and quantitative terms, timeliness of distribution, major issues and problems faced by farmers, measures to improve effectiveness of the scheme, etc.

4.1 Productivity Comparison between Beneficiary and Non-Beneficiary

The productivity of crops is one of the major factors, which determines the extent of income generation from crop production. The productivity of crops varies from season to season depending upon weather conditions, extent of irrigation infrastructure, soil type, topography, and the extent of input application and mechanization of farm. Even for the same crop, productivity varies from region to region depending upon the variety of seeds sown, cultural practices followed, method of cultivation, technical know-how of farming and other management practices. In the light of these facts, this section attempts to compare the productivity of various crops cultivated by beneficiary and non-beneficiary

farmers under both irrigated and rain fed conditions. The productivity of various crops cultivated under irrigated and un-irrigated conditions by various categories of beneficiary and non-beneficiary farmers of seed minikits are presented in Table 4.1 and Table 4.2. These estimates for all the gram and tur cultivating beneficiary and non- beneficiary farmers drawn from the districts of Ahmednagar and Yavatmal are brought out in Appendix 45 to Appendix 50.

Table 4.1: Average Yield/Productivity of Major Crops Grown by Selected Farmers (for the reference year 2018-19) – Beneficiary Farmers

(Qtl/Acre)

Crop	Marginal	Small	Medium	Large	Total
Irrigated Area					
Kharif					
Bajra	3.27	3.84	2.83	2.75	3.28
Cotton	2.04	2.87	2.89	3.07	2.87
Onion	65.00	62.27	72.00	70.40	66.93
Green Gram (mung)	2.00	-	-	-	2.00
Maize	-	6.33	8.29	8.56	8.18
Tur	3.87	3.97	5.33	4.23	4.24
Soyabean	5.80	6.32	6.88	5.49	6.26
Udid	-	3.00	-	-	3.00
Hulga	-	-	-	2.50	2.50
Rabi					
Gram	4.53	5.46	5.53	5.33	5.28
Wheat	7.18	6.90	6.49	8.92	7.41
Jowar	4.00	5.27	4.33	4.86	4.66
Onion	72.50	72.32	75.13	67.86	73.35
Summer					
Groundnut	4.33	5.60	5.11	6.60	5.41
Kadwal	-	5.08	-	-	5.08
Total					
Perennial					
Lemon	29.17	26.43	24.55	30.00	26.92
Pomegranate	41.88	57.63	52.00	-	52.81
Sugarcane	500.00	501.39	524.00	570.00	531.36
Grapes	-	91.89	-	-	91.89
Unirrigated Area					
Kharif					
Bajra	4.00	4.05	2.91	2.67	3.25
Cotton	2.00	2.36	2.53	2.58	2.42
Onion	-	60.00	-	-	60.00
Maize	-	6.00	7.00	-	6.50
Tur	3.29	4.95	4.46	4.35	4.61
Soyabean	5.63	6.27	7.73	7.89	7.08
Hulga	-	1.25	2.00	2.08	1.94
Sunflower	-	2.00	-	-	2.00
Rabi					
Gram	3.88	4.16	3.40	-	3.91
Wheat	-	3.00	-	-	3.00
Jowar	3.00	4.20	3.76	3.25	3.74
Onion	-	65.00	72.00	-	70.00
Summer					
Groundnut	-	-	5.64	-	5.64
Perennial	-	-	-	-	-

The general trend showed that the productivity of various crops cultivated by beneficiary farmers under irrigated conditions was higher as against unirrigated

conditions. However, the productivity of tur was marginally higher under unirrigated as against irrigated condition. The average productivity of tur for beneficiary farmers was estimated at 4.61 qtl/ acre under unirrigated and 4.24 qtl/acre under irrigated condition. The higher productivity of tur under unirrigated condition was mainly due to its cultivation under rainfed condition. As against higher productivity of tur under rainfed condition, the productivity of gram was much higher under irrigated as against unirrigated condition due to its cultivation mainly under irrigation. The average productivity of gram for beneficiaries was estimated at 5.28 qtl/ acre under irrigated and 3.91 qtl/ acre under rainfed condition. While the productivity of gram varied from 4.53 qtl/ acre for marginal category to 5.53 qtl/ acre for medium category of beneficiaries under irrigated condition, the productivity of tur varied from 3.29 qtl/ acre for marginal to 4.95 qtl/ acre for small category of beneficiary farmers under unirrigated condition.

The beneficiary farmers cultivated large number of other crops on their farm which showed varied productivity with perennial crops showing much higher productivity as against field crops. In case of beneficiaries, the average productivity was estimated at 3.28 qtl/acre for bajra, 2.87 qtl/acre for cotton, 66.93 qtl/acre for kharif onion, 2.00 qtl/acre for mung, 8.18 qtl/acre for maize, 6.26 qtl/acre for soybean, 3.00 qtl/acre for udid, 7.41 qtl/acre for wheat, 4.66 qtl/acre for jowar, 73.35 qtl/acre for rabi onion, 5.41 qtl/acre for groundnut, 26.92 qtl/acre for lemon, 52.81 qtl/acre for pomegranate, 531.36 qtl/acre for sugarcane, and 91.89 qtl/acre for grape under irrigated conditions. The average productivity under rainfed condition for beneficiary farmers was estimated at 3.25 qtl/acre for bajra, 2.42 qtl/acre for cotton, 60.00 qtl/acre for kharif onion, 6.50 qtl/acre for maize, 7.08 qtl/acre for soybean, 2.00 qtl/acre for sunflower, 3.00 qtl/acre for rabi jowar, 70.00 qtl/acre for rabi onion, and 5.64 qtl/acre for groundnut.

The non-beneficiary farmers also showed higher productivity of crops under irrigated as against rainfed condition. The productivity of tur for non-beneficiaries was also marginally higher under unirrigated as against rainfed condition. The average productivity of tur for non-beneficiary farmers was estimated at 4.00 qtl/ acre under unirrigated and 3.90 qtl/acre under irrigated condition. However, the productivity of gram for non-beneficiaries was much higher under irrigated as against unirrigated condition due to its cultivation mainly under irrigation. The average productivity of gram for non-beneficiary farmers was estimated at 4.42 qtl/ acre under irrigated and 3.46 qtl/ acre under rainfed condition (Table 4.2). There was not much variation in productivity of gram for various categories of non-beneficiaries, especially under irrigated condition.

Table 4.2: Average Yield/Productivity of Major Crops Grown by Selected Farmers (for the reference year 2018-19) – Non-Beneficiary Farmers

(Qtl/Acre)

Crop	Marginal	Small	Medium	Large	Total
Irrigated Area					
Kharif					
Bajra	3.15	3.64	2.98	2.75	3.15
Cotton	3.61	2.31	2.44	2.46	2.47
Onion	-	55.00	60.00	61.00	60.00
Maize	5.00	5.56	7.00	6.57	6.25
Tur	3.76	4.70	3.86	3.25	3.90
Soyabean	5.00	6.26	5.94	5.95	5.99
Udid	-	-	-	2.97	2.97
Hulga	-	1.75	2.00	2.25	2.00
Groundnut	-	-	-	5.00	5.00
Rabi					
Gram	4.63	4.63	4.55	4.26	4.42
Wheat	4.33	6.45	6.81	7.14	6.70
Jowar	3.50	4.58	4.54	4.90	4.71
Onion	-	62.17	59.44	80.00	62.67
Summer					
Groundnut	-	4.00	5.00	-	4.91
Perennial					
Lemon	20.00	25.00	-	-	24.71
Pomegranate	-	45.00	-	55.00	51.00
Sugarcane	-	542.31	483.33	555.00	519.66
Unirrigated Area					
Kharif					
Bajara	-	4.14	2.56	4.26	3.59
Cotton	2.05	2.05	2.17	2.28	2.14
Maize	4.50	-	-	6.00	5.83
Tur	2.50	3.97	3.58	4.34	4.00
Soyabean	3.67	5.45	5.18	6.29	5.60
Udid	-	2.50	2.75	2.78	2.75
Hulga	-	1.50	1.70	1.95	1.81
Rabi					
Gram	3.00	3.60	3.00	-	3.46
Jowar	2.50	3.77	3.96	3.05	3.60
Onion	-	-	63.33	-	63.33
Summer					
Groundnut	-	-	4.00	-	4.00
Perennial	-	-	-	-	-

In addition to pulses, the non-beneficiary farmers also cultivated large number of kharif, rabi, summer and perennial crops, the productivity of which also varied significantly across crops and farm size categories. As for non-beneficiary farmers, the average productivity was worked out at 3.15 qtl/acre for bajra, 2..47 qtl/acre for cotton, 60.00 qtl/acre for kharif onion, 6.25 qtl/acre for maize, 5.99 qtl/acre for soybean, 2.97 qtl/acre for udid, 5.00 qtl/acre for kharif groundnut, 6.70 qtl/acre for wheat, 4.71 qtl/acre for rabi jowar, 62.67 qtl/acre for rabi onion, 4.91 qtl/acre for summer groundnut, 24.71 qtl/acre for lemon, 51.00 qtl/acre for pomegranate, and 519.66 qtl/acre for sugarcane under irrigated conditions. The average productivity under rainfed condition for non-beneficiary farmers was estimated at 3.59 qtl/acre for bajra, 2.14 qtl/acre for cotton, 5.83

qtl/acre for kharif maize, 5.60 qtl/acre for soybean, 2.75 qtl/acre for udid, 3.60 qtl/acre for rabi jowar, 63.33 qtl/acre for rabi onion, and 4.00 qtl/acre for groundnut, showing significant variation in crop productivity during various seasons..

Thus, the general trend showed wide variations in productivity among various kharif, rabi, summer and perennial crops not only for beneficiary but also non-beneficiary farmers, both under irrigated and rainfed conditions. The productivity of crops cultivated under irrigated conditions in general turned out to be higher as against rainfed conditions. Further, the estimates in general showed higher productivity of various crops for beneficiary as against non-beneficiary farmers. Among various crops, pulses in particular showed higher productivity for beneficiary as against non-beneficiary farmers, both under irrigated and rainfed conditions. While the average productivity of tur was estimated at 4.24 qtl/acre under irrigated and 4.61 qtl/acre under rainfed condition for beneficiary farmers, the non-beneficiary farmers showed the estimated productivity of the same at 3.90 qtl/acre under irrigated and 4.00 qtl/acre under rainfed condition. Similarly, the average productivity of gram varied from 3.91 qtl/acre under rainfed to 5.28 qtl/acre under irrigation for beneficiaries and from 3.46 qtl/acre under rainfed to 4.42 qtl/acre under irrigated condition for non-beneficiaries. Therefore, the productivity of pulses on farms belonging to beneficiaries in general was higher as against non-beneficiaries.

4.2 Production Cost Comparison between Beneficiary and Non-Beneficiary

The extent of income generation from crop production generally depends on the magnitude of cost of production since the productivity and output prices of crops do not vary significantly for various farmers. Therefore, higher cost of production generally leads to lower income generation from crop enterprise. The returns over cash costs incurred during farming operations generally is an indicator of availability of cash at the end of the production period of the crop. In the light of this fact, this section attempts to analyse the extent of income generation by the selected farming households from various pulse crop production on their farms.

4.2.1: Cost and Return Comparison for Pulse Crops - Beneficiary and Non-Beneficiary

Among various pulse crops, the sampled beneficiary and non-beneficiary farmers were found to allocate major area under tur and gram crop during kharif and rabi seasons. The estimates relating to per acre value of output, cost of production, net and gross returns for gram and tur crops cultivated by various farm size categories of beneficiary and non-beneficiary farmers are presented in Table 4.3 and Table 4.4. These output, cost and return estimates for all the farm size categories of gram and tur cultivating

beneficiary and non- beneficiary farmers drawn from the districts of Ahmednagar and Yavatmal are brought out in Appendix 51.

Although the estimates presented in Table 4.3 showed significant variations in value of output for tur and gram crops for various categories of beneficiary farmers, the average per acre value of output of was estimated at Rs.23,422 for gram and Rs.23,225 for tur crop with an overall average of Rs.23,327 for tur and gram crops put together, showing hardly any difference in the same for gram and tur crop. However, in general, per acre value of output for tur and gram crop increased with the increase in land holding size of beneficiary farmers. The average per acre cost of production was estimated at Rs.8,520 for gram and Rs.8,351 for tur crop with an overall average of Rs.8,438 for tur and gram crops put together. The average per acre cost of production of beneficiaries varied from Rs.7,344 for small category to Rs.9,761 for large category in case of gram crop and from Rs.8,377 for marginal category to Rs.9,289 for small category for tur crop. The average per acre net farm income estimated at Rs.14,902 for gram and Rs.14,874 for tur crop showed hardly any difference in income generation from tur as against gram crop. The net farm business income was the highest for small and lowest for marginal category of beneficiary farmers in case of gram crop, and the highest for medium and lowest for marginal category for tur crop cultivation. The average per household income generation estimated at Rs.24,394 for gram crop and Rs.22,086 for tur crop increased with the increase in land holding size of beneficiary farmers.

Table 4.3: Value of Output, Cost of Production and Net Returns for Selected Pulse Crops – Beneficiary Farmers

Farm Size	Value of output (Rs/acre)	Cost of production (Rs/acre)		Total Cost per (Rs/acre)	Net returns (Farm business income) (Rs/acre)	Gross Farm income from cultivated area (Rs) per hh	Net Farm income from cultivated area (Rs) per hh
		Material cost	Labour cost				
Gram							
Marginal	21432	4242	4102	8344	13088	23886	15704
Small	23441	3796	3548	7344	16096	33456	24109
Medium	23993	4791	4909	9700	14293	39510	25333
Large	24507	4406	5355	9761	14746	64217	41767
Total	23422	4215	4305	8520	14902	35993	24394
Tur							
Marginal	20191	2690	5688	8377	11814	20068	12696
Small	22868	3829	5459	9289	13579	25591	16422
Medium	27630	3341	5111	8452	19178	36130	26209
Large	22612	2398	4548	6946	15666	71644	52644
Total	23225	3181	5170	8351	14874	32313	22086
Overall Gram and Tur							
Marginal	20911	3590	4768	8358	12553	22182	14361
Small	23162	3812	4477	8289	14873	29137	19887
Medium	25504	4188	4993	9182	16322	37923	25744
Large	23419	3253	4892	8145	15274	68163	47545
Total	23327	3715	4723	8438	14889	34117	23218

The non-beneficiary farmers also showed significant variations in value of output for gram and tur crops for various farm size categories, which on an average on per acre basis was estimated at Rs.16,772 for gram and Rs.17,647 for tur crop with an overall average of Rs.17,171 for tur and gram crops put together, showing hardly any difference in the same for gram and tur crop. The average per acre cost of production for non-beneficiaries was estimated at Rs.6,673 for gram and Rs.6,142 for tur crop with an overall average of Rs.6,431 for tur and gram crops put together. The average per acre cost of production of non-beneficiaries varied from Rs.6,014 for marginal category to Rs.8,071 for large category in case of gram crop and from Rs.4,333 for marginal category to Rs.6,415 for small category for tur crop. The average per acre net farm income of non-beneficiaries estimated at Rs.10,099 for gram and Rs.11,505 for tur crop showed higher income generation from tur as against gram crop. The net farm business income was the highest for marginal and lowest for large category of beneficiary farmers in case of gram crop, and the highest for small and lowest for medium category for tur crop cultivation. Further, the average per household income generation estimated at Rs.23,972 for gram crop and Rs.21,039 for tur crop increased with the increase in land holding size of non-beneficiary farmers.

Table 4.4: Value of Output, Cost of Production and Net Returns for Selected Pulse Crops – Non-Beneficiary Farmers

Farm Size	Value of output (Rs/acre)	Cost of production (Rs/acre)		Total Cost per (Rs/acre)	Net returns (Farm business income) (Rs/acre)	Gross Farm income from cultivated area (Rs) per hh	Net Farm income from cultivated area (Rs) per hh
		Material cost	Labour cost				
Gram							
Marginal	19609	2297	3716	6014	13596	24364	17411
Small	18260	3246	4825	8071	10189	23333	13917
Medium	17547	2415	3830	6245	11302	36964	25143
Large	15171	2444	3774	6218	8953	75615	47635
Total	16772	2628	4045	6673	10099	37507	23972
Tur							
Marginal	15924	2297	2286	4333	11590	39090	29990
Small	18994	3246	3492	6415	12578	20081	13949
Medium	16207	2415	3452	6310	9898	26437	17603
Large	17756	2444	3747	6301	11455	54995	37562
Total	17647	2628	3464	6142	11505	30430	21039
Overall Gram and Tur							
Marginal	17650	2165	2956	5120	12530	30028	22249
Small	18633	3082	4148	7230	11402	21520	13934
Medium	16955	2611	3663	6274	10681	31519	21243
Large	16244	2490	3763	6253	9991	64569	42238
Total	17171	2651	3780	6431	10740	33779	22427

Thus, a comparison of cost and returns estimates clearly showed not only higher per acre value of output but also higher net farm business income from gram and tur crop for beneficiary as against non-beneficiary farmers. On the other hand, non-beneficiary

farmers showed lower per acre cost of production of gram and tur crop as against beneficiaries. The proportionately higher value of output in relation to cost of production led to higher farm business income generation for beneficiary farmers. The net farm business income estimated at Rs.14,902 for gram and Rs.14,874 for tur crop in case of beneficiary farmers, and Rs.10,099 for gram and Rs.11,505 for tur crop for non-beneficiary farmers showed 48 per cent higher income from gram and 29 per cent higher income generation from tur crop for beneficiary as against non-beneficiary farmers on per acre basis. However, there was not much difference in per household income generation from gram and tur crop since it varied from Rs.24,394 for gram to Rs.22,086 for tur crop for beneficiaries and from Rs.23,972 for gram to Rs.21,039 for tur crop for non-beneficiary farmers. The plausible reason for this could be lower area allocation under gram and tur crop by the sampled beneficiary as against non-beneficiary farmers.

4.2.2: Productivity and Net Returns from Pulses – Beneficiary and Non-Beneficiary

The beneficiary farmers not only allocated area under gram and tur crop using seed supplied to them under seed minikits scheme but also purchased seed from other agencies to meet their requirement of pulse crop production. The information relating to number of seed minikits received by sampled gram and tur cultivating beneficiary farmers during 2017-18 is provided in Table 4.5.

Table 4.5: Number of Seed Minikits Distributed among Selected Farmers

Farmers	2017		2018		2019	
	Numbers	%	Numbers	%	Numbers	%
Gram						
Marginal	28	28.00	-	-	-	-
Small	42	42.00	-	-	-	-
Medium	22	22.00	-	-	-	-
Large	8	8.00	-	-	-	-
Total	100	100.00	-	-	-	-
Tur			-	-	-	-
Marginal	17	17.00	-	-	-	-
Small	58	58.00	-	-	-	-
Medium	15	15.00	-	-	-	-
Large	10	10.00	-	-	-	-
Total	100	100.00	-	-	-	-
Gram and Tur			-	-	-	-
Marginal	45	22.50	-	-	-	-
Small	100	50.00	-	-	-	-
Medium	37	18.50	-	-	-	-
Large	18	9.00	-	-	-	-
Total	200	100.00	-	-	-	-

Each of the sampled gram and tur cultivating sampled beneficiary farmers received only one seed minikit, which contained 4 kg of seed in case of tur crop and 8 kg for gram crop. The gram cultivating sampled beneficiary farmers altogether received 100 seed minikits for gram crop with 28 per cent of the same being supplied to marginal

category, 42 per cent to small, 22 per cent to medium and the remaining 8 per cent to large category. Similarly, the tur cultivating sampled beneficiary farmers altogether received 100 seed minikits for tur crop with 17 per cent of the same being supplied to marginal category, 58 per cent to small, 15 per cent to medium and the remaining 10 per cent to large category. In all, the beneficiary farmers received 200 seed minikits for gram and tur crops, which comprised of 23 per cent of seed minikits distribution to marginal category, 50 per cent to small, 18 per cent to medium and 9 per cent to large category.

The sampled beneficiary farmers cultivated both gram and tur crops using seed supplied to them under seed minikits and also using seed purchased from other agencies to meet their total requirement of seed. The estimates relating to per household area allocation under gram and tur crops using seed under seed minikits (SMK) and without SMK, crop productivity, value of production, cost of production, net returns and prices of output of these selected pulse crops with SMK and without SMK for various farm size categories of beneficiary farmers are shown in Table 4.6, whereas Table 4.6.1 compares average estimates in this respect for beneficiary and non-beneficiary farmers.

The estimates presented in Table 4.6 clearly showed lower area allocation of gram and tur crops under SMK as against non-SMK for beneficiaries. The beneficiary farmers were found to allocate 25 per cent of total area of gram and tur crop under SMK and 75 per cent under non-SMK. The average per household area allocation was estimated at 0.59 acres under SMK and 1.62 acres under non-SMK for gram crop and 0.58 acres under SMK and 1.91 acres under non-SMK for tur crop with an aggregate of 0.59 acres under SMK and 1.75 acres under non-SMK for both the pulse crops put together.

Table 4.6: Productivity and Net Returns from Pulses with and without Seed-minikits for Beneficiary Farmers

Farm Size	Area under pulses (acres/household)		Productivity (Quintals/acre)		Value of Output (Rs/acre)		Cost of Production (Rs/acre)		Net Returns (Rs/acre)		Net price obtained (Rs/qtl.)	
	SMK	Without	SMK	Without	SMK	Without	SMK	Without	SMK	Without	SMK	Without
Gram (Bengal)												
Marginal	0.45	1.28	4.86	4.18	24072	19575	9173	7761	14899	11815	4957	4682
Small	0.54	1.63	5.37	5.21	23649	23340	7986	7033	15663	16306	4400	4483
Medium	0.62	1.28	4.99	5.41	24717	23585	9350	9897	15367	13688	4954	4360
Large	1.27	3.04	5.52	5.25	27564	23233	11909	8866	15655	14368	4992	4421
Total	0.59	1.62	5.20	5.10	24656	22778	9225	8152	15431	14626	4741	4467
Tur (Red Gram)												
Marginal	0.31	1.87	3.88	3.72	18988	20563	9764	7948	9224	12615	4888	5523
Small	0.51	1.11	5.39	3.70	27393	19168	9827	8849	17566	10319	5085	5180
Medium	0.74	2.64	5.69	4.42	32457	24233	7955	8801	24502	15432	5708	5479
Large	1.23	4.28	5.63	3.53	28016	20679	6939	6949	21078	13730	4974	5858
Total	0.58	1.91	5.36	3.76	27743	20673	8857	8065	18885	12608	5174	5500
Aggregate Average (Gram and Tur)												
Marginal	0.39	1.51	4.57	3.96	22583	20054	9346	7851	13236	12203	4940	5066
Small	0.53	1.39	5.38	4.55	25767	21523	9027	7824	16739	13698	4788	4730
Medium	0.67	1.61	5.30	5.02	28190	23841	8724	9465	19466	14377	5317	4749
Large	1.24	3.66	5.58	4.25	27811	21740	9191	7745	18621	13995	4982	5120
Total	0.59	1.75	5.28	4.46	26188	21776	9043	8111	17145	13665	4959	4882

Note: Note: The estimates with respect to with and without seed minikits presented above are for beneficiary farmers only

Table 4.6.1: Productivity and Net Returns from Pulses with and without Seed-minikits for Beneficiary and Non-Beneficiary Farmers

Farm Size	Area under pulses (acres/household)		Productivity (Quintals/acre)		Value of Output (Rs/acre)		Cost of Production (Rs/acre)		Net Returns (Rs/acre)		Net price obtained (Rs/qtl.)	
	BF	NBF	BF	NBF	BF	NBF	BF	NBF	BF	NBF	BF	NBF
Gram (Bengal)												
Marginal	1.72	1.85	4.46	4.41	21432	19609	8344	6014	13088	13596	4806	4451
Small	2.17	2.10	5.26	4.38	23441	18260	7344	8071	16096	10189	4456	4168
Medium	1.90	3.79	5.26	4.49	23993	17547	9700	6245	14293	11302	4563	3908
Large	4.30	8.36	5.33	4.26	24507	15171	9761	6218	14746	8953	4595	3564
Total	2.22	3.70	5.13	4.35	23422	16772	8520	6673	14902	10099	4562	3857
Tur (Red Gram)												
Marginal	2.17	1.17	3.76	3.52	20191	15924	8377	4333	11814	11590	5368	4519
Small	1.69	3.25	4.46	4.31	22868	18994	9289	6415	13579	12578	5128	4409
Medium	3.39	2.63	4.94	3.70	27630	16207	8452	6310	19178	9898	5588	4377
Large	5.51	5.93	4.08	3.92	22612	17756	6946	6301	15666	11455	5537	4528
Total	2.50	3.10	4.34	3.96	23225	17647	8351	6142	14874	11505	5355	4459
Aggregate Average (Gram and Tur)												
Marginal	1.90	1.41	4.17	3.94	20911	17650	8358	5120	12553	12530	5019	4483
Small	1.92	2.56	4.87	4.34	23162	18633	8289	7230	14873	11402	4755	4290
Medium	2.28	3.17	5.13	4.14	25504	16955	9182	6274	16322	10681	4974	4093
Large	4.91	7.14	4.62	4.12	23419	16244	8145	6253	15274	9991	5073	3945
Total	2.34	3.40	4.75	4.17	23327	17171	8438	6431	14889	10740	4912	4118

Note: BF - Beneficiary Farmers; NBF - Non-Beneficiary Farmers

The productivity of selected gram and tur crops cultivated by beneficiary farmers under SMK was found to be much higher as against non-SMK for various farm size categories. The average productivity was estimated at 5.20 qtl/acre with SMK and 5.10 qtl/acre without SMK for gram, and 5.36 qtl/acre with SMK and 3.76 qtl/acre without SMK for tur crop with an overall average of 5.28 qtl/acre with SMK and 4.46 qtl/acre without SMK for both the crops put together. Further, the estimates for beneficiaries also showed much higher value of output and cost of production of gram and tur crop with SMK as against without SMK. However, relatively higher value of output in relation to cost resulted in higher net returns from gram and tur crop with SMK as against non-SMK. The average per acre value of output was estimated at Rs.24,656 with SMK and Rs.22,778 without SMK for gram crop, and Rs.27,743 with SMK and Rs.20,673 without SMK for tur crop with an overall average of Rs.26,188 with SMK and Rs.21,776 without SMK for both the pulse crops put together. On the other hand, the estimated average per acre cost of production was found to be Rs.9,225 with SMK and Rs.8,152 without SMK for gram crop, and Rs.8,857 with SMK and Rs.8,065 without SMK for tur crop with an overall average of Rs.9,043 with SMK and Rs.8,111 without SMK for both the pulse crops put together. As a result, the average per acre net returns turned out to be Rs.15,431 with SMK and Rs.14,626 without SMK for gram, and Rs.18,885 with SMK and Rs.12,608 without SMK for tur crop with an overall average of Rs.17,145 with SMK and Rs.13,665 without SMK for both the crops put together (Table 4.6). Further, the output

price was higher for gram and lower for tur with SMK as against without SMK for all the farm size categories of beneficiary farmers.

The sampled beneficiaries cultivated selected gram and tur crops not only by using seed supplied under SMK scheme but also by purchasing the same from other agencies to meet their requirement. The area, productivity, value of output, cost of production and net returns differed significantly with respect to seed used under SMK and without SMK. The beneficiary farmers cultivated only 25 per cent of total area of gram and tur crops using seed supplied under SMK scheme and for the remaining area seed was purchased from other agencies. While the average productivity, per acre value of output and cost of production for gram and tur crops were much higher with SMK as against without SMK, the relatively higher value of output in relation to cost of production with SMK as against non-SMK resulted in much higher per acre average net returns from the selected pulse crops with SMK as against non-SMK. The average per acre net returns estimated at Rs.15,431 with SMK and Rs.14,626 without SMK for gram crop revealed that the beneficiaries generated 6 per cent higher net returns from gram crop with SMK as against without SMK. Similarly, average per acre net returns estimated at Rs.18,885 with SMK and Rs.12,608 without SMK for tur crop showed that these farmers generated 50 per cent higher net returns from tur crop with SMK as against without SMK. In general, beneficiaries earned 25 per cent higher per acre net returns from the selected pulse crops with SMK as against without SMK. However, though, in general, there was not much difference in average output prices of selected pulse crops with and without SMK, the average price of tur turned out to be higher without SMK as against SMK owing to the difference in colour of tur crop, which stood at white for SMK and red for non-SMK.

A comparison of per acre value of output, cost and return estimates between beneficiary and non-beneficiary farmers presented in Table 4.6.1 further revealed that the beneficiaries not only generated 48 per cent higher income from gram and 29 per cent higher income from tur crop but in general 39 higher income from both gram and tur crop put together as against non-beneficiary farmers. Although average per household area allocation under gram and tur crop for beneficiaries was much lower, the productivity of selected pulse crops as well as net prices obtained for these crops stood at much higher for beneficiary farmers as against non-beneficiaries, which resulted in significantly higher per acre value of output and consequently much higher net farm income generation for beneficiary farmers as against non-beneficiary farmers.

4.2.3: Cost Details for Selected Pulses – Beneficiary and Non-Beneficiary

The cost of production for various farm operations carried out in the cultivation of selected pulse crops varied significantly and estimates in this respect for selected gram and tur crops for various farm size categories of beneficiary and non-beneficiary farmers are presented in Table 4.7 and Table 4.8, respectively. An aggregate scenario in this respect for beneficiary and non-beneficiary farmers with both the selected pulse crops put together is shown in Table 4.9.

The estimates presented in Table 4.7 clearly showed higher per acre cost of production for gram crop for beneficiary as against non-beneficiary farmers. The labour charges was found to be the main activity accounting for the major share in cost of production of gram crop in case of both beneficiary and non-beneficiary farmers. The share of labour cost in cost of production of gram crop was estimated at 52 per cent with SMK and 50 per cent without SMK with an average of 51 per cent for beneficiary and 40 per cent for non-beneficiary farmers. The land preparation was another major activity accounting for 25 per cent share in average per acre cost of production of gram crop with SMK and 30 per cent without SMK with an average of 28 per cent share in the same for beneficiary and 30 per cent for non-beneficiary farmers. Another major activity accounting for major share in cost of production was harvesting and threshing, which showed a share of 12 per cent in average per acre cost of production of gram crop with SMK and 8 per cent without SMK with an average of 9 per cent for beneficiary and 10 per cent for non-beneficiary farmers. Thus, while activities like labour charges, land preparation and harvesting and threshing accounted for about 90 per cent share in total cost of production of gram crop for beneficiaries, this share for non-beneficiary farmers was about 80 per cent. The non-beneficiaries showed relatively higher share in cost of production of gram crop on account of activities like seed and fertilizer application, plant protection chemicals, bagging, transportation and marketing.

The estimates presented in Table 4.8 also showed marginally higher per acre cost of production for tur crop for beneficiary as against non-beneficiary farmers. The distribution of total cost of production across various cultivation activities showed significantly high share of labour charges. The average per acre cost of production of tur crop was estimated Rs.8,360 for beneficiary farmers, which encompassed a share 62 per cent on account of labour charges. Similarly, the average per acre cost of production of tur crop estimated at Rs.6,142 for non-beneficiary farmers encompassed a share of 43 per cent on account of labour charges.

Table 4.7: Cost Details Item-wise for Beneficiary and Non-Beneficiary Farmers – Bengal Gram (%)

Activity	SMK/Without	Marginal	Small	Medium	Large	Total
Land Preparation	SMK	2745 (29.92)	1780 (22.3)	2682 (28.68)	2485 (20.86)	2314 (25.08)
	Without SMK	2010 (25.90)	2531 (35.99)	2747 (27.76)	2427 (27.37)	2473 (30.34)
	Avg. Beneficiary	2313 (27.72)	2286 (31.13)	2724 (28.08)	2444 (25.04)	2419 (28.39)
	Non-Beneficiary	2116 (35.18)	2704 (33.5)	1402 (22.45)	1679 (27.00)	1971 (29.53)
Seed	SMK	-	-	-	-	-
	Without SMK	263 (3.39)	249 (3.54)	237 (2.40)	187 (2.11)	236 (2.89)
	Avg. Beneficiary	155 (1.85)	168 (2.29)	152 (1.57)	132 (1.35)	155 (1.82)
	Non-Beneficiary	316 (5.25)	323 (4.00)	365 (5.85)	171 (2.75)	298 (4.46)
Inter crop	SMK	-	-	-	-	-
	Without SMK	-	-	-	-	-
	Avg. Beneficiary	-	-	-	-	-
	Non-Beneficiary	-	-	-	-	-
FYM, Organic/Bio-fertilizer	SMK	-	-	-	-	-
	Without SMK	-	-	-	-	-
	Avg. Beneficiary	-	-	-	-	-
	Non-Beneficiary	-	-	-	-	-
Major and minor nutrients	SMK	-	-	-	-	-
	Without SMK	-	-	-	-	-
	Avg. Beneficiary	-	-	-	-	-
	Non-Beneficiary	-	-	-	-	-
Other fertilizer	SMK	222 (2.42)	206 (2.58)	680 (7.27)	643 (5.4)	394 (4.27)
	Without SMK	221 (2.84)	158 (2.25)	352 (3.56)	415 (4.68)	265 (3.24)
	Avg. Beneficiary	221 (2.65)	174 (2.36)	470 (4.85)	482 (4.94)	309 (3.62)
	Non-Beneficiary	241 (4.00)	242 (3.00)	375 (6.00)	435 (7.00)	334 (5.00)
Irrigation charges	SMK	108 (1.17)	132 (1.66)	119 (1.27)	217 (1.82)	138 (1.5)
	Without SMK	255 (3.28)	165 (2.35)	82 (0.83)	82 (0.93)	144 (1.76)
	Avg. Beneficiary	194 (2.33)	155 (2.11)	95 (0.98)	122 (1.25)	142 (1.67)
	Non-Beneficiary	301 (5.00)	242 (3.00)	125 (2.00)	124 (2.00)	200 (3.00)
Plant protection chemicals	SMK	179(1.95)	146 (1.83)	518 (5.54)	369 (3.1)	277 (3.01)
	Without SMK	191 (2.46)	101(1.43)	416 (4.2)	339 (3.82)	233 (2.86)
	Avg. Beneficiary	186 2.23)	116 (1.57)	453 (4.67)	348 (3.56)	248 (2.92)
	Non-Beneficiary	241(4.00)	242 (3.00)	375 (6.00)	497 (8.00)	350 (5.25)
Labour Charges	SMK	4685 (51.07)	4519 (56.58)	4131 (44.18)	6515 (54.71)	4806 (52.10)
	Without SMK	3692 (47.57)	3078 (43.76)	5348 (54.03)	4872 (54.95)	4044 (49.60)
	Avg. Beneficiary	4102 (49.16)	3548 (48.31)	4909 (50.61)	5355 (54.86)	4305 (50.53)
	Non-Beneficiary	1959 (32.57)	3430 (42.5)	2917 (46.7)	2441 (39.25)	2686 (40.26)
Weeding and plant protection measures	SMK	-	-	-	-	-
	Without SMK	-	-	-	-	-
	Avg. Beneficiary	-	-	-	-	-
	Non-Beneficiary	-	-	-	-	-
Harvesting and Threshing	SMK	1023 (11.15)	995 (12.46)	1003 (10.73)	1409 (11.83)	1074 (11.64)
	Without SMK	986 (12.71)	612 (8.70)	525 (5.30)	421 (4.75)	611 (7.50)
	Avg. Beneficiary	1001 (12.00)	737 (10.03)	697 (7.19)	712 (7.29)	770 (9.03)
	Non-Beneficiary	661 (11.00)	726 (9.00)	500 (8.00)	622 (10.00)	634 (9.50)
Bagging, transportation and marketing cost	SMK	211 (2.30)	208 (2.60)	217 (2.33)	271 (2.28)	222 (2.40)
	Without SMK	143 (1.84)	139 (1.98)	189 (1.91)	123 (1.39)	147 (1.80)
	Avg. Beneficiary	171 (2.05)	161 (2.20)	199 (2.06)	167 (1.71)	173 (2.02)
	Non-Beneficiary	180 (3.00)	161(2.00)	187 (3.00)	249 (4.00)	200 (3.00)
Others	SMK	-	-	-	-	-
	Without SMK	-	-	-	-	-
	Avg. Beneficiary	-	-	-	-	-
	Non-Beneficiary	-	-	-	-	-
Total cost (Rs per acre)	SMK	9173 (100)	7986 (100)	9350 (100)	11909 (100)	9225 (100)
	Without SMK	7761 (100)	7033 (100)	9897 (100)	8866 (100)	8152 (100)
	Avg. Beneficiary	8344 (100)	7344 (100)	9700 (100)	9761 (100)	8520 (100)
	Non-Beneficiary	6014 (100)	8071 (100)	6245 (100)	6218 (100)	6673 (100)

Note: Figures in parentheses are percentages to total cost. (Other than labour, material cost only included)
SMK: Seed Minikit

Table 4.8: Cost Details Item-wise for Beneficiary and Non-Beneficiary Farmers – Red Gram (%)

Activity	SMK/Without	Marginal	Small	Medium	Large	Total
Land Preparation	SMK	1744 (17.86)	1888 (19.22)	1682 (21.14)	1054 (15.19)	1661 (18.75)
	Without SMK	1209 (15.21)	1856 (20.97)	1671 (18.98)	1037 (14.92)	1451 (17.99)
	Avg. Beneficiary	1336 (15.94)	1870 (20.13)	1675 (19.82)	1041 (14.99)	1526 (18.28)
	Non-Beneficiary	1068 (24.65)	1748 (27.25)	1704 (27)	1207 (19.15)	1506 (24.51)
Seed	SMK	-	-	-	-	-
	Without SMK	223 (2.81)	309 (3.49)	284 (3.23)	149 (2.14)	238 (2.95)
	Avg. Beneficiary	170 (2.03)	170 (1.83)	167 (1.97)	110 (1.58)	152 (1.82)
	Non-Beneficiary	249 (5.75)	257 (4.00)	312 (4.95)	129 (2.05)	257 (4.19)
Inter crop	SMK	-	-	-	-	-
	Without SMK	-	-	-	-	-
	Avg. Beneficiary	-	-	-	-	-
	Non-Beneficiary	-	-	-	-	-
FYM, Organic/Bio-fertilizer	SMK	-	-	-	-	-
	Without SMK	-	-	-	-	-
	Avg. Beneficiary	-	-	-	-	-
	Non-Beneficiary	-	-	-	-	-
Major and minor nutrients	SMK	-	-	-	-	-
	Without SMK	-	-	-	-	-
	Avg. Beneficiary	-	-	-	-	-
	Non-Beneficiary	-	-	-	-	-
Other fertilizer	SMK	347 (3.56)	122 (1.25)	143 (1.8)	276 (3.98)	179 (2.02)
	Without SMK	77 (0.97)	218 (2.46)	118(1.34)	71 (1.01)	131 (1.62)
	Avg. Beneficiary	141 (1.68)	175 (1.88)	128 (1.52)	125 (1.79)	148 (1.77)
	Non-Beneficiary	87 (2.00)	192 (3.00)	126 (2.00)	126 (2.00)	138 (2.25)
Irrigation charges	SMK	250 (2.56)	104 (1.06)	126 (1.58)	110 (1.59)	123 (1.38)
	Without SMK	161 (2.02)	88 (0.99)	174 (1.97)	286 (4.12)	179 (2.21)
	Avg. Beneficiary	182 (2.17)	95 (1.03)	154 (1.82)	240 (3.45)	158 (1.90)
	Non-Beneficiary	173 (4.00)	128 (2.00)	252 (4.00)	189 (3.00)	200 (3.25)
Plant protection chemicals	SMK	135 (1.38)	393 (4.00)	117 (1.47)	188 (2.71)	274 (3.09)
	Without SMK	86 (1.09)	409 (4.62)	212 (2.40)	104 (1.50)	225 (2.79)
	Avg. Beneficiary	98 (1.17)	402 (4.32)	172 (2.04)	126 (1.82)	243 (2.91)
	Non-Beneficiary	93 (2.15)	353 (5.50)	379 (6.00)	158 (2.50)	248 (4.04)
Labour Charges	SMK	6087 (62.33)	6122 (62.3)	4709 (59.19)	4571 (65.88)	5523 (62.36)
	Without SMK	5564 (70.01)	4918 (55.58)	5394 (61.29)	4540 (65.34)	4971 (61.63)
	Avg. Beneficiary	5688 (67.89)	5459 (58.77)	5111 (60.47)	4548 (65.48)	5170 (61.91)
	Non-Beneficiary	1944 (44.85)	2261 (35.25)	2464 (39.05)	3296 (52.3)	2633 (42.86)
Weeding and plant protection measures	SMK	-	-	-	-	-
	Without SMK	-	-	-	-	-
	Avg. Beneficiary	-	-	-	-	-
	Non-Beneficiary	-	-	-	-	-
Harvesting and Threshing	SMK	990 (10.14)	999 (10.17)	928 (11.67)	633 (9.13)	908 (10.25)
	Without SMK	485 (6.10)	868 (9.80)	729 (8.28)	644 (9.26)	710 (8.80)
	Avg. Beneficiary	604 (7.21)	927 (9.98)	811 (9.60)	641 (9.23)	781 (9.36)
	Non-Beneficiary	520 (12.00)	642(10.00)	568 (9.00)	693 (11.00)	645 (10.50)
Bagging, transportation and marketing cost	SMK	212 (2.17)	198 (2.02)	251 (3.16)	106 (1.53)	190 (2.15)
	Without SMK	143 (1.80)	184 (2.08)	221 (2.51)	118 (1.70)	161 (2.00)
	Avg. Beneficiary	159 (1.90)	191 (2.05)	233 (2.76)	115 (1.66)	172 (2.06)
	Non-Beneficiary	199 (4.60)	834 (13.00)	505 (8.00)	504 (8.00)	516 (8.40)
Others	SMK	-	-	-	-	-
	Without SMK	-	-	-	-	-
	Avg. Beneficiary	-	-	-	-	-
	Non-Beneficiary	-	-	-	-	-
Total cost (Rs per acre)	SMK	9764 (100)	9827 (100)	7955 (100)	6939 (100)	8857 (100)
	Without SMK	7948 (100)	8849 (100)	8801 (100)	6949 (100)	8065 (100)
	Avg. Beneficiary	8377 (100)	9289 (100)	8452 (100)	6946 (100)	8351 (100)
	Non-Beneficiary	4333 (100)	6415 (100)	6310 (100)	6301 (100)	6142 (100)

Note: Figures in parentheses are percentages to total cost. (Other than labour, material cost only included)
SMK: Seed Minikit

Table 4.9: Cost Details Item-wise for Beneficiary and Non-Beneficiary – Aggregate Bengal and Red Gram (%)

Activity	SMK/Without	Marginal	Small	Medium	Large	Total
Land Preparation	SMK	2451 (26.23)	1841 (20.4)	2233 (25.6)	1702 (18.52)	1990 (22.00)
	Without SMK	1622 (20.65)	2237 (28.59)	2322 (24.54)	1614 (20.84)	1986 (24.49)
	Avg. Beneficiary	1903 (22.77)	2084 (25.14)	2288 (24.92)	1639 (20.12)	1988 (23.55)
	Non-Beneficiary	1532 (29.92)	2196 (30.38)	1551 (24.73)	1443 (23.08)	1738 (27.02)
Seed	SMK	-	-	-	-	-
	Without SMK	244 (3.11)	275 (3.52)	256 (2.70)	165 (2.13)	237 (2.92)
	Avg. Beneficiary	161 (1.93)	169 (2.04)	158 (1.72)	119 (1.46)	154 (1.82)
	Non-Beneficiary	282 (5.50)	289 (4.00)	339 (5.40)	150 (2.40)	278 (4.33)
Inter crop	SMK	-	-	-	-	-
	Without SMK	-	-	-	-	-
	Avg. Beneficiary	-	-	-	-	-
	Non-Beneficiary	-	-	-	-	-
FYM, Organic/Bio-fertilizer	SMK	-	-	-	-	-
	Without SMK	-	-	-	-	-
	Avg. Beneficiary	-	-	-	-	-
	Non-Beneficiary	-	-	-	-	-
Major and minor nutrients	SMK	-	-	-	-	-
	Without SMK	-	-	-	-	-
	Avg. Beneficiary	-	-	-	-	-
	Non-Beneficiary	-	-	-	-	-
Other fertilizer	SMK	259 (2.77)	159 (1.76)	439 (5.03)	442 (4.81)	287 (3.17)
	Without SMK	151 (1.92)	184 (2.35)	260 (2.74)	214 (2.76)	201 (2.48)
	Avg. Beneficiary	188 (2.24)	174 (2.10)	328 (3.58)	277 (3.40)	231 (2.74)
	Non-Beneficiary	154 (3.00)	217 (3.00)	251 (4.00)	281 (4.50)	233 (3.63)
Irrigation charges	SMK	149 (1.6)	116 (1.29)	122 (1.40)	158 (1.72)	131 (1.44)
	Without SMK	209 (2.66)	132 (1.68)	118 (1.25)	201 (2.60)	160 (1.98)
	Avg. Beneficiary	189 (2.26)	126 (1.52)	120 (1.30)	190 (2.33)	150 (1.78)
	Non-Beneficiary	230 (4.50)	181 (2.50)	188 (3.00)	156 (2.50)	201 (3.13)
Plant protection chemicals	SMK	166 (1.78)	285 (3.16)	338 (3.87)	270 (2.94)	276 (3.05)
	Without SMK	140 (1.78)	235 (3.00)	335 (3.54)	202 (2.61)	229 (2.83)
	Avg. Beneficiary	149 (1.78)	255 (3.07)	336 (3.66)	221 (2.71)	246 (2.91)
	Non-Beneficiary	157 (3.08)	307 (4.25)	376 (6.00)	328 (5.25)	299 (4.64)
Labour Charges	SMK	5096 (54.52)	5425 (60.1)	4390 (50.32)	5452 (59.32)	5162 (57.09)
	Without SMK	4600 (58.58)	3879 (49.58)	5366 (56.70)	4678 (60.40)	4485 (55.30)
	Avg. Beneficiary	4768 (57.04)	4477 (54.01)	4993 (54.38)	4892 (60.06)	4723 (55.97)
	Non-Beneficiary	1982 (38.71)	2811 (38.88)	2690 (42.88)	2862 (45.78)	2673 (41.56)
Weeding and plant protection measures	SMK	-	-	-	-	-
	Without SMK	-	-	-	-	-
	Avg. Beneficiary	-	-	-	-	-
	Non-Beneficiary	-	-	-	-	-
Harvesting and Threshing	SMK	1014 (10.84)	997 (11.05)	969 (11.11)	985 (10.72)	992 (10.96)
	Without SMK	743 (9.46)	723 (9.24)	605 (6.39)	551 (7.12)	658 (8.11)
	Avg. Beneficiary	835 (9.99)	829 (10.00)	744 (8.11)	671 (8.24)	775 (9.19)
	Non-Beneficiary	589 (11.50)	687 (9.50)	533 (8.50)	657 (10.50)	643 (10.00)
Bagging, transportation and marketing cost	SMK	211 (2.26)	202 (2.24)	233 (2.67)	181 (1.97)	206 (2.28)
	Without SMK	143 (1.82)	159 (2.03)	202 (2.13)	120 (1.55)	154 (1.90)
	Avg. Beneficiary	166 (1.99)	176 (2.12)	214 (2.33)	137 (1.68)	172 (2.04)
	Non-Beneficiary	195 (3.80)	542 (7.50)	345 (5.50)	375 (6.00)	367 (5.70)
Others	SMK	-	-	-	-	-
	Without SMK	-	-	-	-	-
	Avg. Beneficiary	-	-	-	-	-
	Non-Beneficiary	-	-	-	-	-
Total cost (Rs per acre)	SMK	9346 (100)	9027 (100)	8724 (100)	9191 (100)	9043 (100)
	Without SMK	7851 (100)	7824 (100)	9465 (100)	7745 (100)	8111 (100)
	Avg. Beneficiary	8358 (100)	8289 (100)	9182 (100)	8145 (100)	8438 (100)
	Non-Beneficiary	5120 (100)	7230 (100)	6274 (100)	6253 (100)	6431 (100)

Note: Figures in parentheses are percentages to total cost. (Other than labour, material cost only included)
SMK: Seed Minikit

In case of tur, the next major item of cost was land preparation, which accounted for 19 per cent share in average per acre cost of production with SMK and 18 per cent without SMK with an average of 18 per cent share in the same for beneficiary and 25 per cent for non-beneficiary farmers. The third major item of cost was noticed to be harvesting and threshing, which showed a share of 10 per cent in average cost of production of tur crop with SMK and 9 per cent without SMK with an average of 9 per cent share in the same for beneficiary and 11 per cent for non-beneficiary farmers. Thus, tur crop also showed a trend similar to gram crop in terms of share of various activities in cost of production. The activities like labour charges, land preparation and harvesting and threshing accounted for about 90 per cent share in total cost of production of tur crop in case of beneficiary farmers and nearly 80 per cent share in the same for non-beneficiary farmers. The non-beneficiaries showed relatively higher share in cost of production of tur crop on account of activities like seed and fertilizer application, plant protection chemicals, bagging, transportation and marketing.

The cost of production of selected pulse crops varied significantly for beneficiary and non-beneficiary farmers, which turned out to lower for non-beneficiary as against beneficiary farmers. The aggregate per acre average cost of production of gram and tur crops put together was estimated at Rs.8,443 for beneficiary and Rs.6,431 for non-beneficiary farmers, showing about 30 per cent higher cost of production for beneficiary farmers as against non-beneficiary farmers. Further, the distribution of total cost of production across various cultivation activities showed significantly high share of labour charges, followed by expenses towards land preparation, and harvesting and threshing activities. While labour charges accounted for 57 per cent share in average cost of production of gram and tur crops with SMK and 55 per cent without SMK with an average of 56 per cent share in the same for beneficiary and 42 per cent for non-beneficiary farmers, the share of land preparation in cost of production was found to be about 22 per cent with SMK and 24 per cent without SMK with an average of 24 per cent for beneficiary and 27 per cent for non-beneficiary farmers. The share of harvesting and threshing activity in average cost of production of gram and tur crop at aggregate level was about 10 per cent with SMK and 8 per cent without SMK with an average of 9 per cent for beneficiary and 10 per cent for non-beneficiary farmers. These estimates clearly showed that activities like labour payment, land preparation, harvesting and threshing almost cornered about 90 per cent share in cost of production of pulse crops for beneficiary and 80 per cent share for non-beneficiary farmers. The non-beneficiaries

showed relatively higher share in cost of production of gram and tur crop on account of activities like seed and fertilizer application, plant protection chemicals, bagging, transportation and marketing.

4.2.4: Use of Human Labour for Pulses – Beneficiary and Non-Beneficiary Farmers

The cultivation of pulse crops required application of human labour over wide range of activities like land preparation, sowing, irrigation, inter cultural operation, plant protection, weeding, harvesting and threshing, etc. The application of human labour varied significantly across these farming operations carried out in the cultivation of pulses by beneficiary and non-beneficiary farmers. The estimates relating to human labour utilization by sampled beneficiary and non-beneficiary farmers towards various farming operations carried out in the cultivation of Bengal gram, red gram and aggregate of Bengal and red gram are brought out in Table 4.10, Table 4.11 and Table 4.12.

The estimates presented in Table 4.10 showed that the total labour utilization in man days was much lower in the cultivation of gram crop for non-beneficiary farmers, which stood at 27 days for beneficiary 19 days for non-beneficiary farmers. The major human labour utilization in the cultivation of gram crop was noticed in the harvesting and threshing operation, which accounted for 33 per cent share in total human labour for beneficiary and 16 per cent for non-beneficiary farmers. Another major farming operating showing higher human labour application was weeding and plant protection measures, which accounted for 26 per cent share in total human labour for both beneficiary and non-beneficiary farmers. Land preparation was the other important activity showing a share of about 19 per cent in total human labour application for beneficiary and 16 per cent for non-beneficiary farmers. Bagging and transportation showed a share of about 7 per cent in total human labour application for beneficiary and 11 per cent for non-beneficiary farmers. These farming activities put together accounted for about 85 per cent share in total human labour application in the cultivation of gram crop for beneficiary and 69 per cent for non-beneficiary farmers. The non-beneficiary farmers also showed significantly high share of human labour application in irrigation, plant protection and bagging and transportation activity.

The estimates further showed significantly higher human labour allocation during various farming operations in the cultivation of tur crop for beneficiaries, which was worked out at 35 man days for beneficiary and 17 man days for non-beneficiary farmers (Table 4.11). In case of tur crop, both beneficiary and non-beneficiary farmers utilized major human labour towards harvesting and threshing operation, followed by land

preparation, weeding and plant protection and bagging and transportation operation. These farming operations accounted for 86 per cent share in total human labour allocation of beneficiary farmers and 71 per cent share in the same for non-beneficiary farmers. However, the non-beneficiary farmers showed significantly high share of human labour application in irrigation, and relatively higher share of human labour in interculture, sowing, harvesting and threshing activities as against beneficiary farmers. In general, the human labour allocation showed an increasing trend with the increase in land holding size of farmers in case of non-beneficiaries and a declining trend in this respect for beneficiary farmers.

Table 4.10: Use of Human Labour by Activities for Beneficiary and Non-Beneficiary – Bengal Gram

(man days per acre)

Activity Gram	SMK / Without	Marginal	Small	Medium	Large	Total
Land Preparation	SMK	7 (22.58)	4 (14.81)	5 (17.24)	6 (22.22)	5 (17.86)
	Without SMK	5 (20.83)	3 (13.04)	6 (17.14)	4 (13.79)	4 (14.81)
	Avg. Beneficiary	6 (22.22)	4 (15.38)	5 (15.15)	4 (14.29)	5 (18.52)
	Non-Beneficiary	2 (14.29)	3 (13.64)	4 (20)	2 (11.76)	3 (15.79)
Sowing	SMK	1 (3.23)	1 (3.7)	1 (3.45)	1 (3.7)	1 (3.57)
	Without SMK	1 (4.17)	1 (4.35)	1 (2.86)	1 (3.45)	1 (3.7)
	Avg. Beneficiary	1 (3.7)	1 (3.85)	1 (3.03)	1 (3.57)	1 (3.7)
	Non-Beneficiary	1 (7.14)	1 (4.55)	1 (5)	1 (5.88)	1 (5.26)
Manure & FYM	SMK	-	-	-	-	-
	Without SMK	-	-	-	-	-
	Avg. Beneficiary	-	-	-	-	-
	Non-Beneficiary	-	-	-	-	-
Major and minor nutrients	SMK	-	-	-	-	-
	Without SMK	-	-	-	-	-
	Avg. Beneficiary	-	-	-	-	-
	Non-Beneficiary	-	-	-	-	-
Irrigation	SMK	2 (6.45)	1 (3.7)	1 (3.45)	1 (3.7)	1 (3.57)
	Without SMK	2 (8.33)	2 (8.7)	1 (2.86)	0 (0)	1 (3.7)
	Avg. Beneficiary	2 (7.41)	1 (3.85)	1 (3.03)	1 (3.57)	1 (3.7)
	Non-Beneficiary	1 (7.14)	2 (9.09)	2 (10)	2 (11.76)	2 (10.53)
Inter cultural operations	SMK	1 (3.23)	1 (3.7)	1 (3.45)	2 (7.41)	1 (3.57)
	Without SMK	1 (4.17)	1 (4.35)	1 (2.86)	1 (3.45)	1 (3.7)
	Avg. Beneficiary	1 (3.7)	1 (3.85)	1 (3.03)	1 (3.57)	1 (3.7)
	Non-Beneficiary	1 (7.14)	1 (4.55)	1 (5)	1 (5.88)	1 (5.26)
Plant protection	SMK	2 (6.45)	1 (3.7)	1 (3.45)	2 (7.41)	1 (3.57)
	Without SMK	1 (4.17)	0 (0)	1 (2.86)	2 (6.9)	1 (3.7)
	Avg. Beneficiary	1 (3.7)	1 (3.85)	1 (3.03)	2 (7.14)	1 (3.7)
	Non-Beneficiary	1 (7.14)	2 (9.09)	1 (5)	2 (11.76)	2 (10.53)
Weeding and plant protection measures	SMK	4 (12.9)	7 (25.93)	8 (27.59)	5 (18.52)	6 (21.43)
	Without SMK	6 (25)	8 (34.78)	9 (25.71)	9 (31.03)	8 (29.63)
	Avg. Beneficiary	5 (18.52)	8 (30.77)	9 (27.27)	8 (28.57)	7 (25.93)
	Non-Beneficiary	2 (14.29)	6 (27.27)	5 (25)	4 (23.53)	5 (26.32)
Harvesting and Threshing	SMK	12 (38.71)	9 (33.33)	10 (34.48)	7 (25.93)	10 (35.71)
	Without SMK	7 (29.17)	7 (30.43)	15 (42.86)	9 (31.03)	9 (33.33)
	Avg. Beneficiary	9 (33.33)	8 (30.77)	13 (39.39)	8 (28.57)	9 (33.33)
	Non-Beneficiary	2 (14.29)	5 (22.73)	3 (15)	3 (17.65)	3 (15.79)
Bagging, Transporting	SMK	2 (6.45)	3 (11.11)	2 (6.9)	3 (11.11)	3 (10.71)
	Without SMK	1 (4.16)	1 (4.35)	1 (2.86)	3 (10.34)	2 (7.41)
	Avg. Beneficiary	2 (7.42)	2 (7.69)	2 (6.06)	3 (10.71)	2 (7.41)
	Non-Beneficiary	4 (28.57)	2 (9.07)	3 (15)	2 (11.76)	2 (10.53)
Total	SMK	31 (100)	27 (100)	29 (100)	27 (100)	28 (100)
	Without SMK	24 (100)	23 (100)	35 (100)	29 (100)	27 (100)
	Avg. Beneficiary	27 (100)	26 (100)	33 (100)	28 (100)	27 (100)
	Non-Beneficiary	14 (100)	22 (100)	20 (100)	17 (100)	19 (100)

Table 4.11: Use of Human Labour by Activities for Beneficiary and Non-Beneficiary – Red Gram (tur)

(man days per acre)

Activity Gram	SMK / Without	Marginal	Small	Medium	Large	Total
Land Preparation	SMK	9 (22.5)	9 (21.43)	6 (21.43)	4 (12.5)	8 (22.22)
	Without SMK	8 (21.62)	6 (18.18)	4 (11.11)	5 (16.13)	5 (15.15)
	Avg. Beneficiary	8 (21.05)	7 (19.44)	5 (15.63)	5 (15.63)	6 (17.14)
	Non-Beneficiary	3 (23.08)	1 (6.67)	2 (12.5)	4 (19.05)	3 (17.65)
Sowing	SMK	1 (2.5)	1 (2.38)	1 (3.57)	1 (3.13)	1 (2.78)
	Without SMK	1 (2.7)	1 (3.03)	1 (2.78)	1 (3.23)	1 (3.03)
	Avg. Beneficiary	1 (2.63)	1 (2.78)	1 (3.13)	1 (3.13)	1 (2.86)
	Non-Beneficiary	1 (7.69)	1 (6.67)	1 (6.25)	1 (4.76)	1 (5.88)
Manure & FYM	SMK	-	-	-	-	-
	Without SMK	-	-	-	-	-
	Avg. Beneficiary	-	-	-	-	-
	Non-Beneficiary	-	-	-	-	-
Major and minor nutrients	SMK	-	-	-	-	-
	Without SMK	-	-	-	-	-
	Avg. Beneficiary	-	-	-	-	-
	Non-Beneficiary	-	-	-	-	-
Irrigation	SMK	1 (2.5)	1 (2.38)	1 (3.57)	2 (6.25)	1 (2.78)
	Without SMK	1 (2.7)	0 (0)	2 (5.56)	1 (3.23)	1 (3.03)
	Avg. Beneficiary	1 (2.63)	1 (2.78)	1 (3.13)	1 (3.13)	1 (2.86)
	Non-Beneficiary	1 (7.69)	2 (13.33)	2 (12.5)	2 (9.52)	2 (11.76)
Inter cultural operations	SMK	1 (2.5)	2 (4.76)	1 (3.57)	1 (3.13)	1 (2.78)
	Without SMK	0 (0)	1 (3.03)	1 (2.78)	1 (3.23)	1 (3.03)
	Avg. Beneficiary	0 (0)	1 (2.78)	1 (3.13)	1 (3.13)	1 (2.86)
	Non-Beneficiary	1 (7.69)	1 (6.67)	2 (12.5)	1 (4.76)	1 (5.88)
Plant protection	SMK	3 (7.5)	2 (4.76)	1 (3.57)	1 (3.13)	2 (5.56)
	Without SMK	1 (2.7)	2 (6.06)	1 (2.78)	2 (6.45)	1 (3.03)
	Avg. Beneficiary	2 (5.26)	2 (5.56)	1 (3.13)	2 (6.25)	2 (5.71)
	Non-Beneficiary	1 (7.69)	2 (13.33)	1 (6.25)	1 (4.76)	1 (5.88)
Weeding and plant protection measures	SMK	6 (15)	8 (19.05)	6 (21.43)	8 (25)	7 (19.44)
	Without SMK	14 (37.84)	7 (21.21)	15 (41.67)	13 (41.94)	11 (33.33)
	Avg. Beneficiary	12 (31.58)	7 (19.44)	11 (34.38)	12 (37.5)	10 (28.57)
	Non-Beneficiary	2 (15.38)	2 (13.33)	2 (12.5)	3 (14.29)	2 (11.76)
Harvesting and Threshing	SMK	13 (32.5)	13 (30.95)	9 (32.14)	11 (34.38)	11 (30.56)
	Without SMK	11 (29.73)	14 (42.42)	10 (27.78)	7 (22.58)	11 (33.33)
	Avg. Beneficiary	12 (31.58)	13 (36.11)	9 (28.13)	8 (25)	11 (31.43)
	Non-Beneficiary	3 (23.09)	5 (33.33)	4 (25)	8 (38.1)	6 (35.31)
Bagging, Transporting	SMK	6 (15)	6 (14.29)	3 (10.72)	4 (12.48)	5 (13.88)
	Without SMK	1 (2.71)	2 (6.07)	2 (5.54)	1 (3.21)	2 (6.07)
	Avg. Beneficiary	2 (5.27)	4 (11.11)	3 (9.34)	2 (6.23)	3 (8.57)
	Non-Beneficiary	1 (7.69)	1 (6.67)	2 (12.5)	1 (4.76)	1 (5.88)
Total	SMK	40 (100)	42 (100)	28 (100)	32 (100)	36 (100)
	Without SMK	37 (100)	33 (100)	36 (100)	31 (100)	33 (100)
	Avg. Beneficiary	38 (100)	36 (100)	32 (100)	32 (100)	35 (100)
	Non-Beneficiary	13 (100)	15 (100)	16 (100)	21 (100)	17 (100)

The human labour application in various cultivation operations of selected pulse crops differed significantly, which turned out to be 31 man days for beneficiary and 19 man days for non-beneficiary farmers with both gram and tur crops put together (Table 4.12). The farming operations which showed higher allocation of human labour in cultivation of selected pulse crops were harvesting and threshing, land preparation, and weeding and plant protection. These farming operations accounted for 81 per cent share in total human labour allocation for beneficiary farmers and 63 per cent for non-beneficiary farmers. However, the non-beneficiary farmers showed significantly high

share of human labour application in irrigation, interculture, sowing, and plant protection activities as against beneficiary farmers. In general, the human labour allocation showed an increasing trend with the increase in land holding size for non-beneficiary farmers whereas medium category of beneficiary showed higher allocation of human labour as against other categories of beneficiaries.

Table 4.12: Use of Human Labour by Activities for Beneficiary and Non-Beneficiary – Bengal and Red Gram (aggregate)

(man days per acre)

Activity Gram	SMK / Without	Marginal	Small	Medium	Large	Total
Land Preparation	SMK	8 (24.24)	7 (18.92)	5 (17.24)	5 (17.86)	6 (18.75)
	Without SMK	6 (20.69)	4 (14.81)	5 (13.51)	4 (13.33)	5 (16.13)
	Avg. Beneficiary	7 (22.58)	5 (16.67)	5 (15.15)	5 (16.67)	5 (16.13)
	Non-Beneficiary	3 (23.08)	2 (11.11)	3 (16.67)	3 (15)	3 (15.79)
Sowing	SMK	1 (3.03)	1 (2.7)	1 (3.45)	1 (3.57)	1 (3.13)
	Without SMK	1 (3.45)	1 (3.7)	1 (2.7)	1 (3.33)	1 (3.23)
	Avg. Beneficiary	1 (3.23)	1 (3.33)	1 (3.03)	1 (3.33)	1 (3.23)
	Non-Beneficiary	1 (7.69)	1 (5.56)	1 (5.56)	1 (5)	1 (5.26)
Manure & FYM	SMK	-	-	-	-	-
	Without SMK	-	-	-	-	-
	Avg. Beneficiary	-	-	-	-	-
	Non-Beneficiary	-	-	-	-	-
Major and minor nutrients	SMK	-	-	-	-	-
	Without SMK	-	-	-	-	-
	Avg. Beneficiary	-	-	-	-	-
	Non-Beneficiary	-	-	-	-	-
Irrigation	SMK	2 (6.06)	1 (2.7)	1 (3.45)	2 (7.14)	1 (3.13)
	Without SMK	1 (3.45)	1 (3.7)	2 (5.41)	1 (3.33)	1 (3.23)
	Avg. Beneficiary	1 (3.23)	1 (3.33)	1 (3.03)	1 (3.33)	1 (3.23)
	Non-Beneficiary	1 (7.69)	2 (11.11)	2 (11.11)	2 (10)	2 (10.53)
Inter cultural operations	SMK	1 (3.03)	2 (5.41)	1 (3.45)	1 (3.57)	1 (3.13)
	Without SMK	0 (0)	1 (3.7)	1 (2.7)	1 (3.33)	1 (3.23)
	Avg. Beneficiary	1 (3.23)	1 (3.33)	1 (3.03)	1 (3.33)	1 (3.23)
	Non-Beneficiary	1 (7.69)	1 (5.56)	1 (5.56)	1 (5)	1 (5.26)
Plant protection	SMK	2 (6.06)	2 (5.41)	1 (3.45)	1 (3.57)	1 (3.13)
	Without SMK	1 (3.45)	1 (3.7)	1 (2.7)	2 (6.67)	1 (3.23)
	Avg. Beneficiary	1 (3.23)	1 (3.33)	1 (3.03)	2 (6.67)	1 (3.23)
	Non-Beneficiary	1 (7.69)	2 (11.11)	1 (5.56)	2 (10)	2 (10.53)
Weeding and plant protection measures	SMK	4 (12.12)	8 (21.62)	7 (24.14)	6 (21.43)	7 (21.88)
	Without SMK	10 (34.48)	7 (25.93)	12 (32.43)	11 (36.67)	10 (32.26)
	Avg. Beneficiary	8 (25.81)	7 (23.33)	10 (30.3)	10 (33.33)	9 (29.03)
	Non-Beneficiary	2 (15.38)	4 (22.22)	4 (22.22)	4 (20)	4 (21.05)
Harvesting and Threshing	SMK	12 (36.36)	11 (29.73)	10 (34.48)	9 (32.14)	11 (34.35)
	Without SMK	9 (31.03)	10 (37.04)	13 (35.14)	8 (26.67)	10 (32.24)
	Avg. Beneficiary	10 (32.26)	11 (36.68)	12 (36.36)	8 (26.67)	11 (35.47)
	Non-Beneficiary	3 (23.08)	5 (27.78)	3 (16.67)	5 (25)	5 (26.32)
Bagging, Transporting	SMK	3 (9.09)	5 (13.51)	3 (10.34)	3 (10.72)	4 (12.5)
	Without SMK	1 (3.45)	2 (7.42)	2 (5.41)	2 (6.67)	2 (6.45)
	Avg. Beneficiary	2 (6.43)	3 (10)	2 (6.06)	2 (6.67)	2 (6.45)
	Non-Beneficiary	1 (7.70)	1 (5.55)	3 (16.65)	2 (10)	1 (5.26)
Total	SMK	33 (100)	37 (100)	29 (100)	28 (100)	32 (100)
	Without SMK	29 (100)	27 (100)	37 (100)	30 (100)	31 (100)
	Avg. Beneficiary	31 (100)	30 (100)	33 (100)	30 (100)	31 (100)
	Non-Beneficiary	13 (100)	18 (100)	18 (100)	20 (100)	19 (100)

Thus, the total human labour allocation during various farming operations in the cultivation of selected pulse crops estimated at 31 man days for beneficiaries and 19 man days for non-beneficiaries showed much lower application labour for non-beneficiary as

against beneficiary farmers. The estimates further showed that some of the major activities like harvesting and threshing, land preparation, weeding and plant protection and bagging and transportation put together accounted for 87 per cent share in total human labour for beneficiary and 68 per cent share in the same for non-beneficiary farmers. However, some other activities like irrigation, interculture, sowing, and plant protection accounted for much higher share in total human labour for non-beneficiary as against beneficiary farmers. In general, the human labour allocation showed an increasing trend with the increase in land holding size for non-beneficiary farmers whereas beneficiary farmers did not show any discernable trend in this respect.

4.2.5 Method of Sowing

There are various methods of sowing of pulse crops, which depend on the type of crop selected and availability of land and other natural resources for crop production. The major methods of sowing of pulse crops include broadcasting, drilling, and line sowing. The responses of various categories of sampled beneficiary and non-beneficiary farmers regarding the method of sowing of various pulse crops followed by them are delineated in Table 4.13. The responses in this respect of all the sampled gram and tur cultivating sampled beneficiary and non-beneficiary farmers drawn from the districts of Ahmednagar and Yavatmal, and also the overall scenario of the same for beneficiary and non-beneficiary farmers are shown in Appendix 52.

The sampled beneficiaries of seed minikits chiefly depended on drilling and line sowing methods of sowing of pulse crops followed by broadcasting method since 50 per cent of them aired their view in favour of drilling method of sowing, 30 followed line sowing and the remaining 20 percent adopted broadcasting method of sowing. The broadcasting method of sowing was mainly adopted by large category, followed by small and medium categories of beneficiaries.

Table 4.13: Method of Sowing followed by Selected Households in reference year (%)

Method	Marginal	Small	Medium	Large	Total
Beneficiary					
Broadcasting	4.44	23.00	18.92	38.89	19.50
Drill sown	48.89	52.00	48.65	50.00	50.50
Line Sown	46.67	25.00	32.43	11.11	30.00
Total Beneficiary	100.00	100.00	100.00	100.00	100.00
Non Beneficiary					
Broadcasting	25.00	19.23	10.53	17.65	18.00
Drill sown	41.67	53.85	63.16	64.71	56.00
Line Sown	33.33	26.92	26.32	17.65	26.00
Total Non-Beneficiary	100.00	100.00	100.00	100.00	100.00

The majority of non-beneficiary farmers also adopted drilling as the major method of sowing pulse crops followed by line sowing and broadcasting method. Among various non-beneficiary farmers, 56 per cent of them followed drilling, 26 per cent lining and the remaining 18 adopted broadcasting method of sowing of various pulse crops. The drilling method of sowing of pulses increased with the increase in land holding size of non-beneficiary farmers. On the other hand, lining method of sowing decreased with the increase in land holding size of non-beneficiary farmers.

Thus, the major method of sowing of pulse crops followed by sampled beneficiary and non-beneficiary farmers was noticed to be drilling, followed by line sowing and broadcasting. In general, drilling method of sowing was followed by 50 per cent of beneficiary and 56 per cent of non-beneficiary farmers whereas line sowing turned out to be another method of sowing followed by 30 per cent of beneficiary and 26 per cent of non-beneficiary farmers. About 20 per cent of beneficiary and 18 per cent of non-beneficiaries followed broadcasting method of sowing.

4.3 Distribution of Seed Minikits – Socio Economic Comparisons

The seed minikits are meant for introduction and popularization of newly released / pre-released varieties/hybrids not older than 10 years among the farmers free of cost. The Central Agencies deliver the allotted minikits to the destination identified by the beneficiary States within the stipulated time. The seed minikits are subsequently supplied to various districts of the State for further distribution of the same to the beneficiary farmers at the village level. The distribution of seed minikits is exercised with the help of various agencies like Krishi Vigyan Kendra (KVK), agricultural departments, village Panchayats, etc. The information relating to number of seed minikits distributed by various agencies to sampled beneficiary farmers is provided in Table 4.14. The information in this respect of all the sampled gram and tur cultivating beneficiary farmers drawn from the districts of Ahmednagar and Yavatmal with overall scenario of the same is shown in Appendix 53.

Table 4.14: Distribution of Seed Minikit (Numbers) – Beneficiary Farmers

Agency	Marginal	Small	Medium	Large	Total
Overall Beneficiary					
KVK	-	-	-	-	-
Agricultural Departments	45	100	37	18	200
Gram Panchayat	-	-	-	-	-
Others	-	-	-	-	-
Total beneficiary	45	100	37	18	200

Although there are various agencies involved in the distribution of seed minikits for pulse crops, the sampled beneficiary farmers received seed minikits for pulses from agricultural department. Each of the sampled beneficiary farmers received only one seed minikit for pulse crops, which contained 4 kg of seed in case of tur crop and 8 kg for gram crop with kit size: tur @ 4 kg and gram @ 8 kg.

4.3.1 Documents Submitted to Avail Seed Minikit

The seed minikits were distributed to beneficiary farmers based on various documents furnished by them to avail the facility. The documents required for availing seed minikits encompassed Adhar Card, Pahani (land records), and Bank passbook. The information relating to type of documents furnished by the beneficiary farmers to avail the facility of seed minikits for pulses is brought out in Table 4.15. Similar information for all the gram and tur cultivating beneficiary farmers drawn from the districts of Ahmednagar and Yavatmal with overall scenario of the same is shown in Appendix 54.

Table 4.15: Documents Submitted to Avail Seed Minikit (Combine Number and Percent)

Documents	Marginal	Small	Medium	Large	Total
1	10 (22.22)	20 (20.00)	5 (13.51)	4 (22.22)	39 (19.50)
1,2	26 (57.78)	54 (54.00)	15 (40.54)	7 (38.89)	102 (51.00)
1,2,3	4 (8.89)	17 (17.00)	8 (21.62)	3 (16.67)	32 (16.00)
1,3	2 (4.44)	6 (6.00)	6 (16.22)	2 (11.11)	16 (8.00)
2,3	3 (6.67)	3 (3.00)	3 (8.11)	2 (11.11)	11 (5.50)
Total	45 (100.00)	100 (100.00)	37 (100)	18 (100)	200 (100)

Code Note: 1=Adhar Card, 2= Pahani (land records), 3= Bank Passbook

The majority of sampled beneficiary farmers availed the facility of seed minikits for pulses by submitting documents like land records and Adhar Card since about 70 per cent of them aired their view in favour of receiving seed minikits by submitting either a combination of land records and Adhar Card or Adhar Card alone. However, 16 per cent of beneficiaries received seed minikits after submitting a combination of documents like Adhar Card, land records and bank passbook. The remaining 14 per cent of beneficiary farmers availed the facility of seed minikits by submitting a combination of documents like Adhar Card and bank passbook or land records and bank passbook.

4.3.2: Criteria for Farmer Selection

At the time of survey, various categories of sampled beneficiaries were asked to indicate the criteria of selection of farmers for the distribution of seed minikits for pulses, and the responses in this respect received from them are shown in Table 4.16. The details of such responses received from all the sampled gram and tur cultivating beneficiary

farmers drawn from the districts of Ahmednagar and Yavatmal with overall scenario of the same is shown in Appendix 55.

Table 4.16: Criteria for Farmer Selection (Combine Number and Percent)

Criteria	Marginal	Small	Medium	Large	Grand Total
1	18 (40.00)	35 (35.00)	11 (29.73)	3 (16.67)	67 (33.50)
2	4 (8.89)	10 (10.00)	8 (21.62)	7 (38.89)	29 (14.50)
3	3 (6.67)	12 (12.00)	3 (8.11)	2 (11.11)	20 (10.00)
4	7 (15.56)	13 (13.00)	2 (5.41)	2 (11.11)	24 (12.00)
1,2	2 (4.44)	3 (3.00)	6 (16.22)	1 (5.56)	12 (6.00)
1,2,3	6 (13.33)	12 (12.00)	3 (8.11)	1 (5.56)	22 (11.00)
2,3	5 (11.11)	15 (15.00)	4 (10.81)	2 (11.11)	26 (13.00)
Total	45 (100.00)	100 (100.00)	37 (100.00)	18 (100)	200 (100)

Code Note: 1Any Interested Farmer, 2= SC/ST Farmer,3= Small . Marginal Farmer, 4=BPL Farmer

The responses of sampled beneficiary farmers were recorded in terms of the criteria adopted by the concerned agricultural department to supply seed minikits to them. The major criteria followed for the distribution of seed minikits encompassed various options like any interested farmer, SC/ST farmer, small/marginal farmer, BPL farmer or a combination of these criteria.

About 34 per cent of sampled beneficiary farmers aired their view in favour of receiving seed minikits due to their interest in the same whereas 15 per cent of them believed that they received the kit since they belonged to SC/ST category, 10 per cent of them favored the view of receiving the kit as they were marginal/small farmers, and 12 per cent of them favored the view of receiving the kit as they belonged to BPL category of farmers. Thus, about 70 per cent of beneficiary farmers aired their view in favour of receiving seed minikits as they belonged to interested category of farmers, SC/ST category, small/marginal farmer category and BPL farmer category. The remaining 30 per cent of beneficiary farmers aired their view in favour of receiving seed minikits due to various combinations of these criteria.

4.3.3: Financial Details of Seed Minikit

Although the sampled beneficiary farmers received seed minikits for pulse crops from the concerned agricultural department of the sampled districts, these kits were supplied to them free of cost. Therefore, the financial details of seed minikits presented in Table 4.17 for various categories of beneficiary farmers do not incorporate any such detail. The financial details of seed minikits for pulse crops for all the sampled gram and tur cultivating farmers drawn from the districts of Ahmednagar and Yavatmal are presented in Appendix 56, which also do not contain any such information.

Table 4.17: Financial Details of Seed Minikit

Farm Size	Amount Charged (Rs/Kit)	Amount Reimbursed (Rs/Kit)	Reimbursed Through (Rs/Kit)		Duration of Reimbursement (months)
			Cash	Bank	
Marginal	-	-	-	-	-
Small	-	-	-	-	-
Medium	-	-	-	-	-
Large	-	-	-	-	-
Total	-	-	-	-	-

The sampled beneficiary farmers did not provide any information relating to amount paid by them or reimbursed for receiving seed minikits for pulse crops since they received the same free of cost from the concerned agency. However, all the beneficiary farmers aired their view in favour of incurring transportation cost from village to block/district level agriculture department to avail the facility.

4.3.4: Details of Seed Minikit Provided for Pulses Crop

The estimates relating to the variety and quantity of seed of gram and tur received by beneficiary farmers under seed minikits scheme, area sown with seed, output produced from seed minikits, output retained and output used as seed for various farm size categories are furnished in Table 4.18.

The information furnished in Table 4.18 clearly showed that each of the sampled gram cultivating beneficiary households received only one seed minikit containing 8 kg of Jackey variety of seed. The total area under Jackey variety of Bengal gram seed was estimated at 59.25 acres with a distribution of 21 per cent area under seed for marginal category, 39 per cent for small, 23 per cent for medium and 17 per cent for large category. The average per household output produced, retained and kept as seed using Jackey variety of Bengal gram seed increased with the increase in land size of beneficiary farmers. The average per household output produced through Jackey variety of Bengal gram seed was estimated at 3.08 qtl, which comprised of 47 kg as total retention, and 15 kg specifically kept as seed for future use, constituting 5 per cent of total output.

The estimates further revealed that each of the sampled beneficiary households received 4 kg of BDN 711 variety of red gram/tur crop seed under seed minikit scheme. The total area sown under BDN 711 variety of red gram seed was estimated at 58.35 acres, which encompassed 9 per cent area under seed for marginal category, 51 per cent for small, 19 per cent for medium and 21 per cent for large category. The average per household output produced, retained and kept as seed using BDN 711 variety of red gram seed increased with the increase in land size of beneficiary farmers. The average per

household output produced through BDN 711 variety of red gram seed was estimated at 3.13 qtl, which comprised of 48 kg as total retention, and 16 kg specifically kept as seed for future use, constituting 5 per cent of total output.

Table 4.18: Details of Seed Minikit Provided for Pulses Crop 2018-19

Farm Size		Marginal	Small	Medium	Large	Total
Gram (Bengal)						
Variety		Jackey	Jackey	Jackey	Jackey	Jackey
Quantity (kgs/hh)		8	8	8	8	32
Area Sown (acres/household)		0.45	0.54	0.62	1.27	0.59
Season	Kharif	-	-	-	-	-
	Rabi	0.45	0.54	0.62	1.27	0.59
	Summer	-	-	-	-	-
Output Produced from seed minikits (Quintals per hh)		2.18	2.92	3.11	7.01	3.08
Output produced per Acre in Quintals		4.86	5.37	4.99	5.52	5.20
Output retained (kgs per hh)		35	47	51	81	47
Output kept/ used as seed (kgs per hh)		9	15	18	24	15
Tur (Red Gram)						
Variety		BDN 711	BDN 711	BDN 711	BDN 711	BDN 711
Quantity (kgs/hh)		4.00	4.00	4.00	4.00	28.00
Area Sown (acres/household)		0.31	0.51	0.74	1.23	0.58
Season	Kharif	0.31	0.51	0.74	1.23	0.58
	Rabi	-	-	-	-	-
	Summer	-	-	-	-	-
Output Produced from seed minikits (Quintals per hh)		1.19	2.76	4.23	6.90	3.13
Output produced per Acre in Quintals		3.88	5.39	5.69	5.63	5.36
Output retained (kgs per hh)		24	44	67	78	48
Output kept/ used as seed (kgs per hh)		7	13	21	27	16
Overall Gram and Tur						
Variety		-	-	-	-	-
Quantity (kgs/hh)		6.49	5.68	6.38	5.78	6.00
Area Sown (acres/household)		0.39	0.53	0.67	1.24	0.59
Season	Kharif	-	-	-	-	-
	Rabi	-	-	-	-	-
	Summer	-	-	-	-	-
Output Produced from seed minikits (Quintals per hh)		1.80	2.83	3.56	6.95	3.11
Output produced per Acre in Quintals		4.57	5.38	5.30	5.58	5.28
Output retained (kgs per hh)		31	46	57	79	47
Output kept/ used as seed (kgs per hh)		8	14	19	25	15

Thus, each of the sampled beneficiary households were found to receive Jackey variety of Bengal gram seed and BDN 711 variety of red gram seed under seed minikits scheme with a kit size of 8 kg of seed for Bengal gram and 4 kg for red gram, which helped them to cultivate 59.25 acres of area under Bengal gram and 58.35 acres under red gram with all beneficiaries put together. Further, the average per beneficiary household output produced was estimated at 3.08 qtl for Bengal gram and 3.13 qtl for red gram using seed variety supplied under seed minikit scheme. About 15 per cent of total output produced through seed varieties received under the scheme was retained, which also contained 5 per cent of the same specifically meant for future use as seed. In general,

average per household output produced, retained and kept as seed using seed varieties of pulses received under the scheme and subsequently cultivated on farms increased with the increase in land size of beneficiary farmers.

4.4 Efficiency in Distribution and Usage of Seed Minikits

The efficiency in distribution of seed minikits was evaluated by gathering information relating to content of seed minikit, quantity and source of purchase of seed minikit, purchase of seed from other sources, channels of marketing of pulses, etc.

4.4.1: Content of the Seed Minikit

The seed minikits supplied by the agriculture department to pulse farmers also contain a pamphlet regarding the content of seed minikits per packet, which encompass the recommended package of practice (POP), phosphate solubilizing bacteria (PSB) culture of 100 grams, seed treating chemicals, and Rhizobium Culture of 100 grams.

The responses of sampled beneficiary farmers were also recorded in terms of the content of seed minikits received by them and these responses are presented in Table 4.19. The responses in this respect for all the sampled gram and tur cultivating farmers drawn from the districts of Ahmednagar and Yavatmal are presented in Appendix 57.

Table 4.19: Content of the Seed Minikit (%)

Farm Size	POP	PSB culture (100gms)	Rhizobium (100gms)	PSB and Rhizobium	Total
Marginal	-	2 (4.44)	38 (84.44)	5 (11.11)	45 (100.00)
Small	-	2 (2.00)	97 (97.00)	1 (1.00)	100 (100.00)
Medium	-	3 (8.11)	33 (89.19)	1 (2.70)	37 (100.00)
Large	-	1 (5.56)	15 (83.33)	2 (11.11)	18 (100.00)
Total	-	8 (4.00)	183 (91.50)	9 (4.50)	200 (100.00)

While about 92 per cent of sampled beneficiary farmers aired their view in favour of receiving seed minikits for pulses which contained 100 grams of Rhizobium Culture, 4 per cent of them were of the view that the kit also contained (PSB) culture of 100 grams, and another 4 per cent opined that the kit contained PSB and Rhizobium. Thus, majority of sampled beneficiary farmers aired their view in favour of receiving seed minikits for pulses which contained 100 grams of Rhizobium Culture with few of them also airing opinion in favour of kit containing PSB culture of 100 grams, and PSB and Rhizobium.

4.4.2: Seed Purchased by Farmers through Seed minikits and Other Sources

The sampled beneficiary farmers were also asked to indicate the quantity of seed procured by them under seed minikits scheme for pulses, price per kit, source of procurement, the distance from farm to the place of procurement, and transportation charges incurred by them in procuring the same. The information relating to procurement

of seed by the sampled beneficiary farmers under seed minikits scheme for pulses is brought out in Table 4.20.1. Similar information for the beneficiary farmers drawn from the districts of Ahmednagar and Yavatmal is presented in Appendix 58.

It is to be noted that each of the sampled beneficiary farmer received only one seed minikit under the scheme, which contained 8 kg of seed for gram crop for the beneficiaries of Ahmednagar district and 4 kg of seed of tur crop in case of beneficiaries of Yavatmal district. The average quantity of seed received by the beneficiary farmers was estimated at 6 kg with gram and tur crop put together. Further, all the beneficiary farmers obtained the seed minikits free of cost from the concerned agriculture department. The average distance between farm and place of procurement of seed minikits for beneficiaries turned out to be 12.90 kms with average transportation cost in procuring the same estimated at Rs. 12.80 per kit for each beneficiary. However, the average distance traveled in procuring seed minikits varied significantly for various farm size categories of beneficiaries.

Table 4.20.1: Seed Purchased by the Farmer for the Reference year through Seed Minikits

Crop	Quantity (kgs) Average	Price (Rs/ kit) Avg.	Source of purchase (%)					Distance from farm (kms) Avg.	Transport Cost (Rs/Kit)
			KVK	Agril. Office (RSK)	Private Dealer	Co-op society	Total		
Ahmednagar Beneficiary – Gram (Bengal Gram)									
Marginal	8.00	-	-	28 (100)	-	-	28 (100)	23.75	15.71
Small	8.00	-	-	42 (100)	-	-	42 (100)	16.14	13.21
Medium	8.00	-	-	22 (100)	-	-	22 (100)	14.59	12.73
Large	8.00	-	-	8 (100)	-	-	8 (100)	11.13	10.00
Total	8.00	-	-	100 (100)	-	-	100 (100)	17.53	13.55
Yavatmal Beneficiary – Tur (Red gram)									
Marginal	4.00	-	-	17 (100)	-	-	17 (100)	6.12	10.29
Small	4.00	-	-	58 (100)	-	-	58 (100)	8.16	12.33
Medium	4.00	-	-	15 (100)	-	-	15 (100)	7.53	11.67
Large	4.00	-	-	10 (100)	-	-	10 (100)	9.20	14.00
Total	4.00	-	-	100 (100)	-	-	100 (100)	8.26	12.05
Overall Beneficiary – Gram and Tur									
Marginal	6.49	-	-	45 (100)	-	-	45 (100)	17.09	13.67
Small	5.68	-	-	100 (100)	-	-	100 (100)	11.51	12.70
Medium	6.38	-	-	37 (100)	-	-	37 (100)	11.73	12.30
Large	5.78	-	-	18 (100)	-	-	18 (100)	12.50	12.22
Total	6.00	-	-	200 (100)	-	-	200 (100)	12.90	12.80

Note: Since the minikits were provided by the government agency, it did not involve any extra cost (price) for the packet other than transport cost.

The sampled beneficiaries not only procured seed for pulse crops from the agriculture department under seed minikits scheme but many among them also purchased the same from other sources. The details regarding the average quantity of seed for pulse crops purchased by the beneficiary farmers from other sources, price/kg, source of purchase, distance from farm to place of purchase, and transportation cost involved in the

same are shown in Table 4.20.2. Similar information for the beneficiary farmers drawn from the districts of Ahmednagar and Yavatmal is presented in Appendix 59.

The estimates presented in Table 4.20.2 clearly show that about 27 per cent of total sampled beneficiaries of seed minikits also purchased seed from other agencies to meet their total seed requirement for pulse crops. The average quantity of seed purchased by these beneficiary farmers turned out to be 17 kg with gram and tur crop put together, which was priced at Rs.72.10/kg. While about 66 per cent of these beneficiaries purchased seed from private dealers, the remaining 34 per cent of them purchased the same from cooperative society. The average distance between farm and place of purchase of seed for these beneficiaries was estimated at 10.89 kms with an average transportation cost estimated at Rs.2.69/kg of seed. Thus, it was only in case of 53 sampled beneficiary farmers out of 200 who also depended on outside sources/agencies to meet their total seed requirement for pulse crops.

Table 4.20.2: Seed Purchased by the Farmer from Other Sources in the Reference - Beneficiary

Crop	Quantity (kgs) Average	Price (Rs/ kg) Average	Source of purchase (Number and Percent)					Distance from farm (kms)	Transportation Cost (Rs/kg) Average
			KVK	RSK	Private Dealer	Co-op society	Total		
Ahmednagar Beneficiary – Gram (Bengal Gram)									
Marginal	17.14	57.14	-	-	5 (71.43)	2 (28.57)	7 (100)	17.14	1.67
Small	21.33	90.00	-	-	7 (63.64)	4 (36.36)	11 (100)	10.78	2.24
Medium	25.20	71.50	-	-	8 (72.73)	3 (27.27)	11 (100)	12.60	2.90
Large	30.00	73.33	-	-	2 (33.33)	4 (66.67)	6 (100)	12.00	2.25
Total	23.25	73.91	-	-	22 (62.86)	13 (37.14)	35 (100)	12.97	2.37
Yavatmal Beneficiary – Tur (Red gram)									
Marginal	4.00	75.00	-	-	3 (75)	1 (25)	4 (100)	8.25	5.31
Small	3.75	60.00	-	-	3 (75)	1 (25)	4 (100)	9.00	7.33
Medium	8.00	80.00	-	-	2 (66.67)	1 (33.33)	3 (100)	7.33	5.83
Large	7.29	65.71	-	-	5 (71.43)	2 (28.57)	7 (100)	5.29	3.72
Total	5.89	68.89	-	-	13 (72.22)	5 (27.78)	18 (100)	7.11	4.95
Overall Beneficiary – Gram and Tur									
Marginal	12.36	63.64	-	-	8 (72.73)	3 (27.27)	11 (100)	13.91	2.10
Small	15.92	80.77	-	-	10 (66.67)	5 (33.33)	15 (100)	10.23	2.61
Medium	21.23	73.46	-	-	10 (71.43)	4 (28.57)	14 (100)	11.38	3.15
Large	17.77	69.23	-	-	7 (53.85)	6 (46.15)	13 (100)	8.38	2.58
Total	17.00	72.10	-	-	35 (66.04)	18 (33.96)	53 (100)	10.86	2.69

Note: Farmer has Purchased Extra seed due to less size of seed minikits.

Thus, about 27 per cent of total sampled beneficiaries of seed minikits also purchased seed from other agencies like private dealers and cooperative society with the average quantity of seed purchased by them estimated at 17 kg at a price Rs.72.10/kg. The average distance traveled by them to procure the same was worked out at 10.89 kms with an average transportation cost estimated at Rs.2.69/kg of seed.

It is to be further noted that while beneficiary farmers procured seed for pulse crops from the agriculture department under seed minikits scheme and also purchased the same from other sources to meet their total requirement of seed, the non-beneficiary farmers completely depended on other agencies to meet their requirement of seed for the cultivation of pulse crops. The details regarding the average quantity of seed for pulse crops purchased by the non-beneficiary farmers from various sources, price/kg, source of purchase, distance from farm to place of purchase, and transportation cost involved in the same are shown in Table 4.20.3.

Table 4.20.3: Seed Purchased by the Farmer from Other Sources in the Reference – Non-Beneficiary

Crop	Quantity (kgs) Average	Price (Rs/ kg) Average	Source of purchase (Number and Percent)					Distance from farm (kms)	Transportation Cost (Rs/kg) Average
			KVK	RSK	Private Dealer	Co-op society	Total		
Ahmednagar Non-Beneficiary – Gram (Bengal Gram)									
Marginal	35.00	75.63	-	-	6 (75.00)	2 (25.00)	8 (100)	12.75	1.48
Small	25.18	81.14	-	-	17 (77.27)	5 (22.73)	22 (100)	16.00	2.88
Medium	30.00	82.27	-	-	8 (72.73)	3 (27.27)	11 (100)	14.91	2.98
Large	43.89	76.67	-	-	6 (66.67)	3 (33.33)	9 (100)	18.89	2.35
Total	31.18	79.70	-	-	37 (74.00)	13 (26.00)	50 (100)	15.76	2.52
Yavatmal Non-Beneficiary – Tur (Red gram)									
Marginal	5.50	70.00	-	-	2 (50.00)	2 (50.00)	4 (100)	15.00	8.41
Small	5.20	79.83	-	-	24 (80.00)	6 (20.00)	30 (100)	10.33	7.88
Medium	7.88	75.63	-	-	5 (62.50)	3 (37.50)	8 (100)	13.50	8.10
Large	7.38	74.38	-	-	6 (75.00)	2 (25.00)	8 (100)	12.63	8.64
Total	6.00	77.50	-	-	37 (74.00)	13 (26.00)	50 (100)	11.58	8.12
Overall Non-Beneficiary – Gram and Tur									
Marginal	25.17	73.75	-	-	8 (66.67)	4 (33.33)	12 (100)	13.50	1.99
Small	13.65	80.38	-	-	41 (78.85)	11 (21.15)	52 (100)	12.73	3.98
Medium	20.68	79.47	-	-	13 (68.42)	6 (31.58)	19 (100)	14.32	3.80
Large	26.71	75.59	-	-	12 (70.59)	5 (29.41)	17 (100)	15.94	3.17
Total	18.59	78.60	-	-	74 (74.00)	26 (26.00)	100 (100)	13.67	3.42

The estimates presented in Table 4.20.3 clearly showed that 74 per cent of total sampled non-beneficiary farmers purchased seed for selected pulse crops from private dealers and the remaining 26 per cent of them purchased the same from cooperative societies. The average quantity of seed purchased by these non-beneficiary farmers turned out to be 19 kg with gram and tur crop put together, which was priced at Rs.78.10/kg. The average distance between farm and place of purchase of seed for these non-beneficiaries was estimated at 13.67 kms with an average transportation cost estimated at Rs.3.42/kg of seed.

4.4.3 Marketing Channels used for Selling Pulses

It is to be further noted that although there could be several channels through which pulse crops might move from producers to consumers, the sampled beneficiary farmers were seen to sell their pulse crop produce only to wholesalers at APMC market

yard. The estimates relating to the proportion of pulse output diverted by sampled beneficiaries through various marketing channels are provided in Table 4.21. Similar estimates for beneficiary farmers drawn from the districts of Ahmednagar and Yavatmal are shown in Appendix 60.

The estimates presented in Table 4.21 clearly showed that all the sampled beneficiary farmers sold their gram and tur crop produce in the APMC wholesale market. In general, the proportion of output sold in the wholesale market by beneficiary farmers was estimated at 84 per cent for gram crop and 88 per cent for tur crop with an overall average of 86 per cent for both the crops put together. Thus, the proportion of output sold by beneficiary farmers was slightly higher for tur as against gram crop.

Table 4.21: Marketing Channels through which Pulses Sold by the Selected Households (Percent of output) – Beneficiary Farmers

Farm Size	Wholesale market	Local market	Village directly	Co-operative	Government agencies	Intermediaries at farm gate	Merchant Or pre-arranged Contract	Others	Aggregate
Ahmednagar Beneficiary – Gram (Bengal Gram)									
Marginal	82.10	-	-	-	-	-	-	-	82.10
Small	83.91	-	-	-	-	-	-	-	83.91
Medium	83.33	-	-	-	-	-	-	-	83.33
Large	86.17	-	-	-	-	-	-	-	86.17
Total	83.63	-	-	-	-	-	-	-	83.63
Yavatmal Beneficiary – Tur (Red gram)									
Marginal	80.69	-	-	-	-	-	-	-	80.69
Small	89.83	-	-	-	-	-	-	-	89.83
Medium	85.33	-	-	-	-	-	-	-	85.33
Large	86.86	-	-	-	-	-	-	-	86.86
Total	87.50	-	-	-	-	-	-	-	87.50
Overall Beneficiary – Gram and Tur									
Marginal	81.46	-	-	-	-	-	-	-	81.46
Small	87.84	-	-	-	-	-	-	-	87.84
Medium	84.26	-	-	-	-	-	-	-	84.26
Large	86.56	-	-	-	-	-	-	-	86.56
Total	85.86	-	-	-	-	-	-	-	85.86

The non-beneficiary farmers also sold their pulse crop only in the wholesale market and did not use any other marketing channel available to them for the same. The estimates with respect to the output of pulse crops sold by non-beneficiary farmers through various marketing channels are brought out in Table 4.22. Similar estimates for non-beneficiary farmers drawn from the districts of Ahmednagar and Yavatmal are also shown in Appendix 60.

It could be readily discerned from Table 4.22 that the non-beneficiary farmers also sold their gram and tur crop produce in the APMC wholesale market. The average proportion of output sold by the non-beneficiary farmers in the wholesale market was

worked out at 88 per cent for gram crop and 91 per cent for tur crop with an overall average of 89 per cent for both the crops put together. Thus, the proportion of output sold by non-beneficiary farmers was also slightly higher for tur as against gram crop.

Table 4.22: Marketing Channels through which Pulses Sold by the Selected Households (Percent of output) – Non-Beneficiary Farmers

Farm Size	Wholesale market	Local market	Village directly	Co-operative	Government agencies	Intermediaries at farm gate	Merchant Or pre-arranged Contract	Others	Aggregate
Ahmednagar Non-Beneficiary– Gram (Bengal Gram)									
Marginal	85.00	-	-	-	-	-	-	-	85.00
Small	89.29	-	-	-	-	-	-	-	89.29
Medium	85.50	-	-	-	-	-	-	-	85.50
Large	90.00	-	-	-	-	-	-	-	90.00
Total	88.16	-	-	-	-	-	-	-	88.16
Yavatmal Non Beneficiary– Tur (Red gram)									
Marginal	86.76	-	-	-	-	-	-	-	86.76
Small	90.07	-	-	-	-	-	-	-	90.07
Medium	89.36	-	-	-	-	-	-	-	89.36
Large	92.04	-	-	-	-	-	-	-	92.04
Total	90.67	-	-	-	-	-	-	-	90.67
Overall Non Beneficiary– Gram and Tur									
Marginal	85.45	-	-	-	-	-	-	-	85.45
Small	89.69	-	-	-	-	-	-	-	89.69
Medium	87.11	-	-	-	-	-	-	-	87.11
Large	91.27	-	-	-	-	-	-	-	91.27
Total	89.44	-	-	-	-	-	-	-	89.44

Thus, the foregoing estimates clearly showed that both beneficiary and non-beneficiary farmers sold their pulse crop produce only in APMC wholesale market and did not use any other marketing channel available to them for the same with the proportion of output being marketed by them estimated at 86 per cent for both gram and tur crops put together in case of beneficiary farmers and 89 per cent of the same for non-beneficiary farmers. The beneficiary farmers sold marginally lower proportion of pulse output in the wholesale market as against non-beneficiary farmers since beneficiaries retained some quantity of pulse output to use it as seed in future.

4.5 Awareness about the Scheme

There are several possible ways through which information regarding seed minikits for pulses can be disseminated among farmers, and important among these encompass: agricultural officer, farmer facilitator, fellow farmers, print and visual media, wall writing, KVK officials, agricultural university, etc. The responses of various categories of beneficiary farmers in terms of their awareness about the seed minikits for pulse crops are brought out in Table 4.23. The responses in this respect of all the sampled

gram and tur cultivating beneficiary farmers drawn from the districts of Ahmednagar and Yavatmal with overall scenario of the same are shown in Appendix 61.

Appendix 4.23: Awareness of Distribution of Seed Minikit (%) – Beneficiary Farmers

Source	Marginal	Small	Medium	Large	Total
Agriculture Officer (RSK)	60.00	82.00	59.46	50.00	70.00
Farmer Facilitator	-	-	-	-	-
Fellow Farmer	40.00	18.00	40.54	50.00	30.00
Print & Visual media	-	-	-	-	-
Wall writing	-	-	-	-	-
KVK official	-	-	-	-	-
Agricultural University	-	-	-	-	-
Others	-	-	-	-	-
Overall Beneficiary	100.00	100.00	100.00	100.00	100.00

Although there are multiple sources to make farmers aware about the seed minikits scheme for pulses, the sampled beneficiary farmers mainly acquired information about the scheme either from agricultural officer of the concerned department or from fellow beneficiary farmers. As much as 70 per cent of sampled beneficiary farmers acquired information regarding seed minikits scheme for pulse crops from the agricultural officer whereas the remaining 30 per cent depended on fellow farmers to receive such information. While the small category of beneficiaries chiefly depended on agricultural officer, fellow farmers and agricultural officer became the major source of information about seed minikits for large category of beneficiary farmers.

4.6 Farmers Perceptions about Seed Minikits

This section mainly analyses beneficiary producer farmers' response with respect to the cultivation of various pulses crops, reasons for their cultivation, problems in their cultivation and suggested remedial measures with respect to their cultivation. Analysis of responses of farmers with respect to various queries raised in terms of the cultivation of pulses crops is essential to judge the effectiveness/impact of seed minikits programme on farming community with a view to augment pulses production to meet ever-growing demand for these crops from both urban and rural population of India.

4.6.1 Farmers Opinion regarding Distribution of Seed Minikit

At the time of survey, the sampled beneficiary farmers were asked to indicate the reasons that weighed in favour of distribution of seed minikits which helped them in cultivation of pulse crops. The perceptions with respect to effectiveness of seed minikits were recorded and analysed, and these perceptions for the sampled beneficiary farmers are presented in Table 4.24.1. The perceptions in this respect for all the sampled gram

and tur cultivating beneficiary farmers drawn from the districts of Ahmednagar and Yavatmal are shown in Appendix 62.

Table 4.24.1: Farmers Opinion regarding Distribution of Seed Minikit for the Reference Year – Beneficiary

Opinion		Marginal	Small	Medium	Large	Total
1. Is seed minikit distribution advantageous?	Yes	41 (91.11)	92 (92.00)	34 (91.89)	16 (88.89)	183 (91.5)
	No	4 (8.89)	8 (8.00)	3 (8.11)	2 (11.11)	17 (8.50)
	Total	45 (100.00)	100 (100.00)	37 (100.00)	18 (100.00)	200 (100.00)
	1	28 (62.22)	41 (41.00)	16 (43.24)	8 (44.44)	93 (46.50)
	2	3 (6.67)	1 (1.00)	-	1 (5.56)	5 (2.50)
	3	1 (2.22)	5 (5.00)	2 (5.41)	3 (16.67)	11 (5.50)
	4	1 (2.22)	-	-	-	1 (0.50)
	1,2	7 (15.56)	27 (27.00)	7 (18.92)	-	41 (20.50)
	1,2,3	-	4 (4.00)	4 (10.81)	-	8 (4.00)
	1,3	1 (2.22)	13 (13.00)	4 (10.81)	3 (16.67)	21 (10.50)
	2,3	-	1 (1.00)	1 (2.70)	1 (5.56)	3 (1.50)
	No Comments	4 (8.89)	8 (8.00)	3 (8.11)	2 (11.11)	17 (8.50)
	Total	45 (100.00)	100 (100.00)	37 (100.00)	18 (100.00)	200 (100.00)

Code: Yield difference = 1; Quality difference = 2; More profitable = 3; Short duration of crop = 4; Any other = 5

The yield difference in pulse crop production was found to be the major reason that weighed in favour of seed minikit scheme since 47 per cent of sampled beneficiary farmers aired their view in its favour. Another major reason weighing in favour of seed minikit scheme was the combination of yield difference and quality difference since 21 per cent of sampled beneficiary farmers aired their view in favour of this reason for the effectiveness of the scheme. The other reason favouring seed minikit scheme was the combination of yield difference and profitability which was indicated by 11 per cent of beneficiary farmers as the reason for the effectiveness of the scheme. In general, the observations clearly show that yield difference, followed by quality difference and profitability were the major factors which made seed minikits scheme beneficial/ advantageous to them. However, about 9 per cent of sampled beneficiary farmers reserved their comments in terms of effectiveness of seed minikits scheme.

Thus, the majority (about 90 per cent) of sampled beneficiary farmers found seed minikits scheme beneficial/ advantageous to them due to yield difference in pulse crop production, quality difference, profitability and combinations of these factors, which helped them to raise their farm income from pulse crop production.

A further query was also raised before the beneficiary farmers regarding the efficacy of the size of seed minikits for pulse crops. In response to a query on adequacy of size of seed minikit/ quantity of seed contained in seed minikits for gram and tur crop, the sampled beneficiaries aired varied opinion, and these views expressed by them are reported/presented in Table 4.24.2. These responses are also shown in Appendix 63.

While majority of sampled beneficiary farmers were satisfied with the size of seed minikits for gram and tur crops, about 22 per cent of them found the size of minikit insufficient to meet their pulse crop production requirement. In all, 43 sampled beneficiary farmers' aired varied opinion regarding the size/quantity of seed minikits. Among these beneficiary farmers, about 49 per cent of them wanted the size of seed minikits to be of 16 kg for gram crop whereas 26 per cent of them aired their view in favour of 5 kg size of seed minikit for tur crop. The remaining 25 per cent of beneficiaries wanted the size of seed minikits to be of 20-40 kg, especially for gram crop.

Thus, though majority of beneficiaries found the size of seed minikits for pulse crops adequate, about 22 per cent of them were not satisfied with the quantity of seed contained in the kit and they aired varied opinion about the size of seed minikits. While 49 per cent of these beneficiaries wanted the size of seed minikits to be of 16 kg for gram crop, about 26 per cent of them favoured the size of minikit to be of 5 kg size for tur crop, and the remaining 25 per cent wanted the size of the kit of the order of 20-40 kg, especially for gram crop. In general, about 22 per cent of beneficiaries wanted the seed minikits for pulses to contain more quantity of seed, varying from 16 to 40 kg for gram crop and 5 kg for tur crop.

Table 4.24.2: Farmers Opinion regarding Quantity of Seed Supplied in Seed Minikit for the Reference Year

Sufficient in Quantity (%)	Marginal	Small	Medium	Large	Total
Ahmednagar Beneficiary– Gram (Bengal Gram)					
1. Yes	19 (67.86)	26 (61.90)	16 (72.73)	7 (87.50)	68 (68.00)
2. No	9 (32.14)	16 (38.10)	6 (27.27)	1 (12.50)	32 (32.00)
Total	28 (100.00)	42 (100.00)	22 (100.00)	8 (100.00)	100 (100.00)
Opinion –if not Sufficient then how much quantity in kgs should be distributed					
16 Kg	5 (55.56)	11 (68.75)	4 (66.67)	1 (100)	21 (65.63)
20 Kg	-	1 (6.25)	-	-	1 (3.13)
25 Kg	2 (22.22)	1 (6.25)	-	-	3 (9.38)
30 Kg	1 (11.11)	1 (6.25)	1 (16.67)	-	3 (9.38)
40 Kg	1 (11.11)	2 (12.50)	1 (16.67)	-	4 (12.50)
Total	9 (100.00)	16 (100.00)	6 (100.00)	1 (100.00)	32 (100.00)
Yavatmal Beneficiary– Tur (Red gram)					
1. Yes	13 (76.47)	51 (87.93)	15 (100.00)	10 (100.00)	89 (89.00)
2. No	4 (23.53)	7 (12.07)	-	-	11 (11.00)
Total	17 (100.00)	58 (100.00)	15 (100.00)	10 (100.00)	100 (100.00)
Opinion –if not Sufficient then how much quantity in kgs should be distributed					
5 Kg	4 (100.00)	7 (100.00)	-	-	11 (100.00)
Total	4 (100.00)	7 (100.00)	-	-	11 (100.00)
Overall Beneficiary– Gram and Tur					
1. Yes	32 (71.11)	77 (77.00)	31 (83.78)	17 (94.44)	157 (78.50)
2. No	13 (28.89)	23 (23.00)	6 (16.22)	1 (5.56)	43 (21.50)
Total	45 (100.00)	100 (100.00)	37 (100.00)	18 (100.00)	200 (100.00)
Opinion –if not Sufficient then how much quantity in kgs should be distributed					
5 Kg	4 (30.78)	7 (30.42)	-	-	11 (25.57)
16 Kg	5 (38.46)	11 (47.83)	4 (66.67)	1 (100.00)	21 (48.84)
20 Kg	-	1 (4.35)	-	-	1 (2.33)
25 Kg	2 (15.38)	1 (4.35)	-	-	3 (6.98)
30 Kg	1 (7.69)	1 (4.35)	1 (16.67)	-	3 (6.98)
40 Kg	1 (7.69)	2 (8.70)	1 (16.67)	-	4 (9.30)
Total	13 (100.00)	23 (100.00)	6 (100.00)	1 (100.00)	43 (100.00)

Another query raised in terms of quality of seed supplied in seed minikits received mixed opinion from various beneficiary farmers. The responses of beneficiary farmers regarding quality of seed contained in the minikit are brought out in Table 4.24.3. The detailed responses of beneficiary farmers with respect to quality of seed contained in the minikit for gram and tur crops are presented in Appendix 64.

Table 4.24.3: Farmers Opinion regarding Quality of Seed Supplied in Seed Minikit for the Reference Year

Quality better than seed available in market (%)	**Marginal**	**Small**	**Medium**	**Large**	**Total**
1. Yes	34 (75.56)	84 (84)	32 (86.49)	13 (72.22)	163 (81.5)
2. No	11 (24.44)	16 (16)	5 (13.51)	5 (27.78)	37 (18.5)
Total					
Opinion –Provide reasons					
- Disease occurrence increased	4 (36.36)	-	2 (40)	-	6 (16.22)
- Use of pesticides & insecticides increased	2 (18.18)	3 (18.75)	-	1 (20)	6 (16.22)
- More HYV seeds required	2 (18.18)	7 (43.75)	3 (60)	3 (60)	15 (40.54)
- Drought resistance variety is required	3 (27.27)	6 (37.5)	-	1 (20)	10 (27.03)
Total	11 (100)	16 (100)	5 (100)	5 (100)	37 (100)

About 82 per cent of sampled beneficiary farmers found the quality of seed contained in the minikit to be of much better as against the seed available in the prevailing market whereas the remaining 18 per cent of them aired varied opining in this respect. In all, 37 sampled beneficiary farmers were not satisfied with the quality of seed contained in the minikit, which constituted about 19 per cent of total sampled beneficiaries of seed minikits for pulse crops. The major reasons for their dissatisfaction with the quality of seed contained in the minikit revolved around higher occurrence of disease, resulting in higher use of insecticides and pesticides, lack of rise in yield and lack of draught resistant variety of seed. About 40 per cent of beneficiaries showing dissatisfaction with the quality of seed revealed that the seed contained in the kit did not generate the expected rise in yield as per the prevailing weather conditions whereas 27 of them showed their dissatisfaction for the same due to their lack of draught resistance. The remaining 33 per cent beneficiaries showing dissatisfaction with the quality of seed opined that there was rise in occurrence of disease with the use of seed contained in the kit, which resulted in rise in use of insecticides and pesticides.

Thus, while majority of beneficiaries were satisfied with the quality of seed, about 19 per cent of them aired varied reasons for their dissatisfaction with respect to quality of seed contained in the kit, which mainly revolved around higher occurrence of disease, resulting in higher use of insecticides and pesticides, lack of expected rise in yield as per the prevailing weather conditions, and lack of their draught resistance.

The beneficiaries were also asked to air their view in terms of timeliness of distribution of seed minikits, and their opinions in this respect are presented in Table 4.24.4. The responses of all the beneficiary farmers with respect to timeliness of distribution of seed minikits for gram and tur crops are brought out in Appendix 65.

Table 4.24.4: Farmers Opinion regarding timeliness of distribution of Seed Minikit

Timely distribution of Kit (%)	**Marginal**	**Small**	**Medium**	**Large**	**Total**
1. Yes	41 (91.11)	82 (82.00)	30 (81.08)	14 (77.78)	167 (83.50)
2. No	4 (8.89)	18 (18.00)	7 (18.92)	4 (22.22)	33 (16.50)
Total	45 (100.00)	100 (100.00)	37 (100.00)	18 (100.00)	200 (100.00)
Opinion – If no Provide reasons					
- Higher distance of farm to Grampanchayat supplying information about kit	1 (25.00)	3 (16.67)	1 (14.29)	-	5 (15.15)
- Lack of information about documents required for the kit	2 (50.00)	8 (44.44)	5 (71.43)	3 (75.00)	18 (54.55)
- Information spread about the scheme is very low	1 (25.00)	7 (38.89)	1 (14.29)	1 (25.00)	10 (30.30)
Total	4 (100.00)	18 (100.00)	7 (100.00)	4 (100.00)	33 (100.00)

While 84 per cent of sampled beneficiaries aired their view in favour of timely supply of seed minikits to them by the concerned agency/ department, the remaining 16 per cent of them found some delay in supply of seed minikits to them due to varied reasons. The major reasons for the lack of timely supply of seed minikits to these beneficiary farmers were higher distance of their farm to gram panchayat supplying information about the kit, lack of information regarding documents required for the seed minikit, and lack of spread of information about the scheme. In all, 33 sampled beneficiary farmers found some kind of delay in supplying seed minikits to them. About 55 per cent of these beneficiaries found lack of information about the documents required for the scheme, which caused delay in supplying seed minikits to them whereas 30 per cent of them showed delay in accessing the same due to lack of spread of information about the scheme. The remaining 15 per cent of these beneficiaries opined that there was significant distance between their farm and the gram panchayat supplying information about seed minikits, which caused delay in accessing seed minikits on time. Since these farmers constructed their house on the farm itself, this caused delay in receiving information from gram panchayat.

The foregoing observations clearly underscore that fact that while most of the sampled beneficiaries found timely distribution of seed minikits for pulse crops, about 15 per cent of them found some delay in supplying these kits to them, which was mainly caused by reasons like lack of information about the documents required for the scheme, lack of spread of information about the scheme, and higher distance of farm to gram

panchayat supplying information about the seed minikits scheme. These reasons were instrumental in causing delay in timely supply of seed minikits to them.

4.6.2 Major Issues Faced by Farmers in Availing Seed Minikit

The perceptions of beneficiary farmers were also ascertained with respect to the various issues faced by them in availing seed minikits for pulse crops, and these issues reported by them are presented in Table 4.25. The detailed perceptions of all the gram and tur cultivating beneficiary farmers who faced various issues related to seed minikits are brought out in Appendix 66.

Table 4.25: Major issues faced by farmers in availing the Seed Minikit (%)

Issues	Marginal	Small	Medium	Large	Total
Provision of seed minikits to all farmers instead of some selected farmers	1 (2.22)	3 (3.00)	1 (2.70)	2 (11.11)	7 (3.50)
Seed supplied is inadequate		5 (5.00)	3 (8.11)		8 (4.00)
Lack of creation of awareness about minikit	34 (75.56)	83 (83.00)	31 (83.78)	14 (77.78)	162 (81.00)
No Comments	3 (6.67)	6 (6.00)	2 (5.41)	2 (11.11)	13 (6.50)
No Problem	7 (15.56)	3 (3.00)	-	-	10 (5.00)
Total	45 (100.00)	100 (100.00)	37 (100.00)	18 (100.00)	200 (100.00)

The lack of creation of awareness about the benefits of seed minikits scheme was found to be the major issue faced by majority of beneficiary farmers. The other issues faced by these beneficiaries were inadequate supply of seed in the kit and lack of coverage of beneficiary farmers under the scheme. It is to be noted that while about 12 per cent of total sampled beneficiaries did not report any issue related to seed minikits and reserved their comments in this respect, 80 per cent of them found lack of creation of awareness about the benefits of seed minikit as the major issue faced by them. About 4 per cent of these beneficiaries wanted wider coverage of seed minikit scheme and inclusion of all the pulse growing farmers under the scheme. Another 4 per cent of these beneficiaries were not satisfied with the quantity of seed contained in the kit and they wanted the size of the kit to be expanded in order to minimize their dependence on purchase of seed from other agencies.

Thus, the major issues faced by beneficiaries revolved around lack of creation of awareness among farmers about the benefits of seed minikits scheme, inadequate supply of seed in the kit and lack of coverage of beneficiary farmers under the scheme. The beneficiaries not only wanted much wider coverage of seed minikit scheme and inclusion of all the pulse growing farmers under the scheme but also more quantity of seed in the kit to minimize their dependence on purchase of seed from other agencies, apart from better creation of awareness among farmers about the benefits of the scheme.

4.6.3 Major Problems Faced by Farmers in Availing Seed Minikit

Although majority of beneficiary farmers did not face any problem in availing the facility of seed minikits for pulse crops, a section of them aired their opinion regarding the problems faced by them in availing the same, and the perceptions of these beneficiaries in this respect are presented in Table 4.26. The perceptions of all the sampled gram and tur cultivating beneficiary farmers with respect to problems faced by them in availing seed minikits are brought out in Appendix 67.

Table 26: Major Problems Faced by Farmers in Availing the Seed Minikit (%)

Problems	Marginal	Small	Medium	Large	Total
Lack of creation of awareness among farmers	1 (2.22)	2 (2.00)	-	1 (5.56)	4 (2.00)
No provision of on farm/ door step delivery of kits	2 (4.44)	1 (1.00)	1 (2.70)	2 (11.11)	6 (3.00)
Many documents demanded to avail kits	-	3 (3.00)	-	-	3 (1.50)
Random selection/ distribution of kits	5 (11.11)	10 (10.00)	3 (8.11)	2 (11.11)	20 (10.00)
No Problem	37 (82.22)	84 (84.00)	33 (89.19)	13 (72.22)	167 (83.50)
Total	45 (100.00)	100 (100.00)	37 (100.00)	18 (100.00)	200 (100.00)

While 84 per cent of beneficiary farmers did not report any problem faced by them in availing seed minikits, the remaining 16 per cent of them aired their own view in terms of problems faced by them in availing the facility and these problems encompassed: (a) lack of creation of awareness among farmers about the scheme, (b) non-availability of provision of on-farm/ door step delivery of kits, (c) large number of documents required for availing the facility, and (d) random selection/ distribution of kits among farmers. Among these problems, random selection of farmers for the distribution of seed minikits was found to be the major problem faced by the beneficiaries, followed by non-availability of provision of on-farm/ door step delivery of kits. The lack of creation of awareness about the scheme and large number of submission of documents required for availing the facility were the other problems cited/faced by some of the sampled beneficiaries of seed minikits.

Thus, the foregoing observations revealed that while majority of the beneficiary farmers did not report any problem faced by them in availing the facility of seed minikits, some among them aired their own perceptions regarding the problems faced by them in availing such facility, and these problems encompassed lack of creation of awareness among farmers about the scheme, non-availability of provision of on-farm/ door step delivery of kits, large number of submission of documents required for availing the facility, and random selection of farmers for the distribution of seed minikits.

4.6.4 Measures to Improve the Effectiveness of the Scheme

An effort was also made to ascertain the responses of beneficiary farmers regarding various measures to improve the effectiveness of the seed minikits scheme for pulse crops. The reported responses of beneficiary farmers regarding initiation of various measures to improve the effectiveness of the seed minikits scheme are presented in Table 4.27. The reported responses of all the sampled gram and tur cultivating beneficiary farmers with respect to suggested measures to improve the effectiveness of the seed minikits scheme are shown in Appendix 68.

Although 30 per cent of beneficiary farmers reserved their opinion regarding measures to improve the effectiveness of seed minikits scheme, the remaining 70 of these beneficiaries were found to suggest a number of measures to make the scheme more effective and these measures encompassed: (a) creation of awareness about the scheme through pamphlet, hoarding, etc., (b) rise in market/ support prices for pulses, (c) supplying of seed varieties suitable for local condition, (d) need for conducting of workshop/ training programme for proper guidance about usage of minikits, (e) provision of fertilizer, pesticides, etc. along with minikit at subsidized rates, (f) provision of seed suitable for early and late sowing of crops, and (g) wider coverage/distribution of seed minikits – inclusion of all the farmers.

Table 27: Measures to Improve the Effectiveness of the Scheme (%)

Measures	Marginal	Small	Medium	Large	Total
Awareness should be created about scheme through pamphlet, hoarding, etc.	4 (8.89)	7 (7.07)	3 (7.89)	1 (5.56)	15 (7.50)
The market/ support price for pulses should increase	6 (13.33)	15 (15.15)	4 (10.53)	1 (5.56)	26 (13.00)
Supply the variety of the seed suitable for local conditions	1 (2.22)	3 (3.03)	2 (5.26)	3 (16.67)	9 (4.50)
Need to conduct workshop/ training programme for proper guidance about usage of minikit	-	-	2 (5.26)	-	2 (1.00)
Provision of fertilizer, pesticides, etc. along with minikit at subsidized rates	3 (6.67)	10 (10.10)	6 (15.79)	5 (27.78)	24 (12.00)
Provision of seed suitable for early and late sowing of crops	14 (31.11)	28 (28.28)	13 (34.21)	6 (33.33)	61 (30.50)
Wider coverage/distribution of seed minikits – inclusion of all the farmers	1 (2.22)	2 (2.02)	-	-	3 (1.50)
No Comments	15 (33.33)	31 (31.31)	8 (21.05)	2 (11.11)	56 (28.00)
No Problem	1 (2.22)	3 (3.03)	-	-	4 (2.00)
Total	45 (100.00)	99 (100.00)	38 (100.00)	18 (100.0)	200 (100.00)

Among various measures suggested to make the seed minikits scheme more effective, the most favoured measure was found to be provision of seeds which suits early and late sowing of pulse crops as per local weather conditions, followed by provision of fertilizer, insecticides, etc along with seed minikits at subsidized rates, rise in market/

support prices for pulse crops, creation of awareness about the scheme through pamphlet, hoarding, etc., and supply of seed varieties suitable for local conditions.

Thus, the beneficiaries of seed minikits came forward with a number of suggestions in order to improve the effectiveness of the scheme, which mainly encompassed creation of better awareness about the scheme through pamphlet, hoarding, etc., provision of seeds suitable for early and late sowing of pulse crops as per local weather conditions, provision of fertilizer, insecticides, etc along with seed minikits at subsidized rates, rise in market/ support prices for pulse crops, supplying of seed varieties suitable for local condition, conducting of workshop/ training programme for proper guidance about usage of minikits, and wider coverage/distribution of seed minikits – inclusion of all the farmers.

4.6.5 Farmers Suggestions to Improve Reach of the Scheme

The beneficiaries were finally asked to extend various suggestions to improve the out reach of seed minikits scheme, and the suggestions extended by them in this respect are brought out in Table 4.28. The extended suggestions of all the sampled gram and tur cultivating beneficiary farmers with respect to improving the out reach of seed minikits scheme are presented in Appendix 69.

In order to augment the out reach of seed minikits scheme, the sampled beneficiaries aired their own suggestions, which included: (a) creation of more awareness about the scheme through various means, (b) distribution of seed minikits to all pulse growing farmers, (c) appointment of more skilled and trained agril. officer/ assistants for proper dissemination of information about the kit, (d) provision of seed varieties as per soil and weather conditions, (e) provision of seed minikits for other crops in addition to pulses, (f) provision of higher quantity of seed in minikit, i.e. increase in size of minikit, (g) rise in market/ support prices for pulse crops, and (h) need for demonstration before distributing the Seed minikits.

Through their suggestions, the majority of beneficiaries aired their view in favour of arranging demonstrations before the distribution of seed minikits, especially to make the farmers aware about content of the kit, standard package of practice to be followed, use of kit under varied soil type and weather conditions, etc. A significant number of beneficiaries also favoured creation of more awareness about the scheme through various means such as pamphlets, hoardings, agriculture extension experts, government offices, etc. Another important suggestion of beneficiary farmers to improve out reach of the scheme was with respect to inclusion of all the pulse growing farmers under the scheme

instead of some select farmers/ random selection. The beneficiaries also extended several other suggestions to improve the out reach of scheme, which encompassed provision of seed varieties in the minikits as per local soil and weather conditions, appointment of more skilled and trained agricultural extension experts to explain in intricacies of cultivation practices using seed contained in the kit, provision of seed minikits for other crops apart from pulses, and a rise in size of seed minikits for pulse crops.

Table 4.28: Farmers Suggestions to Improve the Reach of the Scheme (%)

Suggestions	Marginal	Small	Medium	Large	Total
Creation of more awareness about the scheme through various means	10 (22.22)	22 (22.00)	9 (24.32)	2 (11.11)	43 (21.5)
Distribution of minikits to all pulse growing farmers	4 (8.89)	11 (11.00)	5 (13.51)	-	20 (10.00)
Appointment of more skilled and trained agril. officer/ assistants for proper dissemination of information	1 (2.22)	-	1 (2.7)	1 (5.56)	3 (1.5)
Provision of seed varieties as per soil and weather conditions	-	5 (5.00)	1 (2.70)	-	6 (3.00)
Provision of seed minikits for other crops in addition to pulses	-	1 (1.00)	1 (2.70)	-	2 (1.00)
Provision of higher quantity of seed in minikit	-	1 (1.00)	1 (2.70)	-	2 (1.00)
Rise in market/ support prices for pulse crops	-	3 (3.00)	-	-	3 (1.50)
Demonstration should be given before distributing the Seed minikit	23 (51.11)	48 (48.00)	16 (43.24)	7 (38.89)	94 (47.00)
No Problem	3 (6.67)	8 (8.00)	-	1 (5.56)	12 (6.00)
No Suggestions	4 (8.89)	1 (1.00)	3 (8.11)	7 (38.89)	15 (7.50)
Total	45 (100.00)	100 (100.00)	37 (100.00)	18 (100.00)	200 (100.00)

The major suggestion of beneficiaries with respect to improving the out reach of seed minikits mainly revolved around arrangement of demonstrations before the distribution of seed minikits for making farmers aware about various aspects of the kit like content, standard cultivation practice, use of kit under varied soil type and weather conditions, etc., creation of more awareness about the scheme through various means such as pamphlets, hoardings, agriculture extension experts, government offices, etc., inclusion of all the pulse growing farmers under the scheme instead of random selection, appointment of more skilled and trained agril. officer/ assistants for proper dissemination of information about the kit, provision of seed varieties as per local soil and weather conditions, provision of seed minikits for other crops in addition to pulses, and provision of higher quantity of seed in minikit, i.e. increase in size of minikit.

4.7 Summary of the Chapter

The estimates showed wide variations in productivity of various kharif, rabi, summer and perennial crops not only for beneficiary but also non-beneficiary farmers, both under irrigated and rainfed conditions. The productivity of crops cultivated under irrigated conditions in general turned out to be higher as against rainfed conditions. The estimates further showed higher productivity of various crops for beneficiary as against

non-beneficiary farmers. Among various crops, pulses in particular showed higher productivity for beneficiary as against non-beneficiary farmers, both under irrigated and rainfed conditions. While the average productivity of tur (red gram) was estimated at 4.24 qtl/acre under irrigated and 4.61 qtl/acre under rainfed condition for beneficiary farmers, the non-beneficiary farmers showed the estimated productivity of the same at 3.90 qtl/acre under irrigated and 4.00 qtl/acre under rainfed condition. Similarly, the average productivity of gram (Bengal) varied from 3.91 qtl/acre under rainfed to 5.28 qtl/acre under irrigation for beneficiaries and from 3.46 qtl/acre under rainfed to 4.42 qtl/acre under irrigated condition for non-beneficiaries. Therefore, the productivity of pulses on farms belonging to beneficiaries in general was higher as against non-beneficiaries.

A comparison of cost and returns estimates clearly showed not only higher per acre value of output but also higher net farm business income from gram and tur crop for beneficiary as against non-beneficiary farmers. On the other hand, non-beneficiary farmers showed lower per acre cost of production of gram and tur crop as against beneficiaries. The proportionately higher value of output in relation to cost of production led to higher farm business income generation for beneficiary farmers. The net farm business income estimated at Rs.14,902 for gram and Rs.14,874 for tur crop in case of beneficiary farmers, and Rs.10,099 for gram and Rs.11,505 for tur crop for non-beneficiary farmers showed 48 per cent higher income from gram and 29 per cent higher income generation from tur crop for beneficiary as against non-beneficiary farmers on per acre basis. However, there was not much difference in per household income generation from gram and tur crop since it varied from Rs.24,394 for gram to Rs.22,086 for tur crop for beneficiaries and from Rs.23,972 for gram to Rs.21,039 for tur crop for non-beneficiary farmers. The plausible reason for this could be lower area allocation under gram and tur crop by the sampled beneficiary as against non-beneficiary farmers.

The beneficiaries cultivated selected gram and tur crops not only by using seed supplied under SMK scheme but also by purchasing the same from other agencies to meet their requirement. The area, productivity, value of output, cost of production and net returns differed significantly with respect to seed used under SMK and without SMK. The beneficiary farmers cultivated only 25 per cent of total area of gram and tur crops using seed supplied under SMK scheme and for the remaining area seed was purchased from other agencies. While the average productivity, per acre value of output and cost of production for gram and tur crops were much higher with SMK as against without SMK, the relatively higher value of output in relation to cost of production with SMK as against

non-SMK resulted in much higher per acre average net returns from the selected pulse crops with SMK as against non-SMK. The average per acre net returns estimated at Rs.15,431 with SMK and Rs.14,626 without SMK for gram crop revealed that the beneficiaries generated 6 per cent higher net returns from gram crop with SMK as against without SMK. Similarly, average per acre net returns estimated at Rs.18,885 with SMK and Rs.12,608 without SMK for tur crop showed that these farmers generated 50 per cent higher net returns from tur crop with SMK as against without SMK. In general, beneficiaries earned 25 per cent higher per acre net returns from the selected pulse crops with SMK as against without SMK. However, though, in general, there was not much difference in average output prices of selected pulse crops with and without SMK, the average price of tur turned out to be higher without SMK as against SMK owing to the difference in colour of tur crop, which stood at white for SMK and red for non-SMK.

A comparison of per acre value of output, cost and return estimates between beneficiary and non-beneficiary farmers further revealed that the beneficiaries not only generated 48 per cent higher income from gram and 29 per cent higher income from tur crop but in general 39 higher income from both gram and tur crop put together as against non-beneficiary farmers. Although average per household area allocation under gram and tur crop for beneficiaries was much lower, the productivity of selected pulse crops as well as net prices obtained for these crops was significantly higher for beneficiary farmers as against non-beneficiaries, which resulted in significantly higher per acre value of output and consequently much higher net farm income generation for beneficiary farmers as against non-beneficiary farmers.

The cost of production of selected pulse crops varied significantly for beneficiary and non-beneficiary farmers, which turned out to lower for non-beneficiary as against beneficiary farmers. The aggregate per acre average cost of production of gram and tur crops put together was estimated at Rs.8,443 for beneficiary and Rs.6,431 for non-beneficiary farmers, showing about 30 per cent higher cost of production for beneficiary farmers as against non-beneficiary farmers. Further, the distribution of total cost of production across various cultivation activities showed significantly high share of labour charges, followed by expenses towards land preparation, and harvesting and threshing activities. While labour charges accounted for 57 per cent share in average cost of production of gram and tur crops with SMK and 55 per cent without SMK with an average of 56 per cent share in the same for beneficiary and 42 per cent for non-beneficiary farmers, the share of land preparation in cost of production was found to be

about 22 per cent with SMK and 24 per cent without SMK with an average of 24 per cent for beneficiary and 27 per cent for non-beneficiary farmers. The share of harvesting and threshing activity in average cost of production of gram and tur crop at aggregate level was about 10 per cent with SMK and 8 per cent without SMK with an average of 9 per cent for beneficiary and 10 per cent for non-beneficiary farmers. These estimates clearly showed that activities like labour payment, land preparation, harvesting and threshing almost cornered about 90 per cent share in cost of production of pulse crops for beneficiary and 80 per cent share for non-beneficiary farmers. The non-beneficiaries showed relatively higher share in cost of production of gram and tur crop on account of activities like seed and fertilizer application, plant protection chemicals, bagging, transportation and marketing.

The total human labour allocation during various farming operations in the cultivation of selected pulse crops estimated at 31 man days for beneficiaries and 19 man days for non-beneficiaries showed much lower application labour for non-beneficiary as against beneficiary farmers. The estimates further showed that some of the major activities like harvesting and threshing, land preparation, weeding and plant protection and bagging and transportation put together accounted for 87 per cent share in total human labour for beneficiary and 68 per cent share in the same for non-beneficiary farmers. However, some other activities like irrigation, interculture, sowing, and plant protection accounted for much higher share in total human labour for non-beneficiary as against beneficiary farmers. In general, the human labour allocation showed an increasing trend with the increase in land holding size for non-beneficiary farmers whereas beneficiary farmers did not show any discernable trend in this respect.

The major method of sowing of pulse crops followed by beneficiary and non-beneficiary farmers was noticed to be drilling, followed by line sowing and broadcasting. In general, drilling method of sowing was followed by 50 per cent of beneficiary and 56 per cent of non-beneficiary farmers whereas line sowing turned out to be another method of sowing followed by 30 per cent of beneficiary and 26 per cent of non-beneficiary farmers. About 20 per cent of beneficiary and 18 per cent of non-beneficiaries followed broadcasting method of sowing.

It is to be noted that although there are various agencies involved in the distribution of seed minikits for pulse crops, the sampled beneficiary farmers received seed minikits for pulses from agricultural department. Each of the sampled beneficiary

farmers received only one seed minikit for pulse crops, which contained 4 kg of seed in case of tur crop and 8 kg for gram crop with kit size: tur @ 4 kg and gram @ 8 kg.

The majority of beneficiary farmers availed the facility of seed minikits for pulses by submitting documents like land records and Adhar Card since about 70 per cent of them aired their view in favour of receiving seed minikits by submitting either a combination of land records and Adhar Card or Adhar Card alone

It is to be further noted that about 70 per cent of beneficiary farmers aired their view in favour of receiving seed minikits as they belonged to interested category of farmers, SC/ST category, small/marginal farmer category and BPL farmer category. The remaining 30 per cent of beneficiary farmers aired their view in favour of receiving seed minikits due to various combinations of these criteria. However, the beneficiaries did not provide any information relating to amount paid by them or reimbursed for receiving seed minikits since they received the same free of cost from the concerned agency.

Each of the sampled beneficiary households were found to receive Jackey variety of Bengal gram seed and BDN 711 variety of red gram seed under seed minikits scheme with a kit size of 8 kg of seed for Bengal gram and 4 kg for red gram, which helped them to cultivate 59.25 acres of area under Bengal gram and 58.35 acres under red gram with all beneficiaries put together. Further, the average per beneficiary household output produced was estimated at 3.08 qtl for Bengal gram and 3.13 qtl for red gram using seed variety supplied under seed minikit scheme. About 15 per cent of total output produced through seed varieties received under the scheme was retained, which also contained 5 per cent of the same specifically meant for future use as seed. In general, average per household output produced, retained and kept as seed using seed varieties of pulses received under the scheme and subsequently cultivated on farms increased with the increase in land size of beneficiary farmers.

Majority of sampled beneficiary farmers aired their view in favour of receiving seed minikits for pulses which contained 100 grams of Rhizobium Culture with few of them also airing opinion in favour of kit containing PSB culture of 100 grams, and PSB and Rhizobium. The average quantity of seed received by the beneficiary farmers was estimated at 6 kg with gram and tur crop put together. The average distance between farm and place of procurement of seed minikits for beneficiaries turned out to be 12.90 kms with average transportation cost in procuring the same estimated at Rs.12.80 per kit for each beneficiary. It is to be noted that about 27 per cent of total beneficiaries of seed minikits also purchased seed from other agencies like private dealers and cooperative

society with the average quantity of seed purchased by them estimated at 17 kg at a price Rs.72.10/kg. The average distance traveled by them to procure the same was worked out at 10.89 kms with an average transportation cost estimated at Rs.2.69/kg of seed.

It is to be further noted that all the sampled non- beneficiary farmers purchased seed from various agencies like private dealers and cooperative society with the average quantity of seed purchased by them estimated at 19 kg at a price Rs.78.10/kg. The average distance traveled by them to procure the same was worked out at 13.67 kms with an average transportation cost estimated at Rs.3.42/kg of seed.

Although there are multiple sources to make farmers aware about the seed minikits scheme for pulses, the sampled beneficiary farmers mainly acquired information about the scheme either from agricultural officer of the concerned department or from fellow beneficiary farmers.

About 90 per cent of sampled beneficiary farmers found seed minikits scheme beneficial/ advantageous to them due to yield difference in pulse crop production, quality difference, profitability and combinations of these factors, which helped them to raise their farm income from pulse crop production.

Though majority of beneficiaries found the size of seed minikits for pulse crops adequate, about 22 per cent of them were not satisfied with the quantity of seed contained in the kit and they aired varied opinion about the size of seed minikits. While 49 per cent of these beneficiaries wanted the size of seed minikits to be of 16 kg for gram crop, about 26 per cent of them favoured the size of minikit to be of 5 kg size for tur crop, and the remaining 25 per cent wanted the size of the kit of the order of 20-40 kg, especially for gram crop. About 22 per cent of beneficiaries wanted the seed minikits for pulses to contain more quantity of seed, varying from 16 to 40 kg for gram crop and 5 kg for tur crop. Further, while majority of beneficiaries were satisfied with the quality of seed, about 19 per cent of them aired varied reasons for their dissatisfaction with respect to quality of seed contained in the kit, which mainly revolved around higher occurrence of disease, resulting in higher use of insecticides and pesticides, lack of expected rise in yield as per the prevailing weather conditions, and lack of their draught resistance. Most of the sampled beneficiaries found timely distribution of seed minikits for pulse crops. However, about 15 per cent of beneficiaries found some delay in supplying these kits to them, which was mainly caused by reasons like lack of information about the documents required for the scheme, lack of spread of information about the scheme, and higher distance of farm to gram panchayat supplying information about the scheme.

The major issues faced by beneficiaries revolved around lack of creation of awareness among farmers about the benefits of seed minikits scheme, inadequate supply of seed in the kit and lack of coverage of beneficiary farmers under the scheme. The beneficiaries not only wanted much wider coverage of seed minikit scheme and inclusion of all the pulse growing farmers under the scheme but also more quantity of seed in the kit to minimize their dependence on purchase of seed from other agencies, apart from better creation of awareness among farmers about the benefits of the scheme.

Although majority of the beneficiary farmers did not report any problem faced by them in availing the facility of seed minikits, some among them aired their own perceptions regarding the problems faced by them in availing such facility, and these problems encompassed lack of creation of awareness among farmers about the scheme, non-availability of provision of on-farm/ door step delivery of kits, large number of submission of documents required for availing the facility, and random selection of farmers for the distribution of seed minikits.

The beneficiaries of seed minikits came forward with a number of suggestions in order to improve the effectiveness of the scheme, which mainly encompassed creation of better awareness about the scheme through pamphlet, hoarding, etc., provision of seeds suitable for early and late sowing of pulse crops as per local weather conditions, provision fertilizer, insecticides, etc along with seed minikits at subsidized rates, rise in market/ support prices for pulse crops, supplying of seed varieties suitable for local condition, conducting of training programme for proper guidance about usage of minikits, and wider coverage/distribution of seed minikits – inclusion of all the farmers.

The major suggestion of beneficiaries with respect to improving the out reach of seed minikits mainly revolved around arrangement of demonstrations before the distribution of seed minikits for making farmers aware about various aspects of the kit like content, standard cultivation practice, use of kit under varied soil type and weather conditions, etc., creation of more awareness about the scheme through various means such as pamphlets, hoardings, agriculture extension experts, government offices, etc., inclusion of all the pulse growing farmers under the scheme instead of random selection, appointment of more skilled and trained agril. officer/ assistants for proper dissemination of information about the kit, provision of seed varieties as per local soil and weather conditions, provision of seed minikits for other crops in addition to pulses, and provision of higher quantity of seed in minikit, i.e. increase in size of minikit.

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CHAPTER – V

SUMMARY OF MAIN FINDINGS, CONCLUSION AND POLICY SUGGESTIONS

5.1 Main Findings

The major findings mainly revolve around district-wise distribution of seed minikits for various pulse crops in Maharashtra, underlying growth trends in area, production and productivity of various important crops cultivated in the state with focus on various pulses crops and trends in various other quantitative parameters of agricultural sector of the State, socio-economic characteristics, cropping pattern, land utilization pattern, irrigation status, etc. of beneficiary and non-beneficiary farmers of seed minikits scheme for pulse crops, comparison of productivity of various crops cultivated across various seasons under irrigation and unirrigated conditions between beneficiary and non-beneficiary farmers, evaluation of profitability of various crops with focus on pulse crops, assessment of efficiency of distribution of seed minikits and its usage by beneficiary farmers; their awareness and perceptions regarding seed minikits, assessment of various other relevant and related aspects viz. documents required for availing seed minikits, criteria of farmer selection, details of seed minikits provided for pulse crops, content of the seed minikits and sources of purchase, quantity of pulses marketed through various channels, farmers opinion regarding distribution of seed minikits, both in qualitative and quantitative terms, timeliness of distribution, major issues and problems faced by farmers, measures to improve effectiveness of the scheme, etc.

5.1.1 Distribution of Seed Minikits in Maharashtra

The seed minikits in Maharashtra were mainly distributed for various pulse crops such as red gram, Bengal gram and green gram. The estimates showed that the highest number of seed minikits for red gram during the reference year 2017-18 was distributed in the district of Yavatmal of Maharashtra. Similarly, the highest number of seed minikits for Bengal gram during the reference year 2017-18 was distributed in the district of Ahmednagar of Maharashtra. Therefore, these two districts of Maharashtra were selected for the present investigation to assess the effectiveness of seed minikits scheme in augmenting income levels beneficiary farmers.

5.1.2 Status of Pulse Production in Maharashtra

The state of Maharashtra is the second largest producer of pulses in India with 2.6 million tonnes of production and 3.8 million hectares of area under its cultivation. Pulse

crops are chiefly cultivated in various districts belonging to Vidarbha and Marathwada regions of Maharashtra under rainfed/unirrigated conditions, and these districts show considerable yield gaps in pulse crops. Pulse crops are also grown under irrigated conditions in Western Maharashtra. The estimates showed a steady increase in production of pulses in Maharashtra over time mainly due to expansion in yield levels of these crops since area under pulse crops in the state has not increased significantly. Among various pulse crops cultivated in Maharashtra, gram or Bengal gram/ Chickpea and tur or red gram/ pigeon pea have shown dramatic increase in their production during the last three decades. However, black gram and green gram in Maharashtra have not only shown decline in production but also fall in area under the crop during the given period of time. Therefore, the increase in pulse production in Maharashtra during the last three decades is chiefly accounted for by substantial increase in production of Bengal gram and Red gram, which in turn is due to significant rise in their area as well productivity during this period.

5.1.3 Area, Production and Yield of Pulses

An analysis with respect to changes in area, production and yield of various pulse crops over time revealed several interesting observations. The state of Maharashtra showed an increase in pulse cropped area from 35.48 lakh hectares to 37.72 lakh hectares and production expansion from 19.88 lakh MT to 25.66 lakh MT during the period between TE 2006-07 and TE 2016-17. The increase in area and production of pulse crops was chiefly due to significant increase in area and production of red and Bengal gram in the face of decline in area and production of black and green gram during the same period. The major districts of cultivating various pulse crops mainly belonged to rainfed regions of Vidarbha and Marathwada regions and to some extent irrigated region of Western Maharashtra. These districts accounted for about 85 per cent area and production of red gram and 75-80 per cent area and production of Bengal gram of the state during the last one decade. However, the state of Maharashtra showed about 40 per cent decline in area 45 per cent fall in production of black gram, and about 36 per cent decline in area as well as production of green gram during the last one decade. Unlike fall in area and production of black and green gram, there was 18 per cent rise in area and 27 per cent increase in production of red gram in Maharashtra during the last one decade. Similarly, Bengal gram in Maharashtra showed about 52 per cent rise in area and 82 per cent increase in production during the same period. Consequently, there was overall expansion in production of pulses in Maharashtra, which was caused not only on account of rise in area but also due to significant rise in yield of red and Bengal gram in the state.

5.1.4 Socio-economic Characteristics of Farmers

The demographic profile showed that the average family size of sampled farmers was 5.01 which comprised of 3.12 members of family doing farming. The sampled farmers also showed about 27 years of experience in farming. The estimates also revealed that more than 68 per cent of farmers attained education up to middle level and above with proportion of graduate and above being 14 per cent. The caste profile showed significantly higher proportion of farmers belonging to OBC and ST category with 42 per cent of them belonging to OBC and 28 per cent to ST category. All the respondents also showed agriculture and allied activity as their main occupation. However, about 15 per cent of sampled farmers showed various other activities as their subsidiary occupation, which encompassed 5 per cent of them showing salary/pension as their subsidiary source of income and another 5 per cent of them showing self business/services activity as their subsidiary source of income. The estimates also showed increasing average annual income of selected farmers with the increase in their land holding size.

5.1.5 Characteristics of Operational Holding

The average net operated, irrigated and gross cropped area of farmers was estimated at 5.61 acres, 3.51 acres and 7.44 acres, respectively, which increased with the increase in their land holding size. Although the sampled farmers did not show any leased- out land and showed very marginal presence of leased-in land, medium and large categories, in particular, showed higher uncultivated area. The estimates also showed that about 63 per cent of the net operated area of farmers was irrigated. The average intensity of cropping of sampled farmers was estimated at 133 per cent, which was higher for marginal and medium category as against small and large category. In general, the proportion of net operated area under irrigation was higher for large category of farmers.

5.1.6 Sources of Irrigation

As for sources of irrigation, dug well, bore well and a combination dug and bore well irrigation system dominated on the farms belonging to sampled farmers. The sampled farmers showed river lift and farm pond as the other major sources of irrigation. Further, none of the sampled farmers showed area under canal irrigation with the sole exception of marginal category of farmers. The estimates also showed higher proportion of total operated area as rainfed for the small and medium categories of sampled farmers.

5.1.7 Cropping Pattern

The scenario obtaining in terms of cropping pattern revealed that majority of sampled farmers were found to cultivate various crops under irrigated as against

unirrigated conditions since various crops cultivated by them under irrigation accounted for about 70 per cent share in the gross cropped area (GCA). In general, the cropping pattern of sampled farmers was seen to be in favour of cultivating tur, bajra, soyabean, cotton, and maize in kharif season and gram, wheat, jowar and onion in rabi season. Various crops like sugarcane, lemon, pomegranate and grapes were cultivated as perennial crops by beneficiary and non-beneficiary farmers. The estimates also showed that various pulse crops like tur, gram, udid, and mung cultivated during kharif and rabi seasons under irrigated and unirrigated conditions accounted for 25.05 per cent share in the gross cropped area for sampled farmers. Among various pulse crops, gram and tur accounted for the major share in GCA. The estimates further showed that sugarcane was cultivated as perennial crop and groundnut as summer crop by sampled farmers.

5.1.8 Production, Cost and Returns by Farm Size

The average category of farmers showed 27.04 qtl/acre of crop production at aggregate level with all the crops put together. Although per acre net farm business income at aggregate level was estimated at Rs.19,686, it varied from Rs.17,467 for large category to Rs.22,883 for the small category of farmers. However, the gross and net farm income of farmers from the net operated area on per household basis with all crops put together increased with the increase in their land holding size, which was estimated at Rs.1,68,990 and Rs.1,10,536, respectively, for the average category of farmers. The disaggregated estimates of crop production for sampled farmers showed large variations across seasons, which varied from 5.24 qtl/acre for summer crops to 315.62 qtl/acre for perennial crops. Similarly, the sampled farmers also showed large variations in net farm business income on per acre basis, which varied from Rs.12,531 from kharif crops to Rs.1,10,992 from perennial crops. The estimates further revealed that the average aggregate per household farm income generation of farmers from gross cropped area encompassed 38.45 per cent income from kharif crops, 25.17 per cent from rabi, 1.99 per cent from summer and 34.39 per cent income from perennial crops, showing major income generation from kharif crops, followed by perennial, rabi and summer crops.

5.1.9 Productivity Comparison between Beneficiary and Non-Beneficiary

The estimates showed wide variations in productivity of various kharif, rabi, summer and perennial crops not only for beneficiary but also non-beneficiary farmers, both under irrigated and rainfed conditions. The productivity of crops cultivated under irrigated conditions in general turned out to be higher as against rainfed conditions. The estimates further showed higher productivity of various crops for beneficiary as against

non-beneficiary farmers. Among various crops, pulses in particular showed higher productivity for beneficiary as against non-beneficiary farmers, both under irrigated and rainfed conditions. While the average productivity of tur (red gram) was estimated at 4.24 qtl/acre under irrigated and 4.61 qtl/acre under rainfed condition for beneficiary farmers, the non-beneficiary farmers showed the estimated productivity of the same at 3.90 qtl/acre under irrigated and 4.00 qtl/acre under rainfed condition. Similarly, the average productivity of gram (Bengal) varied from 3.91 qtl/acre under rainfed to 5.28 qtl/acre under irrigation for beneficiaries and from 3.46 qtl/acre under rainfed to 4.42 qtl/acre under irrigated condition for non-beneficiaries. Therefore, the productivity of pulses on farms belonging to beneficiaries in general was higher as against non-beneficiaries.

5.1.10 Production Cost Comparison between Beneficiary and Non-Beneficiary

The returns over cash costs incurred during farming operations generally is an indicator of availability of cash at the end of the production period of the crop. In the light of this fact, an attempt was made to analyse the extent of income generation by the selected farming households from various pulse crop production on their farms.

5.1.10.1 Cost and Return Comparison for Pulse Crops

A comparison of cost and returns estimates clearly showed not only higher per acre value of output but also higher net farm business income from gram and tur crop for beneficiary as against non-beneficiary farmers. On the other hand, non-beneficiary farmers showed lower per acre cost of production of gram and tur crop as against beneficiaries. The proportionately higher value of output in relation to cost of production led to higher farm business income generation for beneficiary farmers. The net farm business income estimated at Rs.14,902 for gram and Rs.14,874 for tur crop in case of beneficiary farmers, and Rs.10,099 for gram and Rs.11,505 for tur crop for non-beneficiary farmers showed 48 per cent higher income from gram and 29 per cent higher income generation from tur crop for beneficiary as against non-beneficiary farmers on per acre basis. However, there was not much difference in per household income generation from gram and tur crop since it varied from Rs.24,394 for gram to Rs.22,086 for tur crop for beneficiaries and from Rs.23,972 for gram to Rs.21,039 for tur crop for non-beneficiary farmers. The plausible reason for this could be lower area allocation under gram and tur crop by the beneficiary as against non-beneficiary farmers.

5.1.10.2 Productivity and Net Returns from Pulses with and without SMK

The beneficiary farmers cultivated only 25 per cent of total area of gram and tur crops using seed supplied under SMK scheme and for the remaining area seed was

purchased from other agencies. While the average productivity, per acre value of output and cost of production for gram and tur crops were much higher with SMK as against without SMK, the relatively higher value of output in relation to cost of production with SMK as against non-SMK resulted in much higher per acre average net returns from the selected pulse crops with SMK as against non-SMK. The average per acre net returns estimated at Rs.15,431 with SMK and Rs.14,626 without SMK for gram crop, and Rs.18,885 with SMK and Rs.12,608 without SMK for tur crop revealed that the beneficiaries generated 6 per cent higher net returns from gram crop and 50 per cent from tur crop with SMK as against without SMK. In general, beneficiaries earned 25 per cent higher per acre net returns from the selected pulse crops with SMK as against without SMK. However, though, in general, there was not much difference in average output prices of selected pulses with and without SMK, the average price of tur turned out to be higher without SMK owing to the difference in colour of tur crop, which stood at white for SMK and red for non-SMK.

A comparison of per acre value of output, cost and return estimates between beneficiary and non-beneficiary farmers further revealed that the beneficiaries not only generated 48 per cent higher income from gram and 29 per cent higher income from tur crop but in general 39 higher income from both gram and tur crop put together as against non-beneficiary farmers. Although average per household area allocation under gram and tur crop for beneficiaries was much lower, the productivity of selected pulse crops as well as net prices obtained for these crops stood at much higher for beneficiary farmers, which resulted in significantly higher per acre value of output and consequently much higher net farm income generation for beneficiary farmers as against non-beneficiary farmers.

5.1.10.3 Cost Details for Selected Pulses for Beneficiary and Non-Beneficiary

The cost of production of selected pulse crops varied significantly for beneficiary and non-beneficiary farmers, which turned out to lower for non-beneficiary farmers. The aggregate per acre average cost of production of gram and tur crops put together was estimated at Rs.8,443 for beneficiary and Rs.6,431 for non-beneficiary farmers, showing about 30 per cent higher cost of production for beneficiaries as against non-beneficiary farmers. Further, the distribution of total cost of production across various cultivation activities showed significantly high share of labour charges, followed by expenses towards land preparation, and harvesting and threshing activities. While labour charges accounted for 56 per cent share in average cost of production of gram and tur crops for beneficiary and 42 per cent share in the same for non-beneficiary farmers, the share of

land preparation in cost of production was found to be about 24 per cent for beneficiary and 27 per cent for non-beneficiary farmers. The share of harvesting and threshing activity in average cost of production of gram and tur crop at aggregate level was about 9 per cent for beneficiary and 10 per cent for non-beneficiary farmers. These estimates clearly showed that activities like labour payment, land preparation, harvesting and threshing almost cornered about 90 per cent share in cost of production of pulse crops for beneficiary and 80 per cent share for non-beneficiary farmers. The remaining share in cost of production being accounted for by other activities like seed and fertilizer application, irrigation, bagging, transportation, etc.

5.1.10.4 Use of Human Labour for Pulses

The total human labour allocation during various farming operations in the cultivation of selected pulse crops estimated at 31 man days for beneficiaries and 19 man days for non-beneficiaries showed much lower application labour for non-beneficiary as against beneficiary farmers. The estimates further showed that some of the major activities like harvesting and threshing, land preparation, weeding and plant protection and bagging and transportation put together accounted for 87 per cent share in total human labour for beneficiary and 68 per cent share in the same for non-beneficiary farmers. However, some other activities like irrigation, interculture, sowing, and plant protection accounted for much higher share in total human labour for non-beneficiary as against beneficiary farmers. In general, the human labour allocation showed an increasing trend with the increase in land holding size for non-beneficiary farmers whereas beneficiary farmers did not show any discernable trend in this respect.

5.1.11 Distribution of Seed Minikits– Socio Economic Comparisons

It is to be noted that although there are various agencies involved in the distribution of seed minikits for pulse crops, the sampled beneficiary farmers received seed minikits for pulses from agricultural department. Each of the sampled beneficiary farmers received only one seed minikit for pulse crops, which contained 4 kg of seed in case of tur crop and 8 kg for gram crop with kit size: tur @ 4 kg and gram @ 8 kg.

5.1.11.1 Documents Submitted to Avail Seed Minikit

The majority of beneficiary farmers availed the facility of seed minikits for pulses by submitting documents like land records and Adhar Card since about 70 per cent of them aired their view in favour of receiving seed minikits by submitting either a combination of land records and Adhar Card or Adhar Card alone.

5.1.11.2 Criteria for Farmer Selection

It is to be noted that about 70 per cent of beneficiary farmers aired their view in favour of receiving seed minikits as they belonged to interested category of farmers, SC/ST category, small/marginal farmer category and BPL farmer category. The remaining 30 per cent of beneficiary farmers aired their view in favour of receiving seed minikits due to various combinations of these criteria. However, the beneficiaries did not provide any information relating to amount paid by them or reimbursed for receiving seed minikits since they received the same free of cost from the concerned agency.

5.1.11.3 Details of Seed Minikit Provided for Pulses Crop

Each of the sampled beneficiary households were found to receive Jackey variety of Bengal gram seed and BDN 711 variety of red gram seed under seed minikits scheme with a kit size of 8 kg of seed for Bengal gram and 4 kg for red gram, which helped them to cultivate 59.25 acres of area under Bengal gram and 58.35 acres under red gram with all beneficiaries put together. Further, the average per beneficiary household output produced was estimated at 3.08 qtl for Bengal gram and 3.13 qtl for red gram using seed variety supplied under seed minikit scheme. About 15 per cent of total output produced through seed varieties received under the scheme was retained, which also contained 5 per cent of the same specifically meant for future use as seed. In general, average per household output produced, retained and kept as seed using seed varieties of pulses received under the scheme and subsequently cultivated on farms increased with the increase in land size of beneficiary farmers.

5.1.12 Efficiency in Distribution and Usage of Seed Minikits

The efficiency in distribution of seed minikits was evaluated by gathering information relating to content of seed minikit, quantity and source of purchase of seed minikit, purchase of seed from other sources, channels of marketing of pulses, etc.

5.1.12.1 Content of the Seed Minikit

The majority of sampled beneficiary farmers aired their view in favour of receiving seed minikits for pulses which contained 100 grams of Rhizobium Culture with few of them also airing opinion in favour of kit containing PSB culture of 100 grams, and PSB and Rhizobium.

5.1.12.2 Seed Purchased by Farmers through Seed minikits and Other Sources

The average quantity of seed received by the beneficiary farmers was estimated at 6 kg with gram and tur crop put together. The average distance between farm and place of procurement of seed minikits for beneficiaries turned out to be 12.90 kms with average

transportation cost in procuring the same estimated at Rs.12.80 per kit for each beneficiary. It is to be noted that about 27 per cent of total beneficiaries of seed minikits also purchased seed from other agencies like private dealers and cooperative society with the average quantity of seed purchased by them estimated at 17 kg at a price Rs.72.10/kg. The average distance traveled by them to procure the same was worked out at 10.89 kms with an average transportation cost estimated at Rs.2.69/kg of seed. It is to be further noted that all the sampled non- beneficiary farmers purchased seed from various agencies like private dealers and cooperative society with the average quantity of seed purchased by them estimated at 19 kg at a price Rs.78.10/kg. The average distance traveled by them to procure the same was worked out at 13.67 kms with an average transportation cost estimated at Rs.3.42/kg of seed.

5.1.12.3 Marketing Channels used for Selling Pulses

The estimates showed that both beneficiary and non-beneficiary farmers sold their pulse crop produce only in APMC wholesale market and did not use any other marketing channel available to them for the same with the proportion of output being marketed by them estimated at 86 per cent for both gram and tur crops put together in case of beneficiary farmers and 89 per cent of the same for non-beneficiary farmers. The beneficiary farmers sold marginally lower proportion of pulse output in the wholesale market as against non-beneficiary farmers since beneficiaries retained some quantity of pulse output to use it as seed for future use.

5.1.13 Awareness about the Scheme

Although there are multiple sources to make farmers aware about the seed minikits scheme for pulses, the sampled beneficiary farmers mainly acquired information about the scheme either from agricultural officer of the concerned department or from fellow beneficiary farmers.

5.1.14 Farmers Perceptions about Seed Minikits

The beneficiary producer farmers' response with respect to the cultivation of various pulses crops using seed minikits, reasons for their cultivation, problems in their cultivation and suggested remedial measures with respect to their cultivation are extremely important to improve the effectiveness of the scheme.

5.1.14.1 Farmers Opinion regarding Distribution of Seed Minikit

About 90 per cent of sampled beneficiary farmers found seed minikits scheme beneficial/ advantageous to them due to yield difference in pulse crop production, quality difference, profitability and combinations of these factors, which helped them to raise

their farm income from pulse crop production. Though majority of beneficiaries found the size of seed minikits for pulse crops adequate, about 22 per cent of them were not satisfied with the quantity of seed contained in the kit and they aired varied opinion about the size of seed minikits. While 49 per cent of these beneficiaries wanted the size of seed minikits to be of 16 kg for gram crop, about 26 per cent of them favoured the size of minikit to be of 5 kg size for tur crop, and the remaining 25 per cent wanted the size of the kit of the order of 20-40 kg, especially for gram crop. About 22 per cent of beneficiaries wanted the seed minikits for pulses to contain more quantity of seed, varying from 16 to 40 kg for gram crop and 5 kg for tur crop.

The observations further revealed that while majority of beneficiaries were satisfied with the quality of seed, about 19 per cent of them aired varied reasons for their dissatisfaction with respect to quality of seed contained in the kit, which mainly revolved around higher occurrence of disease, resulting in higher use of insecticides and pesticides, lack of expected rise in yield as per the prevailing weather conditions, and lack of their draught resistance. Most of the beneficiaries found timely distribution of seed minikits for pulse crops. However, about 15 per cent of them found some delay in supplying these kits to them, which was mainly caused by reasons like lack of information about the documents required for the scheme, lack of spread of information about the scheme, and higher distance of farm to gram panchayat supplying information about the scheme.

5.1.14.2 Major Issues Faced by Farmers in Availing Seed Minikit

The major issues faced by beneficiaries revolved around lack of creation of awareness among farmers about the benefits of seed minikits scheme, inadequate supply of seed in the kit and lack of coverage of beneficiary farmers under the scheme. The beneficiaries not only wanted much wider coverage of seed minikit scheme and inclusion of all the pulse growing farmers under the scheme but also more quantity of seed in the kit to minimize their dependence on purchase of seed from other agencies, apart from better creation of awareness among farmers about the benefits of the scheme.

5.1.14.3 Major Problems Faced by Farmers in Availing Seed Minikit

Although majority of the beneficiary farmers did not report any problem faced by them in availing the facility of seed minikits, some among them aired their own perceptions regarding the problems faced by them in availing such facility, and these problems encompassed lack of creation of awareness among farmers about the scheme, non-availability of provision of on-farm/ door step delivery of kits, large number of

submission of documents required for availing the facility, and random selection of farmers for the distribution of seed minikits.

5.1.14.4 Measures to Improve the Effectiveness of the Scheme

The beneficiaries of seed minikits came forward with a number of suggestions in order to improve the effectiveness of the scheme, which mainly encompassed creation of better awareness about the scheme through pamphlet, hoarding, etc., provision of seeds suitable for early and late sowing of pulse crops as per local weather conditions, provision fertilizer, insecticides, etc along with seed minikits at subsidized rates, rise in market/ support prices for pulse crops, supplying of seed varieties suitable for local condition, conducting of training programme for proper guidance about usage of minikits, and wider coverage/distribution of seed minikits – inclusion of all the farmers.

5.1.14.5 Farmers Suggestions to Improve Reach of the Scheme

The major suggestion of beneficiaries with respect to improving the out reach of seed minikits mainly revolved around arrangement of demonstrations before the distribution of seed minikits for making farmers aware about various aspects of the kit like content, standard cultivation practice, use of kit under varied soil type and weather conditions, etc., creation of more awareness about the scheme through various means such as pamphlets, hoardings, agriculture extension experts, government offices, etc., inclusion of all the pulse growing farmers under the scheme instead of random selection, appointment of more skilled and trained agril. officer/ assistants for proper dissemination of information about the kit, provision of seed varieties as per local soil and weather conditions, provision of seed minikits for other crops in addition to pulses, and provision of higher quantity of seed in minikit, i.e. increase in size of minikit.

5.2 Concluding Remarks

The study showed positive impact of seed minikits scheme on pulses crops cultivation in the state of Maharashtra since the element of profit involved in the cultivation of pulses crops was much higher for beneficiary as against the non-beneficiary farmers. The net farm business income estimates showed 48 per cent higher income from Bengal gram and 29 per cent from red gram for beneficiaries as against non-beneficiaries. Not only this, the beneficiaries even showed higher income generation from pulse cropped area under seed minikits scheme (SMK) since they earned 50 per cent higher net returns from selected crops with SMK as against without SMK. The plausible reasons for higher profit margins for beneficiaries in pulses crops cultivation could be traced in higher yield levels, higher prices on offer for pulses, adoption of improved varieties of

seeds in pulses crops cultivation, higher area under improved varieties, higher adoption of recommended practices such as sowing, seed and other practices including adoption of Rhizobium and PSB culture, lower susceptibility of crop with respect to insects, pests and diseases, lower cost of production due to lower material cost as well as lower application human labour towards irrigation, pests and disease control, weeding practices, plant protection, and other cultural practices, better quality of produce, etc.

Although beneficiaries allocated 55 per cent of pulse cropped area under SMK and generated significantly high income from pulse crops cultivation, these farmers faced some major problems in availing facility of seed minikits, which mainly encompassed lack of creation of awareness among farmers about the scheme, non-availability of provision of on-farm/ door step delivery of kits, large number of submission of documents required for availing the facility, and random selection of farmers for the distribution of seed minikits. The other issues faced by farmers in availing seed minikits were inadequate supply of seed in the kit and lack of coverage of beneficiary farmers under the scheme. These farmers wanted to minimize their dependence on purchase of seed from other agencies since seed contained in the kit was not only of much better quality but the kit also contained bio fertilizer and plant nutrients.

5.3 Policy Suggestions

Although a number of suggestions were made in the past to increase pulses production with emphasis on protective irrigation, soil fertility management, improved crop production technique, plant protection measures, and diversification of cropping pattern. However, these strategies and schemes could not yield the desired results in pulses production. The low level of technology adoption in pulses was the major reason for poor performance of pulses crops in the country. However, the initiation of seed minikits scheme would certainly pay rich dividend since the major thrust of this scheme is on increasing seed replacement and the replacement of older varieties by newer ones, and popularization of latest released/pre-released HYVs of pulse crops. The beneficiaries of seed minikits in Maharashtra aired a number of suggestions to improve the effectiveness of the scheme, which mainly revolved around creation of better awareness about the scheme through pamphlet, hoarding, etc., provision of seeds suitable for early and late sowing of pulse crops as per local weather conditions, provision fertilizer, insecticides, etc along with seed minikits at subsidized rates, supplying of seed varieties suitable for local condition, conducting of training programme/workshops for proper guidance about usage of minikits, and wider coverage/distribution of seed minikits.

There were also several other suggestion extended by the farmers, which encompassed arrangement of demonstrations before the distribution of seed minikits for making farmers aware about various aspects of the kit like content, standard cultivation practice, use of kit under varied soil type and weather conditions, etc., appointment of more skilled and trained agril. officers for proper dissemination of information about the kit, provision of seed varieties as per local soil and weather conditions, and provision of higher quantity of seed in minikits. Initiation of these suggested measures will not only increase out reach of seed minikits scheme but also cover more farmers under its ambit.

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APPENDIX

Appendix 1: Crop-wise Distribution of Seed-Minikits in India (2016-17 to 2018-19)

(Qty: quintal)

Season/ crop	Seed Minikits Distribution					
	2016-17		2017-18		2018-19*	
	No.	Qty.	No.	Qty.	No.	Qty.
Kharif						
Arhar	56900	2276	50750	2030	120175	4807
Urad	93750	3750	165000	6600	93281	3731
Moong	132550	5302	131875	5275	188188	7528
Kharif Total	**283200**	**11328**	**347625**	**13905**	**401644**	**16066**
Rabi						
Gram	168151	26904	222250	35560	209731	33557
Moong	39000	1560			30000	1200
Urad	85000	3400				
Lentil	69938	5595	48125	3850	152875	12230
Rabi Total	**362089**	**37459**	**270375**	**39410**	**392606**	**46987**
Summer						
Urad	35000	1400	117500	4700	11900	476
Moong	105000	4200	74000	2960	93850	3754
Summer total	140000	5600	191500	7660	105750	4230
Grand total	**785289**	**54387**	**809500**	**60975**	**900000**	**67283**
Total Budget Allocation (*Rs. in Cr)*	**61.74**		**75.01**		**76.71**	

Note: Kit size- Arhar, Urad, Mung @ 4kg; Gram @ 16 kg; Lentil @ 8kg each 2018-19* - Target

Appendix 2: State-wise distribution of seed minikit in India (2016-17 to 2017-18)

(Minikits-Numbers)

Sl. No	States	2016-17				2017-18			
		Kharif	Rabi	Summer	Total	Kharif	Rabi	Summer	Total
1	Andhra Pradesh		19500		19500	6249	37500	41000	84749
2	Arunachal Pradesh	500			500				
3	Assam	900	2700		3600	3166			3166
4	Bihar	3000	500	10000	13500	24999	10000	25000	59999
5	Chhattisgarh	7000	29000	4825	40825	13875	31874	2500	48249
6	Gujarat	5778	2202		7980	12500	4358		16858
7	Haryana		1347		1347	12500	11185		23685
8	Himachal Pradesh	485			485				
9	Jammu & Kashmir	500			500		625	4980	5605
10	Jharkhand	10285	5223		15508	12460	15625		28085
11	Karnataka	2550	7800		10350	25850	6250	600	32700
12	Kerala	500			500	5000			5000
13	Madhya Pradesh	9200	12915	25000	47115	21580	34373		55953
14	Maharashtra	28373	13692		42065	10792	31784		42576
15	Manipur	500			500				
16	Meghalaya	500			500				
17	Mizoram	500			500				
18	Oddisa	8000	20668		28668	14000	37500		51500
19	Punjab		565		565	13375	9063	12500	34938
20	Rajasthan	29724	18950		48674	74400	48750	30000	153150
21	Tamil Nadu		13500		13500	17700		13500	31200
22	Telangana	2600	9938		12538	2718			2718
23	Tripura	500	500		1000	1000		2500	3500
24	Uttar Pradesh	14751	55566	50870	121007	49998	69211	16900	136109
25	Uttarakhand	1500			1500	4244	6250		10494
26	West Bengal		11000	6750	17750	1250			1250
	Total	**127646**	**225566**	**97445**	**450477**	**327656**	**354348**	**149480**	**831484**

Source: NFSM Cell, Min. of Agri. & FW (DAC&FW)

Appendix 3: Agency–Wise distribution of seed minikits in India (2016-17)

(Minikits-Numbers)

Sl No.	Agency	Kharif		Rabi		Summer	
		Target	Achievement	Target	Achievement	Target	Achievement
1	NSC	182200	101266	252470	142857	15000	-
2	NAFED	12000	11200	20000	20000	25000	25000
3	HIL	89000	15180	61250	42610	100000	72445
4	KRIBHCO	-	-	12500	4230	-	-
5	IFFDC	-	-	15869	15869	-	-
	Total	**283200**	**127646**	**362089**	**225566**	**140000**	**97445**

Source: NFSM Cell, Min. of Agri. & FW (DAC&FW)

Appendix 4: Agency–Wise distribution of seed minikits in India (2017-18)

(Minikits-Numbers)

Sl No.	Agency	Kharif		Rabi		Summer	
		Target	Achievement	Target	Achievement	Target	Achievement
1	NSC	131225	113168	200400	190398	111500	85080
2	NAFED	112500	111590	82250	82248	-	-
3	HIL	61500	60498	41875	30183	80000	64400
4	KRIBHCO	17400	17400	16000	16000	-	-
5	IFFDC	25000	25000	36250	35519	-	-
	Total	**347625**	**327656**	**376775**	**354348**	**191500**	**149480**

Source: NFSM Cell, Min. of Agri. & FW (DAC&FW)

Appendix 5: Demographic profile of the selected farmers (% of households) – Beneficiary (Ahmednagar)

Characteristics		**Marginal**	**Small**	**Medium**	**Large**	**Total**
No of HH		28 (28)	42 (42)	22 (22)	8 (8)	100 (100)
Household size (Average numbers)		4.61	5.31	5.36	6.13	5.19
	Male	60 (46.51)	95 (42.6)	53 (44.92)	22 (44.9)	230 (44.32)
	Female	43 (33.33)	86 (38.57)	43 (36.44)	19 (38.78)	191 (36.8)
	Children	26 (20.16)	42 (18.83)	22 (18.64)	8 (16.33)	98 (18.88)
	Total	**129 (100)**	**223 (100)**	**118 (100)**	**49 (100)**	**519 (100)**
Gender of Respondent (%)	Male	27 (96.43)	42 (100)	22 (100)	8 (100)	99 (99)
	Female	1 (3.57)	(0)	(0)	(0)	1 (1)
	Total	**28 (100)**	**42 (100)**	**22 (100)**	**8 (100)**	**100 (100)**
Age of the Respondent (%)	<30	3 (10.71)	3 (7.14)	2 (9.09)	1 (12.5)	9 (9)
	30-60	24 (85.71)	33 (78.57)	14 (63.64)	6 (75)	77 (77)
	>60	1 (3.57)	6 (14.29)	6 (27.27)	1 (12.5)	14 (14)
	Total	**28 (100)**	**42 (100)**	**22 (100)**	**8 (100)**	**100 (100)**
Education status of Respondent, number of years of education (%)	Illiterate	6 (21.43)	7 (16.67)	8 (36.36)	1 (12.5)	22 (22)
	Up to Primary (5)	3 (10.71)	8 (19.05)	5 (22.73)	1 (12.5)	17 (17)
	Up to Middle (8)	5 (17.86)	7 (16.67)	5 (22.73)	1 (12.5)	18 (18)
	Up to Matric (10)	5 (17.86)	8 (19.05)	3 (13.64)	3 (37.5)	19 (19)
	Up to + 2	4 (14.29)	7 (16.67)	(0)	(0)	11 (11)
	Up to graduate	4 (14.29)	3 (7.14)	1 (4.55)	2 (25)	10 (10)
	Above graduate	1 (3.57)	2 (4.76)	(0)	(0)	3 (3)
	Total	**28 (100)**	**42 (100)**	**22 (100)**	**8 (100)**	**100 (100)**
Average members of family doing farming	Absolute Numbers(Average Numbers Per HH)	95(3.39)	153(3.64)	75(3.40)	25(3.12)	348(3.48)
Average years of farming experience	Absolute Numbers(Average Numbers Per HH)	662(23.64)	1229(29.02)	748(34)	185(23.12)	2824(28.24)
Caste (% of households)	SC	3 (10.71)	6 (14.29)	1 (4.55)	(0)	10 (10)
	ST	15 (53.57)	17 (40.48)	15 (68.18)	4 (50)	51 (51)
	OBC	10 (35.71)	19 (45.24)	6 (27.27)	4 (50)	39 (39)
	General	(0)	(0)	(0)	(0)	(0)
	Total	**28 (100)**	**42 (100)**	**22 (100)**	**8 (100)**	**100 (100)**
Main occupation of respondent (%)	Agriculture and allied	28 (100)	42 (100)	22 (100)	8 (100)	100 (100)
	Agricultural labour	(0)	(0)	(0)	(0)	(0)
	Non-agricultural labour	(0)	(0)	(0)	(0)	(0)
	Self business/services	(0)	(0)	(0)	(0)	(0)
	Salaried/pensioners	(0)	(0)	(0)	(0)	(0)
	Others	(0)	(0)	(0)	(0)	(0)
	Total	28 (100)	42 (100)	22 (100)	8 (100)	100 (100)
Subsidiary occupation of respondent (%)	Agriculture and allied	(0)	(0)	(0)	(0)	(0)
	Agricultural labour	4 (14.29)	(0)	(0)	(0)	4 (4)
	Non-agricultural labour	1 (3.57)	(0)	(0)	(0)	(0)
	Self business/services	2 (7.14)	(0)	(0)	(0)	2 (2)
	Salaried/pensioners	1 (3.57)	2 (4.76)	1 (4.55)	(0)	4 (4)
	Others	(0)	(0)	(0)	(0)	(0)
	Total	8 (28.57)	2 (4.76)	1 (4.55)	0 (0)	10 (10)
Average Annual Income	Agriculture and allied	126195	353484	530926	1056709	385138
	Non-agricultural Sources	113125	105000	107000	-	110583

Note: Figures in parentheses are percentages to the total sample size within the category of household

Appendix 6: Demographic profile of the selected farmers (% of households) – Non-Beneficiary (Ahmednagar)

Characteristics		Marginal	Small	Medium	Large	Total
No of HH		8 (16)	22 (44)	11 (22)	9 (18)	50 (100)
Household size (Average numbers)		5.25	4.41	5.64	4.89	4.90
	Male	18 (42.86)	44 (45.36)	26 (41.94)	19 (43.18)	107 (43.67)
	Female	16 (38.1)	34 (35.05)	25 (40.32)	16 (36.36)	91 (37.14)
	Children	8 (19.05)	19 (19.59)	11 (17.74)	9 (20.45)	47 (19.18)
	Total	**42 (100)**	**97 (100)**	**62 (100)**	**44 (100)**	**245 (100)**
Gender of Respondent (%)	Male	8 (100)	22 (100)	11 (100)	9 (100)	50 (100)
	Female	(0)	(0)	(0)	(0)	(0)
	Total	**8 (100)**	**22 (100)**	**11 (100)**	**9 (100)**	**50 (100)**
Age of the Respondent (%)	<30	1 (12.5)	1 (4.55)	2 (18.18)	(0)	4 (8)
	30-60	6 (75)	15 (68.18)	8 (72.73)	7 (77.78)	36 (72)
	>60	1 (12.5)	6 (27.27)	1 (9.09)	2 (22.22)	10 (20)
	Total	**8 (100)**	**22 (100)**	**11 (100)**	**9 (100)**	**50 (100)**
Education status of Respondent, number of years of education (%)	Illiterate	2 (25)	3 (13.64)	(0)	3 (33.33)	8 (16)
	Up to Primary (5)	3 (37.5)	4 (18.18)	4 (36.36)	1 (11.11)	12 (24)
	Up to Middle (8)	1 (12.5)	1 (4.55)	1 (9.09)	2 (22.22)	5 (10)
	Up to Matric (10)	1 (12.5)	7 (31.82)	2 (18.18)	1 (11.11)	11 (22)
	Up to + 2	(0)	3 (13.64)	1 (9.09)	(0)	4 (8)
	Up to graduate	1 (12.5)	3 (13.64)	2 (18.18)	1 (11.11)	7 (14)
	Above graduate	(0)	1 (4.55)	1 (9.09)	1 (11.11)	3 (6)
	Total	**8 (100)**	**22 (100)**	**11 (100)**	**9 (100)**	**50 (100)**
Average members of family doing farming	Absolute Numbers(Average Numbers Per HH)	29(3.63)	50(2.27)	33(3)	29(3.22)	141(2.82)
Average years of farming experience	Absolute Numbers(Average Numbers Per HH)	209(26.13)	513(23.32)	256(23.27)	214(23.78)	1192(23.84)
Caste (% of households)	SC	1 (12.5)	2 (9.09)	3 (27.27)	1 (11.11)	7 (14)
	ST	(0)	1 (4.55)	1 (9.09)	(0)	2 (4)
	OBC	3 (37.5)	10 (45.45)	3 (27.27)	(0)	16 (32)
	General	4 (50)	9 (40.91)	4 (36.36)	8 (88.89)	25 (50)
	Total	**8 (100)**	**22 (100)**	**11 (100)**	**9 (100)**	**50 (100)**
Main occupation of respondent (%)	Agriculture and allied	8 (100)	22 (100)	11 (100)	9 (100)	50 (100)
	Agricultural labour	(0)	(0)	(0)	(0)	(0)
	Non-agricultural labour	(0)	(0)	(0)	(0)	(0)
	Self business/services	(0)	(0)	(0)	(0)	(0)
	Salaried/pensioners	(0)	(0)	(0)	(0)	(0)
	Others	(0)	(0)	(0)	(0)	(0)
	Total	8 (100)	22 (100)	11 (100)	9 (100)	50 (100)
Subsidiary occupation of respondent (%)	Agriculture and allied	(0)	(0)	(0)	(0)	(0)
	Agricultural labour	1 (12.5)	(0)	(0)	(0)	1 (2)
	Non-agricultural labour	1 (12.5)	(0)	(0)	(0)	1 (2)
	Self business/services	2 (25)	3 (13.64)	(0)	1 (11.11)	6 (12)
	Salaried/pensioners	2 (25)	2 (9.09)	1 (9.09)	(0)	5 (10)
	Others	(0)	(0)	(0)	(0)	0 (0)
	Total	6 (75)	5 (22.73)	1 (9.09)	1 (11.11)	13 (26)
Average Annual Income	Agriculture and allied	75366	161344	334618	420696	232391
	Non-agricultural Sources	94083	91000	98000	95000	93269

Note: Figures in parentheses are percentages to the total sample size within the category of household

Appendix 7: Demographic profile of the selected farmers (% of households) – Beneficiary (Yavatmal)

Characteristics		**Marginal**	**Small**	**Medium**	**Large**	**Total**
No of HH		17 (17)	58 (58)	15 (15)	10 (10)	100 (100)
Household size (Average Numbers)		4.65	4.67	4.93	5.10	4.75
	Male	34 (43.04)	114 (42.07)	31 (41.89)	24 (47.06)	203 (42.74)
	Female	29 (36.71)	99 (36.53)	28 (37.84)	17 (33.33)	173 (36.42)
	Children	16 (20.25)	58 (21.4)	15 (20.27)	10 (19.61)	99 (20.84)
	Total	**79 (100)**	**271 (100)**	**74 (100)**	**51 (100)**	**475 (100)**
Gender of Respondent (%)	Male	17 (100)	54 (93.1)	15 (100)	10 (100)	96 (96)
	Female	(0)	4 (6.9)	(0)	(0)	4 (4)
	Total	**17 (100)**	**58 (100)**	**15 (100)**	**10 (100)**	**100 (100)**
Age of the Respondent (%)	<30	2 (11.76)	5 (8.62)	2 (13.33)	2 (20)	11 (11)
	30-60	13 (76.47)	47 (81.03)	11 (73.33)	8 (80)	79 (79)
	>60	2 (11.76)	6 (10.34)	2 (13.33)	(0)	10 (10)
	Total	**17 (100)**	**58 (100)**	**15 (100)**	**10 (100)**	**100 (100)**
Education status of Respondent, number of years of education (%)	Illiterate	3 (17.65)	8 (13.79)	(0)	(0)	11 (11)
	Up to Primary (5)	1 (5.88)	10 (17.24)	1 (6.67)	1 (10)	13 (13)
	Up to Middle (8)	2 (11.76)	7 (12.07)	2 (13.33)	(0)	11 (11)
	Up to Matric (10)	5 (29.41)	12 (20.69)	5 (33.33)	2 (20)	24 (24)
	Up to + 2	4 (23.53)	12 (20.69)	5 (33.33)	6 (60)	27 (27)
	Up to graduate	1 (5.88)	7 (12.07)	2 (13.33)	1 (10)	11 (11)
	Above graduate	1 (5.88)	2 (3.45)	(0)	(0)	3 (3)
	Total	**17 (100)**	**58 (100)**	**15 (100)**	**10 (100)**	**100 (100)**
Average members of family doing farming	Absolute Numbers(Average Numbers Per HH)	37(2.18)	170(2.93)	46(3.07)	29(2.90)	282(2.82)
Average years of farming experience	Absolute Numbers(Average Numbers Per HH)	410(24.12)	1626(28.03)	336(22.4	203(20.3)	2575(25.75)
Caste (% of households)	SC	(0)	5 (8.62)	1 (6.67)	(0)	6 (6)
	ST	2 (11.76)	15 (25.86)	3 (20)	4 (40)	24 (24)
	OBC	3 (17.65)	26 (44.83)	9 (60)	6 (60)	44 (44)
	General	12 (70.59)	12 (20.69)	2 (13.33)	(0)	26 (26)
	Total	**17 (100)**	**58 (100)**	**15 (100)**	**10 (100)**	**100 (100)**
Main occupation of respondent (%)	Agriculture and allied	17 (100)	58 (100)	15 (100)	10 (100)	100 (100)
	Agricultural labour	(0)	(0)	(0)	(0)	(0)
	Non-agricultural labour	(0)	(0)	(0)	(0)	(0)
	Self business/services	(0)	(0)	(0)	(0)	(0)
	Salaried/pensioners	(0)	(0)	(0)	(0)	(0)
	Others	(0)	(0)	(0)	(0)	(0)
	Total	17 (100)	58 (100)	15 (100)	10 (100)	100 (100)
Subsidiary occupation of respondent (%)	Agriculture and allied	(0)	(0)	(0)	(0)	(0)
	Agricultural labour	2 (11.76)	1 (1.72)	(0)	(0)	3 (3)
	Non-agricultural labour	2 (11.76)	1 (1.72)	(0)	(0)	3 (3)
	Self business/services	(0)	2 (3.45)	1 (6.67)	(0)	3 (3)
	Salaried/pensioners	(0)	3 (5.17)	(0)	1 (10)	4 (4)
	Others	(0)	(0)	(0)	(0)	(0)
	Total	4 (23.53)	7 (12.07)	1 (6.67)	1 (10)	13 (13)
Average Annual Income	Agriculture and allied	66985	135503	236670	377510	163231
	Non-agricultural Sources	62500	102143	115000	110000	91538

Note: Figures in parentheses are percentages to the total sample size within the category of household

Appendix 8: Demographic profile of the selected farmers (% of households) – Non-Beneficiary (Yavatmal)

Characteristics		Marginal	Small	Medium	Large	Total
No of HH		4 (8)	30 (60)	8 (16)	8 (16)	50 (100)
Household size (numbers)		5.50	4.83	5.38	6.63	5.26
	Male	10 (45.45)	62 (42.76)	19 (44.19)	26 (49.06)	117 (44.49)
	Female	8 (36.36)	53 (36.55)	16 (37.21)	20 (37.74)	97 (36.88)
	Children	4 (18.18)	30 (20.69)	8 (18.6)	7 (13.21)	49 (18.63)
	Total	**22 (100)**	**145 (100)**	**43 (100)**	**53 (100)**	**263 (100)**
Gender of Respondent (%)	Male	4 (100)	29 (96.67)	8 (100)	8 (100)	49 (98)
	Female	(0)	1 (3.33)	(0)	(0)	1 (2)
	Total	**4 (100)**	**30 (100)**	**8 (100)**	**8 (100)**	**50 (100)**
Age of the Respondent (%)	<30	1 (25)	2 (6.67)	2 (25)	2 (25)	7 (14)
	30-60	1 (25)	20 (66.67)	4 (50)	6 (75)	31 (62)
	>60	2 (50)	8 (26.67)	2 (25)	(0)	12 (24)
	Total	**4 (100)**	**30 (100)**	**8 (100)**	**8 (100)**	**50 (100)**
Education status of Respondent, number of years of education (%)	Illiterate	(0)	1 (3.33)	1 (12.5)	(0)	2 (4)
	Up to Primary (5)	(0)	7 (23.33)	1 (12.5)	(0)	8 (16)
	Up to Middle (8)	1 (25)	4 (13.33)	(0)	(0)	5 (10)
	Up to Matric (10)	1 (25)	9 (30)	3 (37.5)	2 (25)	15 (30)
	Up to + 2	1 (25)	9 (30)	3 (37.5)	2 (25)	15 (30)
	Up to graduate	1 (25)	(0)	(0)	3 (37.5)	4 (8)
	Above graduate	(0)	(0)	(0)	1 (12.5)	1 (2)
	Total	**4 (100)**	**30 (100)**	**8 (100)**	**8 (100)**	**50 (100)**
Average members of family doing farming	Absolute Numbers(Average Numbers Per HH)	13(3.25)	96(3.20)	28(3.50)	29(3.63)	166(3.32)
Average years of farming experience	Absolute Numbers(Average Numbers Per HH)	118(29.25)	898(29.93)	204(25.50)	169(21.12)	1389(27.78)
Caste (% of households)	SC	(0)	3 (10)	1 (12.5)	(0)	4 (8)
	ST	(0)	7 (23.33)	(0)	(0)	7 (14)
	OBC	2 (50)	11 (36.67)	7 (87.5)	8 (100)	28 (56)
	General	2 (50)	9 (30)	(0)	(0)	11 (22)
	Total	**4 (100)**	**30 (100)**	**8 (100)**	**8 (100)**	**50 (100)**
Main occupation of respondent (%)	Agriculture and allied	4 (100)	30 (100)	8 (100)	8 (100)	50 (100)
	Agricultural labour	(0)	(0)	(0)	(0)	(0)
	Non-agricultural labour	(0)	(0)	(0)	(0)	(0)
	Self business/services	(0)	(0)	(0)	(0)	(0)
	Salaried/pensioners	(0)	(0)	(0)	(0)	(0)
	Others	(0)	(0)	(0)	(0)	(0)
	Total	**4 (100)**	**30 (100)**	**8 (100)**	**8 (100)**	**50 (100)**
Subsidiary occupation of respondent (%)	Agriculture and allied	(0)	(0)	(0)	(0)	(0)
	Agricultural labour	2 (50)	2 (6.67)	(0)	(0)	4 (8)
	Non-agricultural labour	2 (50)	(0)	(0)	(0)	2 (4)
	Self business/services	(0)	1 (3.33)	2 (25)	(0)	3 (6)
	Salaried/pensioners	(0)	(0)	(0)	1 (12.5)	1 (2)
	Others	(0)	(0)	(0)	(0)	(0)
	Total	**4 (100)**	**3 (10)**	**2 (25)**	**1 (12.5)**	**10 (20)**
Average Annual Income	Agriculture and allied	30698	79729	165555	502605	157199
	Non-agricultural Sources	72500	101667	100000	125000	92000

Note: Figures in parentheses are percentages to the total sample size within the category of household

Appendix 9: Demographic profile of the selected farmers (% of households) – Total Beneficiary

Characteristics		Marginal	Small	Medium	Large	Total
No of HH		45 (22.5)	100 (50)	37 (18.5)	18 (9)	200 (100)
Household size (Average Numbers)		4.62	4.94	5.19	5.56	4.97
	Male	94 (45.19)	209 (42.31)	84 (43.75)	46 (46)	433 (43.56)
	Female	72 (34.62)	185 (37.45)	71 (36.98)	36 (36)	364 (36.62)
	Children	42 (20.19)	100 (20.24)	37 (19.27)	18 (18)	197 (19.82)
	Total	**208 (100)**	**494 (100)**	**192 (100)**	**100 (100)**	**994 (100)**
Gender of Respondent (%)	Male	44 (97.78)	96 (96)	37 (100)	18 (100)	195 (97.5)
	Female	1 (2.22)	4 (4)	0 (0)	0 (0)	5 (2.5)
	Total	**45 (100)**	**100 (100)**	**37 (100)**	**18 (100)**	**200 (100)**
Age of the Respondent (%)	<30	5 (11.11)	8 (8)	4 (10.81)	3 (16.67)	20 (10)
	30-60	37 (82.22)	80 (80)	25 (67.57)	14 (77.78)	156 (78)
	>60	3 (6.67)	12 (12)	8 (21.62)	1 (5.56)	24 (12)
	Total	**45 (100)**	**100 (100)**	**37 (100)**	**18 (100)**	**200 (100)**
Education status of Respondent, number of years of education (%)	Illiterate	9 (20)	15 (15)	8 (21.62)	1 (5.56)	33 (16.5)
	Up to Primary (5)	4 (8.89)	18 (18)	6 (16.22)	2 (11.11)	30 (15)
	Up to Middle (8)	7 (15.56)	14 (14)	7 (18.92)	1 (5.56)	29 (14.5)
	Up to Matric (10)	10 (22.22)	20 (20)	8 (21.62)	5 (27.78)	43 (21.5)
	Up to + 2	8 (17.78)	19 (19)	5 (13.51)	6 (33.33)	38 (19)
	Up to graduate	5 (11.11)	10 (10)	3 (8.11)	3 (16.67)	21 (10.5)
	Above graduate	2 (4.44)	4 (4)	0 (0)	0 (0)	6 (3)
	Total	**45 (100)**	**100 (100)**	**37 (100)**	**18 (100)**	**200 (100)**
Average members of family doing farming	Absolute Numbers(Average Numbers Per HH)	132(2.93)	323(3.23)	121(3.27)	54(3)	630(3.15)
Average years of farming experience	Absolute Numbers(Average Numbers Per HH)	1072.00 (23.82)	2855.00 (28.55)	1084.00 (29.30)	388.00 (21.56)	5399.00(27)
Caste (% of households)	SC	3 (6.67)	11 (11)	2 (5.41)	0 (0)	16 (8)
	ST	17 (37.78)	32 (32)	18 (48.65)	8 (44.44)	75 (37.5)
	OBC	13 (28.89)	45 (45)	15 (40.54)	10 (55.56)	83 (41.5)
	General	12 (26.67)	12 (12)	2 (5.41)	0 (0)	26 (13)
	Total	**45 (100)**	**100 (100)**	**37 (100)**	**18 (100)**	**200 (100)**
Main occupation of respondent (%)	Agriculture and allied	45 (100)	100 (100)	37 (100)	18 (100)	200 (100)
	Agricultural labour	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
	Non-agricultural labour	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
	Self business/services	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
	Salaried/pensioners	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
	Others	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
	Total	45 (100)	100 (100)	37 (100)	18 (100)	200 (100)
Subsidiary occupation of respondent (%)	Agriculture and allied	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
	Agricultural labour	6 (13.33)	1 (1)	0 (0)	0 (0)	7 (3.5)
	Non-agricultural labour	3 (6.67)	1 (1)	0 (0)	0 (0)	3 (1.5)
	Self business/services	2 (4.44)	2 (2)	1 (2.7)	0 (0)	5 (2.5)
	Salaried/pensioners	1 (2.22)	5 (5)	1 (2.7)	1 (5.56)	8 (4)
	Others	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
	Total	**12 (26.67)**	**9 (9)**	**2 (5.41)**	**1 (5.56)**	**23 (11.5)**
Average Annual Income	Agriculture and allied	103827	227055	465490	719996	274185
	Non-agricultural Sources	96250	103000	102500	95000	99400

Note: Figures in parentheses are percentages to the total sample size within the category of household

Appendix 10: Demographic profile of the selected farmers (% of households) – Total Non-Beneficiary

		Marginal	Small	Medium	Large	Total
No of HH		12 (12)	52 (52)	19 (19)	17 (17)	100 (100)
Household size (Average Numbers)		5.33	4.65	5.53	5.71	5.08
	Male	28 (43.75)	106 (43.8)	45 (42.86)	45 (46.39)	224 (44.09)
	Female	24 (37.5)	87 (35.95)	41 (39.05)	36 (37.11)	188 (37.01)
	Children	12 (18.75)	49 (20.25)	19 (18.1)	16 (16.49)	96 (18.9)
	Total	**64 (100)**	**242 (100)**	**105 (100)**	**97 (100)**	**508 (100)**
Gender of Respondent (%)	Male	12 (100)	51 (98.08)	19 (100)	17 (100)	99 (99)
	Female	0 (0)	1 (1.92)	0 (0)	0 (0)	1 (1)
	Total	**12 (100)**	**52 (100)**	**19 (100)**	**17 (100)**	**100 (100)**
Age of the Respondent (%)	<30	2 (16.67)	3 (5.77)	4 (21.05)	2 (11.76)	11 (11)
	30-60	7 (58.33)	35 (67.31)	12 (63.16)	13 (76.47)	67 (67)
	>60	3 (25)	14 (26.92)	3 (15.79)	2 (11.76)	22 (22)
	Total	**12 (100)**	**52 (100)**	**19 (100)**	**17 (100)**	**100 (100)**
Education status of Respondent, number of years of education (%)	Illiterate	2 (16.67)	4 (7.69)	1 (5.26)	3 (17.65)	10 (10)
	Up to Primary (5)	3 (25)	11 (21.15)	5 (26.32)	1 (5.88)	20 (20)
	Up to Middle (8)	2 (16.67)	5 (9.62)	1 (5.26)	2 (11.76)	10 (10)
	Up to Matric (10)	2 (16.67)	16 (30.77)	5 (26.32)	3 (17.65)	26 (26)
	Up to + 2	1 (8.33)	12 (23.08)	4 (21.05)	2 (11.76)	19 (19)
	Up to graduate	2 (16.67)	3 (5.77)	2 (10.53)	4 (23.53)	11 (11)
	Above graduate	0 (0)	1 (1.92)	1 (5.26)	2 (11.76)	4 (4)
	Total	**12 (100)**	**52 (100)**	**19 (100)**	**17 (100)**	**100 (100)**
Average members of family doing farming	Absolute Numbers(Average Numbers Per HH)	42(3.50)	146(2.81)	61(3.21)	58(3.14)	307(3.07)
Average years of farming experience	Absolute Numbers(Average Numbers Per HH)	327(27.25)	1411(27.13)	460(24.21)	383(22.53)	2581(25.81)
Caste (% of households)	SC	1 (8.33)	5 (9.62)	4 (21.05)	1 (5.88)	11 (11)
	ST	0 (0)	8 (15.38)	1 (5.26)	0 (0)	9 (9)
	OBC	5 (41.67)	21 (40.38)	10 (52.63)	8 (47.06)	44 (44)
	General	6 (50)	18 (34.62)	4 (21.05)	8 (47.06)	36 (36)
	Total	**12 (100)**	**52 (100)**	**19 (100)**	**17 (100)**	**100 (100)**
Main occupation of respondent (%)	Agriculture and allied	12 (100)	52 (100)	19 (100)	17 (100)	100 (100)
	Agricultural labour	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
	Non-agricultural labour	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
	Self business/services	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
	Salaried/pensioners	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
	Others	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
	Total	12 (100)	52 (100)	19 (100)	17 (100)	100 (100)
Subsidiary occupation of respondent (%)	Agriculture and allied	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
	Agricultural labour	3 (25)	2 (3.85)	0 (0)	0 (0)	5 (5)
	Non-agricultural labour	3 (25)	0 (0)	0 (0)	0 (0)	3 (3)
	Self business/services	2 (16.67)	4 (7.69)	2 (10.53)	1 (5.88)	9 (9)
	Salaried/pensioners	2 (16.67)	2 (3.85)	1 (5.26)	1 (5.88)	6 (6)
	Others	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
	Total	10 (83.33)	8 (15.38)	3 (15.79)	2 (11.76)	23 (23)
Average Annual Income	Agriculture and allied	69667	114258	263434	459241	194795
	Non-agricultural Sources	81450	95000	99333	110000	90978

Note: Figures in parentheses are percentages to the total sample size within the category of household

Appendix 10.1: Demographic profile of the selected farmers (% of households) – Beneficiary and Non-Beneficiary

Characteristics		Marginal	Small	Medium	Large	Total
No of HH		57	152	56	35	300
Household size (numbers)		4.77	4.84	5.30	5.63	5.01
Gender of Respondent (%)	Male	98.25	96.71	100.00	100.00	98.00
	Female	1.75	3.29	-	-	2.00
Age of the Respondent (%)	<30	12.28	7.23	14.29	14.29	10.34
	30-60	77.19	75.66	66.07	77.14	74.33
	>60	10.53	17.11	19.64	8.57	15.33
Education status of Respondent, number of years of education (%)	Illiterate	19.30	12.51	16.07	11.43	14.33
	Up to Primary (5)	12.28	19.08	19.64	8.57	16.67
	Up to Middle (8)	15.79	12.50	14.29	8.57	13.00
	Up to Matric (10)	21.05	23.68	23.21	22.86	23.00
	Up to + 2	15.79	20.39	16.07	22.86	19.00
	Up to graduate	12.28	8.55	8.93	20.00	10.67
	Above graduate	3.51	3.29	1.79	5.71	3.33
Average members of family doing farming		3.05	3.09	3.25	3.20	3.12
Average years of farming experience		24.54	28.07	27.57	22.03	26.60
Caste (% of households)	SC	7.02	10.52	10.72	2.85	9.00
	ST	29.82	26.32	33.93	22.86	28.00
	OBC	31.58	43.42	44.64	51.43	42.33
	General	31.58	19.74	10.71	22.86	20.67
Main occupation of respondent (%)	Agriculture and allied	100.00	100.00	100.00	100.00	100.00
	Agricultural labour	-	-	-	-	-
	Non-agricultural labour	-	-	-	-	-
	Self business/services	-	-	-	-	-
	Salaried/pensioners	-	-	-	-	-
	Others	-	-	-	-	-
Subsidiary occupation of respondent (%)	Agriculture and allied	-	-	-	-	-
	Agricultural labour	15.79	1.97	-	-	4.00
	Non-agricultural labour	10.53	0.66	-	-	2.00
	Self business/services	7.02	3.95	5.36	2.86	4.67
	Salaried/pensioners	5.26	4.61	3.57	5.71	4.67
	Others	-	-	-	-	-
Average Annual Income	Agriculture and allied	91627	188466	391662	589619	245046
	Non-agricultural Sources	89523	99444	99600	105000	95260

Note: Percentages have been computed from the total sample size within household category

Appendix 11: Characteristics of Operational Holdings (Acres per Household)

Farm size	Sample Size	Total Owned land (1)	Total Leased-in Land (2)	Total Leased –out Land (3)	Uncultivated land (4)	Net Operated Area = (1+2-3-4))	Net irrigated Area	GCA	Cropping Intensity (%)
Ahmednagar District									
Beneficiary									
Marginal	28	1.92	-	-	0.08	1.84	1.64	2.88	156.52
Small	42	4.11	-	-	0.15	3.96	3.28	5.61	141.67
Medium	22	8.03	-	-	1.21	6.82	4.64	13.47	197.50
Large	8	19.00	-	-	1.62	17.38	15.25	22.31	128.36
Total	100	5.55	-	-	0.48	5.07	4.08	7.91	156.01
Non Beneficiary									
Marginal	8	1.56	0.16	-	0.06	1.66	1.38	2.66	160.24
Small	22	4.35	-	-	-	4.35	2.92	5.06	116.32
Medium	11	7.95	-	-	-	7.95	4.86	13.45	169.18
Large	9	15.06	-	-	-	15.06	7.67	15.50	102.95
Total	50	6.63	0.030	-	0.02	6.64	3.96	8.40	126.51
Yavatmal District									
Beneficiary									
Marginal	17	1.91	-	-	-	1.91	1.15	2.68	140.31
Small	58	4.06	-	-	-	4.06	1.96	4.59	113.05
Medium	15	6.97	-	-	0.14	6.83	3.37	8.67	126.93
Large	10	11.85	-	-	0.40	11.45	5.40	13.85	120.96
Total	100	4.91	-	-	0.06	4.85	2.38	5.81	119.79
Non Beneficiary									
Marginal	4	2.44	-	-	-	2.44	1.13	2.94	120.49
Small	30	3.98	-	-	0.08	3.90	1.77	4.45	114.10
Medium	8	8.00	-	-	-	8.00	4.00	9.69	121.12
Large	8	21.25	-	-	-	21.25	15.19	27.13	127.67
Total	50	7.27	-	-	0.05	7.22	4.22	8.80	121.88
Overall Beneficiary									
Marginal	45	1.91	-	-	0.04	1.87	1.45	2.80	149.73
Small	100	4.08	-	-	0.06	4.02	2.51	5.02	124.87
Medium	37	7.60	-	-	0.78	6.82	4.12	11.52	168.91
Large	18	15.03	-	-	0.95	14.08	9.78	17.61	125.07
Total	200	5.23	-	-	0.27	4.96	3.23	6.86	138.30
Overall Non-Beneficiary									
Marginal	12	1.85	0.10	-	0.03	1.92	1.29	2.75	143.22
Small	52	4.14	-	-	0.05	4.09	2.25	4.71	115.16
Medium	19	7.97	-	-	-	7.97	4.50	11.87	148.93
Large	17	17.97	-	-	-	17.97	11.21	20.97	116.69
Total	100	6.95	0.01	-	0.03	6.93	4.09	8.60	124.10
Overall Beneficiary and Non Beneficiary									
Marginal	57	1.90	0.02	-	0.04	1.88	1.42	2.79	148.40
Small	152	4.10	-	-	0.06	4.04	2.43	4.91	121.53
Medium	56	7.73	-	-	0.51	7.22	4.25	11.64	161.22
Large	35	16.46	-	-	0.49	15.97	10.47	19.24	120.48
Total	300	5.80	0.004	-	0.19	5.61	3.51	7.44	132.62

Appendix 12: Source of irrigation of net operated area (%)

Farmer Category	Sample Size	Dug well	Boar well	Canal	Farm Pond	Dug well and Boar well	Other (River lift irrigation)	Rain fed area	Average Water Charges	Total operated area
Ahmednagar District										
Beneficiary										
Marginal	28	10.9 (21.16)	16.8 (32.61)	-	5.22 (10.13)	8 (15.53)	5 (9.7)	5.6 (10.87)	-	51.52 (100)
Small	42	61.12 (36.75)	9.5 (5.71)	-	31.14 (18.72)	31.25 (18.79)	4.75 (2.86)	28.56 (17.17)	-	166.32 (100)
Medium	22	35.5 (23.66)	14.5 (9.66)	-	14.5 (9.66)	29.5 (19.66)	8.08 (5.39)	47.96 (31.96)	-	150.04 (100)
Large	8	40 (28.77)	0 (0)	-	0 (0)	32 (23.01)	50 (35.96)	17.04 (12.26)	-	139.04 (100)
Total	100	147.52 (29.1)	40.8 (8.05)		50.86 (10.03)	100.75 (19.87)	67.83 (13.38)	99.16 (19.56)	-	506.92 (100)
Non Beneficiary										
Marginal	8	9.5 (71.54)	1.54 (11.6)	-	-	-	-	2.24 (16.87)	-	13.28 (100)
Small	22	40 (41.8)	4.49 (4.69)	-	10.25 (10.71)	9.5 (9.93)	-	31.46 (32.87)	-	95.7 (100)
Medium	11	45.96 (52.56)	-	-	6.5 (7.43)	-	1 (1.14)	33.99 (38.87)	-	87.45 (100)
Large	9	52 (38.37)	-	-	-	17.03 (12.56)	-	66.51 (49.07)	-	135.54 (100)
Total	50	147.46 (44.42)	6.03 (1.82)	-	16.75 (5.05)	26.53 (7.99)	1 (0.3)	134.2 (40.43)	-	331.97 (100)
Yavatmal District										
Beneficiary										
Marginal	17	14.25 (43.89)	-	5.3 (16.32)	-	-	-	12.92 (39.79)	1500	32.47 (100)
Small	58	104.68 (44.45)	6 (2.55)	-	-	3 (1.27)	-	121.8 (51.72)	-	235.48 (100)
Medium	15	36.5 (35.63)	-	-	-	4.05 (3.95)	10 (9.76)	51.9 (50.66)	-	102.45 (100)
Large	10	32 (27.95)	-	-	-	16 (13.97)	6 (5.24)	60.5 (52.84)	-	114.5 (100)
Total	100	187.43 (38.65)	6 (1.24)	5.3 (1.09)	-	23.05 (4.75)	16 (3.3)	247.12 (50.96)	1500	484.9 (100)
Non Beneficiary										
Marginal	4	4.52 (46.31)	-	-	-	-	-	5.24 (53.69)	-	9.76 (100)
Small	30	41.5 (35.47)	5 (4.27)	-	-	3.6 (3.08)	3 (2.56)	63.9 (54.62)	-	117 (100)
Medium	8	32 (50)	0 (0)	-	-	-	-	32 (50)	-	64 (100)
Large	8	59.5 (35)	62.02 (36.48)	-	-	-	-	48.48 (28.52)	-	170 (100)
Total	50	137.52 (38.12)	67.02 (18.58)	-	-	3.6 (1)	3 (0.83)	149.62 (41.47)	-	360.76 (100)
Overall Beneficiary										
Marginal	45	25.15 (29.94)	16.8 (20)	5.3 (6.31)	5.22 (6.22)	8 (9.52)	5 (5.95)	18.52 (22.05)	1500	83.99 (100)
Small	100	165.8 (41.26)	15.5 (3.86)	-	31.14 (7.75)	34.25 (8.52)	4.75 (1.18)	150.36 (37.42)	-	401.8 (100)
Medium	37	72 (28.52)	14.5 (5.74)	-	14.5 (5.74)	33.55 (13.29)	18.08 (7.16)	99.86 (39.55)	-	252.49 (100)
Large	18	72 (28.4)	0 (0)	-	0 (0)	48 (18.93)	56 (22.09)	77.54 (30.58)	-	253.54 (100)
Total	200	334.95 (33.77)	46.8 (4.72)	5.3 (0.53)	50.86 (5.13)	123.8 (12.48)	83.83 (8.45)	346.28 (34.91)	1500	991.82 (100)
Overall Non Beneficiary										
Marginal	12	14.02 (60.85)	1.54 (6.68)	-	-	-	-	7.48 (32.47)	-	23.04 (100)
Small	52	81.5 (38.32)	9.49 (4.46)	-	10.25 (4.82)	13.1 (6.16)	3 (1.41)	95.36 (44.83)	-	212.7 (100)
Medium	19	77.96 (51.48)	-	-	6.5 (4.29)	-	1 (0.66)	65.99 (43.57)	-	151.45 (100)
Large	17	111.5 (36.49)	62.02 (20.3)	-	-	17.03 (5.57)	-	114.99 (37.64)	-	305.54 (100)
Total	100	284.98 (41.14)	73.05 (10.55)	-	16.75 (2.42)	30.13 (4.35)	4 (0.58)	283.82 (40.97)	-	692.73 (100)

Appendix 13: Cropping pattern of selected farmers (% of GCA for the reference year 2018-19) – Beneficiary (Ahmednagar)

Crop	Marginal	Small	Medium	Large	Total
Irrigated Area					
Kharif					
Bajra	16.4 (20.34)	39.5 (16.76)	35 (11.81)	12 (6.72)	102.9 (13.01)
Cotton	-	7.5 (3.18)	17.5 (5.91)	7 (3.92)	32 (4.05)
Onion	1 (1.24)	5.5 (2.33)	2 (0.67)	5 (2.8)	13.5 (1.71)
Maize	-	6 (2.55)	7 (2.36)	27 (15.13)	40 (5.06)
Tur	12.5 (15.5)	9.89 (4.2)	7 (2.36)	17 (9.52)	46.39 (5.86)
Hulga	-	-	-	2 (1.12)	2 (0.25)
Total	29.9 (37.08)	68.39 (29.03)	68.5 (23.12)	70 (39.22)	236.79 (29.93)
Rabi					
Gram	17.65 (21.89)	37.25 (15.81)	19.5 (6.58)	18.5 (10.37)	92.9 (11.74)
Wheat	1.75 (2.17)	14.25 (6.05)	9.5 (3.21)	18.5 (10.37)	44 (5.56)
Jowar	1 (1.24)	7.5 (3.18)	25.5 (8.6)	22 (12.33)	56 (7.08)
Onion	12.5 (15.5)	17.39 (7.38)	37.5 (12.65)	7 (3.92)	74.39 (9.4)
Total	32.9 (40.8)	76.39 (32.42)	92 (31.05)	66 (36.98)	267.29 (33.79)
Summer					
Groundnut	0.5 (0.62)	5 (2.12)	16 (5.4)	1 (0.56)	22.5 (2.84)
Kadwal	-	1.2 (0.51)	-	-	1.2 (0.15)
Total	0.5 (0.62)	6.2 (2.63)	16 (5.4)	1 (0.56)	23.7 (3)
Perennial					
Lemon	3 (3.72)	7 (2.97)	7.25 (2.45)	4.5 (2.52)	21.75 (2.75)
Pomegranate	4 (4.96)	9.5 (4.03)	2.5 (0.84)	-	16 (2.02)
Sugarcane	2.84 (3.52)	18.14 (7.7)	20.09 (6.78)	19.98 (11.19)	61.05 (7.72)
Grapes	-	13.5 (5.73)	-	-	13.5 (1.71)
Total	9.84 (12.2)	48.14 (20.43)	29.84 (10.07)	24.48 (13.72)	112.3 (14.2)
Gross Irrigated Area	73.14 (90.70)	199.12 (84.51)	206.34 (69.63)	161.48 (90.48)	640.08 (80.91)
Unirrigated Area					
Kharif					
Bajra	1 (1.24)	10.5 (4.46)	22 (7.42)	3 (1.68)	36.5 (4.61)
Cotton	1.25 (1.55)	5 (2.12)	5 (1.69)	-	11.25 (1.42)
Onion	-	1 (0.42)	-	-	1 (0.13)
Maize	-	2 (0.85)	2 (0.67)	-	4 (0.51)
Tur	1 (1.24)	-	2 (0.67)	7 (3.92)	10 (1.26)
Hulga	-	1 (0.42)	4 (1.35)	3 (1.68)	8 (1.01)
Sunflower	-	0.5 (0.21)	-	-	0.5 (0.06)
Total	3.25 (4.03)	20 (8.49)	35 (11.81)	13 (7.28)	71.25 (9.01)
Rabi					
Gram	3.25 (4.03)	6.5 (2.76)	5 (1.69)	-	14.75 (1.86)
Wheat	-	1 (0.42)	-	-	1 (0.13)
Jowar	1 (1.24)	5 (2.12)	29 (9.79)	4 (2.24)	39 (4.93)
Onion	-	4 (1.7)	10 (3.37)	-	14 (1.77)
Total	4.25 (5.27)	16.5 (7)	44 (14.85)	4 (2.24)	68.75 (8.69)
Summer					
Groundnut	-	-	11 (3.71)	-	11 (1.39)
Total	-	-	11 (3.71)	-	11 (1.39)
Perennial					
Total	-	-	-	-	-
Gross unirrigated Area	7.5 (9.30)	36.5 (15.49)	90 (30.37)	17 (9.52)	151 (19.09)
Gross Crop Area	80.64 (100)	235.62 (100)	296.34 (100)	178.48 (100)	791.08 (100)

Note: Figures in parentheses are percentages to the total gross cropped area

Appendix 14: Cropping pattern of selected farmers (% of GCA for the reference year 2018-19) – Non- Beneficiary (Ahmednagar)

Crop	Marginal	Small	Medium	Large	Total
Irrigated Area					
Kharif					
Bajra	6.5 (30.55)	14 (12.58)	21 (14.19)	8 (5.73)	49.5 (11.78)
Cotton	2.5 (11.75)	7.5 (6.74)	13.25 (8.96)	9 (6.45)	32.25 (7.68)
Onion	-	1 (0.9)	3 (2.03)	5 (3.58)	9 (2.14)
Maize	0.5 (2.35)	4.5 (4.04)	2 (1.35)	7 (5.02)	14 (3.33)
Tur	-	2 (1.8)	6 (4.06)	-	8 (1.9)
Soyabean	-	-	-	3 (2.15)	3 (0.71)
Udid	-	-	-	6 (4.3)	6 (1.43)
Hulga	-	1 (0.9)	4 (2.7)	1 (0.72)	6 (1.43)
Groundnut	-	0 (0)	0 (0)	2 (1.43)	2 (0.48)
Total	9.5 (44.64)	30 (26.95)	49.25 (33.29)	41 (29.39)	129.75 (30.89)
Rabi					
Gram	8 (37.59)	17 (15.27)	18 (12.17)	16.5 (11.83)	59.5 (14.16)
Wheat	1 (4.7)	8 (7.19)	5.75 (3.89)	11.5 (8.24)	26.25 (6.25)
Jowar	0.5 (2.35)	9.5 (8.53)	12.5 (8.45)	20 (14.34)	42.5 (10.12)
Onion	-	5.75 (5.17)	4.5 (3.04)	1 (0.72)	11.25 (2.68)
Total	9.5 (44.64)	40.25 (36.16)	40.75 (27.54)	49 (35.13)	139.5 (33.21)
Summer					
Groundnut	-	-	10 (6.76)	-	10 (2.38)
Total	-	-	10 (6.76)	-	10 (2.38)
Perennial					
Lemon	0.28 (1.32)	4 (3.59)	-	-	4.28 (1.02)
Pomegranate	-	2 (1.8)	-	3 (2.15)	5 (1.19)
Sugarcane	-	6.57 (5.9)	5.95 (4.02)	2 (1.43)	14.52 (3.46)
Total	0.28 (1.32)	12.57 (11.29)	5.95 (4.02)	5 (3.58)	23.8 (5.67)
Gross Irrigated Area	19.28 (90.60)	82.82 (74.40)	105.95 (71.61)	95 (68.10)	303.05 (72.15)
Unirrigated Area					
Kharif					
Bajara	-	3.5 (3.14)	13 (8.79)	17 (12.19)	33.5 (7.98)
Cotton	-	9 (8.08)	6 (4.06)	4 (2.87)	19 (4.52)
Maize	0.25 (1.17)	-	-	2 (1.43)	2.25 (0.54)
Tur	-	3 (2.69)	6 (4.06)	12.5 (8.96)	21.5 (5.12)
Soyabean	-	-	-	1 (0.72)	1 (0.24)
Udid	-	-	-	3 (2.15)	3 (0.71)
Hulga	-	-	-	2 (1.43)	2 (0.48)
Total	0.25 (1.17)	15.5 (13.92)	25 (16.9)	41.5 (29.75)	82.25 (19.58)
Rabi					
Gram	1.25 (5.87)	6.5 (5.84)	1 (0.68)	-	8.75 (2.08)
Jowar	0.5 (2.35)	6.5 (5.84)	6 (4.06)	3 (2.15)	16 (3.81)
Onion	-	-	6 (4.06)	-	6 (1.43)
Total	1.75 (8.22)	13 (11.68)	13 (8.79)	3 (2.15)	30.75 (7.32)
Summer					
Groundnut	-	-	4 (2.7)	-	4 (0.95)
Total	-	-	4 (2.7)	-	4 (0.95)
Perennial					
Total	-	-	-	-	-
Gross unirrigated Area	2 (9.40)	28.5 (25.60)	42 (28.39)	44.5 (31.90)	117 (27.85)
Gross Crop Area	21.28 (100)	111.32 (100)	147.95 (100)	139.5 (100)	420.05 (100)

Note: Figures in parentheses are percentages to the total gross cropped area

Appendix 15: Cropping pattern of selected farmers (% of GCA for the reference year 2018-19) – Beneficiary (Yavatmal)

Crop	Marginal	Small	Medium	Large	Total
Irrigated Area					
Kharif					
Cotton	5.75 (12.62)	23.5 (8.83)	15.5 (11.92)	15 (10.83)	59.75 (10.29)
Green Gram (mung)	1 (2.19)	-	-	-	1 (0.17)
Tur	5.25 (11.52)	23.25 (8.73)	8 (6.15)	14 (10.11)	50.5 (8.7)
Soyabean	5 (10.97)	56.75 (21.32)	26 (19.99)	22.5 (16.25)	110.25 (18.99)
Udid	-	1 (0.38)	-	-	1 (0.17)
Total	17 (37.31)	104.5 (39.25)	49.5 (38.06)	51.5 (37.18)	222.5 (38.33)
Rabi					
Gram	9.5 (20.85)	22 (8.26)	13.5 (10.38)	16 (11.55)	61 (10.51)
Wheat	5.25 (11.52)	15.22 (5.72)	13 (10)	6.5 (4.69)	39.97 (6.89)
Total	14.75 (32.37)	37.22 (13.98)	26.5 (20.38)	22.5 (16.25)	100.97 (17.39)
Summer					
Groundnut	1.06 (2.33)	-	2.05 (1.58)	4 (2.89)	7.11 (1.22)
Total	1.06 (2.33)	-	2.05 (1.58)	4 (2.89)	7.11 (1.22)
Perennial					
Total	-	-	-	-	-
Gross Irrigated Area	32.81 (72.01)	141.72 (53.23)	78.05 (60.02)	78 (56.32)	330.58 (56.94)
Unirrigated Area					
Kharif					
Cotton	2.75 (6.04)	46 (17.28)	21.5 (16.53)	15 (10.83)	85.25 (14.68)
Tur	3.25 (7.13)	33 (12.4)	10 (7.69)	8.5 (6.14)	54.75 (9.43)
Soyabean	6.75 (14.82)	41.25 (15.49)	20.5 (15.76)	37 (26.71)	105.5 (18.17)
Total	12.75 (27.99)	120.25 (45.17)	52 (39.98)	60.5 (43.68)	245.5 (42.29)
Rabi					
Gram	-	4.25 (1.6)	-	-	4.25 (0.73)
Total	-	4.25 (1.6)	-	-	4.25 (0.73)
Summer					
Total	-	-	-	-	-
Perennial					
Total	-	-	-	-	-
Gross unirrigated Area	12.75 (27.99)	124.5 (46.77)	52 (39.98)	60.5 (43.68)	249.75 (43.02)
Gross Crop Area	45.56 (100)	266.22 (100)	130.05 (100)	138.5 (100)	580.53 (100)

Note: Figures in parentheses are percentages to the total gross cropped area

Appendix 16: Cropping pattern of selected farmers (% of GCA for the reference year 2018-19) – Non-Beneficiary (Yavatmal)

Crop	Marginal	Small	Medium	Large	Total
Irrigated Area					
Kharif					
Cotton	2 (17.01)	18.5 (13.86)	13.5 (17.41)	21.5 (9.91)	55.5 (12.62)
Tur	0.5 (4.25)	13 (9.74)	3 (3.87)	16 (7.37)	32.5 (7.39)
Soyabean	2 (17.01)	21.5 (16.1)	15.5 (19.99)	81 (37.32)	120 (27.28)
Total	4.5 (38.27)	53 (39.7)	32 (41.28)	118.5 (54.6)	208 (47.29)
Rabi					
Gram	-	7 (5.24)	7.5 (9.67)	42 (19.35)	56.5 (12.85)
Wheat	2.01 (17.09)	7.5 (5.62)	6.02 (7.77)	10.04 (4.63)	25.57 (5.81)
Total	2.01 (17.09)	14.5 (10.86)	13.52 (17.44)	52.04 (23.98)	82.07 (18.66)
Summer					
Groundnut	-	1 (0.75)	-	-	1 (0.23)
Total	-	1 (0.75)	-	-	1 (0.23)
Perennial					
Total	-	-	-	-	-
Gross Irrigated Area	6.51 (55.36)	68.5 (51.31)	45.52 (58.72)	170.54 (78.58)	291.07 (66.18)
Unirrigated Area					
Kharif					
Cotton	1 (8.5)	27.5 (20.6)	12 (15.48)	15.5 (7.14)	56 (12.73)
Tur	2 (17.01)	14.5 (10.86)	6 (7.74)	13 (5.99)	35.5 (8.07)
Soyabean	2.25 (19.13)	21 (15.73)	11 (14.19)	16 (7.37)	50.25 (11.43)
Udid	-	0.5 (0.37)	2 (2.58)	-	2.5 (0.57)
Hulga	-	0.5 (0.37)	1 (1.29)	-	1.5 (0.34)
Total	5.25 (44.64)	64 (47.94)	32 (41.28)	44.5 (20.5)	145.75 (33.14)
Rabi					
Gram	-	1 (0.75)	-	-	1 (0.23)
Jowar	-	-	-	2 (0.92)	2 (0.45)
Total	-	1 (0.75)	-	2 (0.92)	3 (0.68)
Summer					
Total	-	-	-	-	-
Perennial					
Total	-	-	-	-	-
Gross unirrigated Area	5.25 (44.64)	65 (48.69)	32 (41.28)	46.5 (21.42)	148.75 (33.82)
Gross Crop Area	11.76 (100)	133.5 (100)	77.52 (100)	217.04 (100)	439.82 (100)

Note: Figures in parentheses are percentages to the total gross cropped area

Appendix 17: Cropping pattern of selected farmers (% of GCA for the reference year 2018-19) – Overall Beneficiary Farmers

Crop	Marginal	Small	Medium	Large	Total
Irrigated Area					
Kharif					
Bajra	16.4 (13.02)	39.5 (7.87)	35 (8.21)	12 (3.79)	102.9 (7.5)
Cotton	5.75 (4.56)	31 (6.18)	33 (7.74)	22 (6.94)	91.75 (6.69)
Onion	1 (0.79)	5.5 (1.1)	2 (0.47)	5 (1.58)	13.5 (0.98)
Green Gram (mung)	1 (0.79)	-	-	-	1 (0.07)
Maize	-	6 (1.2)	7 (1.64)	27 (8.52)	40 (2.92)
Tur	17.75 (14.09)	33.14 (6.6)	15 (3.52)	31 (9.78)	96.89 (7.07)
Soyabean	5 (3.97)	56.75 (11.3)	26 (6.1)	22.5 (7.1)	110.25 (8.04)
Udid	-	1 (0.2)	-	-	1 (0.07)
Hulga	-	-	-	2 (0.63)	2 (0.15)
Total	46.9 (37.22)	172.89 (34.44)	118 (27.68)	121.5 (38.33)	459.29 (33.49)
Rabi					
Gram	27.15 (21.55)	59.25 (11.8)	33 (7.74)	34.5 (10.88)	153.9 (11.22)
Wheat	7 (5.56)	29.75 (5.93)	22.5 (5.28)	25 (7.89)	84.25 (6.14)
Jowar	1 (0.79)	7.5 (1.49)	25.5 (5.98)	22 (6.94)	56 (4.08)
Onion	12.5 (9.92)	17.39 (3.46)	37.5 (8.8)	7 (2.21)	74.39 (5.43)
Total	47.65 (37.82)	113.89 (22.69)	118.5 (27.8)	88.5 (27.92)	368.54 (26.88)
Summer					
Groundnut	1.5 (1.19)	5 (1)	18 (4.22)	5 (1.58)	29.5 (2.15)
Kadwal	-	1.2 (0.24)	-	-	1.2 (0.09)
Total	1.5 (1.19)	6.2 (1.24)	18 (4.22)	5 (1.58)	30.7 (2.24)
Perennial					
Lemon	3 (2.38)	7 (1.39)	7.25 (1.7)	4.5 (1.42)	21.75 (1.59)
Pomegranate	4 (3.17)	9.52 (1.9)	2.5 (0.59)	-	16.02 (1.17)
Sugarcane	2.7 (2.14)	18 (3.59)	19.99 (4.69)	19.98 (6.3)	60.67 (4.42)
Grapes	-	13.5 (2.69)	-	-	13.5 (0.98)
Total	9.7 (7.7)	48.02 (9.57)	29.74 (6.98)	24.48 (7.72)	111.94 (8.16)
Gross Irrigated Area	105.75 (83.93)	341 (67.93)	284.24 (66.69)	239.48 (75.55)	970.47 (70.77)
Unirrigated Area					
Kharif					
Bajra	1 (0.79)	10.5 (2.09)	22 (5.16)	3 (0.95)	36.5 (2.66)
Cotton	4 (3.17)	51 (10.16)	26.5 (6.22)	15 (4.73)	96.5 (7.04)
Onion	-	1 (0.2)	-	-	1 (0.07)
Maize	-	2 (0.4)	2 (0.47)	-	4 (0.29)
Tur	4.25 (3.37)	33 (6.57)	12 (2.82)	15.5 (4.89)	64.75 (4.72)
Soyabean	6.75 (5.36)	41.25 (8.22)	20.5 (4.81)	37 (11.67)	105.5 (7.69)
Hulga	-	1 (0.2)	4 (0.94)	3 (0.95)	8 (0.58)
Sunflower	-	0.5 (0.1)	-	-	0.5 (0.04)
Total	16 (12.7)	140.25 (27.94)	87 (20.41)	73.5 (23.19)	316.75 (23.1)
Rabi					
Gram	3.25 (2.58)	10.75 (2.14)	5 (1.17)	-	19 (1.39)
Wheat	-	1 (0.2)	-	-	1 (0.07)
Jowar	1 (0.79)	5 (1)	29 (6.8)	4 (1.26)	39 (2.84)
Onion	-	4 (0.8)	10 (2.35)	-	14 (1.02)
Total	4.25 (3.37)	20.75 (4.13)	44 (10.32)	4 (1.26)	73 (5.32)
Summer					
Groundnut	-	-	11 (2.58)	-	11 (0.8)
Total	-	-	11 (2.58)	-	11 (0.8)
Perennial					
Total	-	-	-	-	-
Gross unirrigated Area	20.25 (16.07)	161 (32.07)	142 (33.31)	77.5 (24.45)	400.75 (29.23)
Gross Crop Area	126 (100)	502 (100)	426.24 (100)	316.98 (100)	1371.22 (100)

Note: Figures in parentheses are percentages to the total gross cropped area

Appendix 18: Cropping pattern of selected farmers (% of GCA for the reference year 2018-19) – Overall Non-Beneficiary Farmers

Crop	Marginal	Small	Medium	Large	Total
Irrigated Area					
Kharif					
Bajra	6.5 (19.7)	14 (5.72)	21 (9.31)	8 (2.24)	49.5 (5.76)
Cotton	4.5 (13.64)	26 (10.62)	26.75 (11.86)	30.5 (8.56)	87.75 (10.2)
Onion	-	1 (0.41)	3 (1.33)	5 (1.4)	9 (1.05)
Maize	0.5 (1.52)	4.5 (1.84)	2 (0.89)	7 (1.96)	14 (1.63)
Tur	0.5 (1.52)	15 (6.12)	9 (3.99)	16 (4.49)	40.5 (4.71)
Soyabean	2 (6.06)	21.5 (8.78)	15.5 (6.87)	84 (23.56)	123 (14.3)
Udid	-	-	-	6 (1.68)	6 (0.7)
Hulga	-	1 (0.41)	4 (1.77)	1 (0.28)	6 (0.7)
Groundnut	-	-	-	2 (0.56)	2 (0.23)
Total	14 (42.42)	83 (33.89)	81.25 (36.03)	159.5 (44.74)	337.75 (39.28)
Rabi					
Gram	8 (24.24)	24 (9.8)	25.5 (11.31)	58.5 (16.41)	116 (13.49)
Wheat	3 (9.09)	15.5 (6.33)	11.75 (5.21)	21.5 (6.03)	51.75 (6.02)
Jowar	0.5 (1.52)	9.5 (3.88)	12.5 (5.54)	20 (5.61)	42.5 (4.94)
Onion	-	5.75 (2.35)	4.5 (2)	1 (0.28)	11.25 (1.31)
Total	11.5 (34.85)	54.75 (22.35)	54.25 (24.05)	101 (28.33)	221.5 (25.76)
Summer					
Groundnut	-	1 (0.41)	10 (4.43)	-	11 (1.28)
Total	-	1 (0.41)	10 (4.43)	-	11 (1.28)
Perennial					
Lemon	0.25 (0.76)	4 (1.63)	-	-	4.25 (0.49)
Pomegranate	-	2 (0.82)	-	3 (0.84)	5 (0.58)
Sugarcane	-	6.67 (2.72)	6.03 (2.67)	1.99 (0.56)	14.69 (1.71)
Total	0.25 (0.76)	12.67 (5.17)	6.03 (2.67)	4.99 (1.4)	23.94 (2.78)
Gross Irrigated Area	25.75 (78.03)	151.42 (61.82)	151.53 (67.19)	265.49 (74.47)	594.19 (69.10)
Unirrigated Area					
Kharif					
Bajra	-	3.5 (1.43)	13 (5.76)	17 (4.77)	33.5 (3.9)
Cotton	1 (3.03)	36.5 (14.9)	18 (7.98)	19.5 (5.47)	75 (8.72)
Maize	0.25 (0.76)	-	-	2 (0.56)	2.25 (0.26)
Tur	2 (6.06)	17.5 (7.15)	12 (5.32)	25.5 (7.15)	57 (6.63)
Soyabean	2.25 (6.82)	21 (8.57)	11 (4.88)	17 (4.77)	51.25 (5.96)
Udid	-	0.5 (0.2)	2 (0.89)	3 (0.84)	5.5 (0.64)
Hulga	-	0.5 (0.2)	1 (0.44)	2 (0.56)	3.5 (0.41)
Total	5.5 (16.67)	79.5 (32.46)	57 (25.27)	86 (24.12)	228 (26.51)
Rabi					
Gram	1.25 (3.79)	7.5 (3.06)	1 (0.44)	-	9.75 (1.13)
Jowar	0.5 (1.52)	6.5 (2.65)	6 (2.66)	5 (1.4)	18 (2.09)
Onion	-	-	6 (2.66)	-	6 (0.7)
Total	1.75 (5.3)	14 (5.72)	13 (5.76)	5 (1.4)	33.75 (3.92)
Summer					
Groundnut	-	-	4 (1.77)	-	4 (0.47)
Total	-	-	4 (1.77)	-	4 (0.47)
Perennial					
Total	-	-	-	-	-
Gross Unirrigated Area	7.25 (21.97)	93.5 (38.18)	74 (32.81)	91 (25.53)	265.75 (30.90)
Gross Crop Area	33 (100)	244.92 (100)	225.53 (100)	356.49 (100)	859.94 (100)

Note: Figures in parentheses are percentages to the total gross cropped area

Appendix 18.1: Cropping pattern of selected farmers (% of GCA for the reference year 2018-19) – Overall Beneficiary and Non-Beneficiary Farmers

Crop	Marginal	Small	Medium	Large	Total
Irrigated Area					
Kharif					
Bajra	14.40	7.16	8.59	2.97	6.83
Cotton	6.45	7.63	9.17	7.80	8.05
Onion	0.63	0.87	0.77	1.48	1.01
Green Gram (mung)	0.63	-	-	-	0.04
Maize	0.31	1.41	1.38	5.05	2.42
Tur	11.48	6.45	3.68	6.98	6.16
Soyabean	4.40	10.48	6.37	15.81	10.45
Udid	-	0.13	-	0.89	0.31
Hulga	-	0.13	0.61	0.45	0.36
Total	38.30	34.26	30.57	41.72	35.72
Rabi					
Gram	22.11	11.15	8.98	13.81	12.10
Wheat	6.29	6.06	5.25	6.90	6.10
Jowar	0.94	2.28	5.83	6.24	4.41
Onion	7.86	3.10	6.44	1.19	3.84
Total	37.20	22.58	26.50	28.14	26.45
Summer					
Groundnut	0.94	0.80	4.30	0.74	1.82
Kadwal	-	0.16	-	-	0.05
Total	0.94	0.96	4.30	0.74	1.87
Perennial					
Lemon	2.04	1.47	1.11	0.67	1.17
Pomegranate	2.52	1.54	0.38	0.45	0.94
Sugarcane	1.70	3.30	3.99	3.26	3.38
Grapes	-	1.81	-	-	0.61
Total	6.26	8.13	5.49	4.38	6.09
Gross Irrigated Area	82.70	65.93	66.86	74.98	70.13
Unirrigated Area					
Kharif					
Bajra	0.63	1.87	5.37	2.97	3.14
Cotton	3.14	11.71	6.83	5.12	7.69
Onion	-	0.13	-	-	0.04
Maize	0.16	0.27	0.31	0.30	0.28
Tur	3.93	6.76	3.68	6.09	5.46
Soyabean	5.66	8.33	4.83	8.02	7.03
Hulga	-	0.20	0.77	0.74	0.52
Sunflower	-	0.07	-	-	0.02
Total	13.52	29.42	22.09	23.68	24.42
Rabi					
Gram	2.83	2.44	0.92	-	1.29
Wheat	-	0.13	-	-	0.04
Jowar	0.94	1.94	6.37	3.56	3.65
Onion	-	1.31	2.22	0.15	1.13
Total	3.77	4.65	8.75	1.34	4.78
Summer					
Groundnut	-	-	2.30	-	0.67
Total	-	-	2.30	-	0.67
Gross unirrigated Area	17.30	34.07	33.14	25.02	29.87
Gross Crop Area	159 (100)	746.92 (100)	651.77 (100)	673.47 (100)	2231.16 (100)

Appendix 19: Production, Value of Output, Cost and Net Returns for Kharif Crops – Bajra

HH	Farm Size	Production(quintals/acre)			Value of Main Product per Acre	Value of By Product Per Acre	Value of output (main + by-product) (Rs/acre)	Cost of production (Rs/acre)		Total Cost per Acre	Net returns (Farm business income) (Rs/acre)	Gross Farm income from cultivated area (Rs) per hh	Gross Farm Expenditure from cultivated area (Rs) per hh	Net Farm income from cultivated area (Rs) per hh
		Irrigated	Rainfed	Total				Material cost	Labour cost					
Ahmednagar beneficiary														
15	Marginal	3.27	4.00	3.32	6392	2481	8874	2636	3675	6312	2562	10293	7322	2972
29	Small	3.84	4.05	3.89	7569	2405	9974	2635	3825	6460	3514	17196	11138	6058
19	Medium	2.83	2.91	2.86	5518	2246	7764	2825	3425	6250	1514	23292	18750	4542
5	Large	2.75	2.67	2.73	5407	2873	8280	3633	3200	6833	1447	24840	20500	4340
68	Total	3.28	3.25	3.27	6351	2400	8751	2820	3576	6396	2355	17939	13111	4827
Ahmednagar Non beneficiary														
5	Marginal	3.15	0.00	3.15	5846	2538	8385	1962	2538	4500	3885	10900	5850	5050
12	Small	3.64	4.14	3.74	7220	2571	9791	3114	3486	6600	3191	14279	9625	4654
9	Medium	2.98	2.56	2.82	5340	2537	7876	2721	3303	6024	1853	29756	22756	7000
8	Large	2.75	4.26	3.78	7566	2280	9846	3600	4240	7840	2006	30769	24500	6269
34	Total	3.15	3.59	3.33	6446	2467	8913	3009	3564	6573	2340	21759	16046	5713
Yavatmal beneficiary														
-	Marginal	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Small	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Medium	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Large	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Total	-	-	-	-	-	-	-	-	-	-	-	-	-
Yavatmal Non beneficiary														
-	Marginal	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Small	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Medium	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Large	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Total	-	-	-	-	-	-	-	-	-	-	-	-	-
Overall beneficiary														
15	Marginal	3.27	4.00	3.32	6392	2481	8874	2636	3675	6312	2562	10293	7322	2972
29	Small	3.84	4.05	3.89	7569	2405	9974	2635	3825	6460	3514	17196	11138	6058
19	Medium	2.83	2.91	2.86	5518	2246	7764	2825	3425	6250	1514	23292	18750	4542
5	Large	2.75	2.67	2.73	5407	2873	8280	3633	3200	6833	1447	24840	20500	4340
68	Total	3.28	3.25	3.27	6351	2400	8751	2820	3576	6396	2355	17939	13111	4827
Overall Non beneficiary														
5	Marginal	3.15	0.00	3.15	5846	2538	8385	1962	2538	4500	3885	10900	5850	5050
12	Small	3.64	4.14	3.74	7220	2571	9791	3114	3486	6600	3191	14279	9625	4654
9	Medium	2.98	2.56	2.82	5340	2537	7876	2721	3303	6024	1853	29756	22756	7000
8	Large	2.75	4.26	3.78	7566	2280	9846	3600	4240	7840	2006	30769	24500	6269
34	Total	3.15	3.59	3.33	6446	2467	8913	3009	3564	6573	2340	21759	16046	5713

Appendix 20: Production, Value of Output, Cost and Net Returns for Kharif Crops – Cotton

HH	Farm Size	Production(quintals/acre)			Value of Main Product per Acre	Value of By Product Per Acre	Value of output (main + by-product) (Rs/acre)	Cost of production (Rs/acre)		Total Cost per Acre	Net returns (Farm business income) (Rs/acre)	Gross Farm income from cultivated area (Rs) per hh	Gross Farm Expenditure from cultivated area (Rs) per hh	Net Farm income from cultivated area (Rs) per hh
		Irrigated	Rainfed	Total				Material cost	Labour cost					
Ahmednagar beneficiary														
1	Marginal	-	2.00	2.00	10000	-	10000	2000	3000	5000	5000	12500	6250	6250
9	Small	3.47	2.35	3.02	16028	-	16028	2122	3158	5280	10748	22261	7333	14928
11	Medium	2.80	2.40	2.71	16000	-	16000	2346	3258	5604	10396	32727	11464	21264
3	Large	3.50	0.00	3.50	18857	-	18857	2400	3386	5786	13071	44000	13500	30500
24	Total	3.11	2.33	2.91	16297	-	16297	2280	3242	5523	10775	29369	9952	19417
Ahmednagar Non beneficiary														
2	Marginal	4.50	-	4.50	24875	-	24875	1950	2800	4750	20125	31094	5938	25156
10	Small	2.55	2.19	2.36	13200	-	13200	1991	2917	4908	8292	21780	8098	13682
7	Medium	2.67	2.35	2.57	14674	-	14674	2296	3209	5505	9169	40354	15139	25214
4	Large	2.86	2.75	2.83	16119	-	16119	2269	3200	5469	10650	52388	17775	34613
23	Total	2.84	2.36	2.66	15064	-	15064	2174	3093	5267	9797	33566	11736	21830
Yavatmal beneficiary														
7	Marginal	2.04	2.00	2.03	10735	-	10735	2101	2806	4907	5828	13036	5959	7077
36	Small	2.68	2.36	2.47	13009	-	13009	2113	2898	5012	7997	25114	9675	15439
13	Medium	3.00	2.56	2.74	14808	-	14808	2318	3003	5321	9487	42146	15144	27002
8	Large	2.87	2.58	2.73	13785	-	13785	2418	2838	5257	8528	51694	19713	31981
64	Total	2.75	2.44	2.57	13495	-	13495	2228	2907	5135	8360	30575	11634	18941
Yavatmal Non beneficiary														
2	Marginal	2.50	2.05	2.35	12297	-	12297	1967	2667	4633	7663	18445	6950	11495
20	Small	2.22	2.00	2.09	10976	-	10976	2172	2739	4911	6065	25245	11296	13949
8	Medium	2.22	2.08	2.16	11667	-	11667	2200	2903	5103	6564	37188	16266	20922
6	Large	2.30	2.16	2.24	12172	-	12172	2219	2972	5191	6981	75058	32008	43050
36	Total	2.26	2.06	2.16	11566	-	11566	2189	2852	5040	6526	35823	15611	20213
Overall beneficiary														
8	Marginal	2.04	2.00	2.03	10641	-	10641	2088	2831	4919	5722	12969	5995	6973
45	Small	2.87	2.36	2.55	13469	-	13469	2115	2938	5053	8416	24543	9207	15336
24	Medium	2.89	2.53	2.73	15259	-	15259	2328	3100	5428	9831	37829	13457	24372
11	Large	3.07	2.58	2.87	14745	-	14745	2415	2942	5357	9388	49595	18018	31577
88	Total	2.87	2.42	2.64	14139	-	14139	2240	2984	5224	8915	30246	11176	19070
Overall Non beneficiary														
4	Marginal	3.61	2.05	3.33	18014	-	18014	1959	2727	4686	13328	24769	6444	18326
30	Small	2.31	2.05	2.16	11563	-	11563	2124	2786	4910	6653	24090	10230	13860
15	Medium	2.44	2.17	2.33	12960	-	12960	2241	3035	5276	7684	38665	15740	22925
10	Large	2.46	2.28	2.39	13198	-	13198	2232	3031	5263	7935	65990	26315	39675
59	Total	2.47	2.14	2.32	12668	-	12668	2184	2928	5112	7556	34943	14100	20843

Appendix 21: Production, Value of Output, Cost and Net Returns for Kharif Crops – Onion

HH	Farm Size	Production(quintals/acre)			Value of Main Product per Acre	Value of By Product Per Acre	Value of output (main + by-product) (Rs/acre)	Cost of production (Rs/acre)		Total Cost per Acre	Net returns (Farm business income) (Rs/acre)	Gross Farm income from cultivated area (Rs) per hh	Gross Farm Expenditure from cultivated area (Rs) per hh	Net Farm income from cultivated area (Rs) per hh
		Irrigated	Rainfed	Total				Material cost	Labour cost					
Ahmednagar beneficiary														
1	Marginal	65.00	-	65.00	110500	-	110500	12000	10000	22000	88500	110500	22000	88500
7	Small	62.27	60.00	61.92	99385	-	99385	13231	12615	25846	73538	92286	24000	68286
1	Medium	72.00	-	72.00	108000	-	108000	13500	14000	27500	80500	216000	55000	161000
3	Large	70.40	-	70.40	129720	-	129720	17300	15800	33100	96620	216200	55167	161033
12	Total	66.93	60.00	66.45	111800	-	111800	14586	13724	28310	83490	135092	34208	100883
Ahmednagar Non beneficiary														
-	Marginal	-	-	-	-	-	-	-	-	-	-	-	-	-
1	Small	55.00	0.00	55.00	82500	-	82500	10000	9000	19000	63500	82500	19000	63500
2	Medium	60.00	0.00	60.00	96000	-	96000	12833	11333	24167	71833	144000	36250	107750
3	Large	61.00	0.00	61.00	103750	-	103750	14000	14600	28600	75150	172917	47667	125250
6	Total	60.00	0.00	60.00	98806	-	98806	13167	12889	26056	72750	148208	39083	109125
Yavatmal beneficiary														
-	Marginal	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Small	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Medium	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Large	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Total	-	-	-	-	-	-	-	-	-	-	-	-	-
Yavatmal Non beneficiary														
-	Marginal	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Small	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Medium	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Large	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Total	-	-	-	-	-	-	-	-	-	-	-	-	-
Overall beneficiary														
1	Marginal	65.00	0.00	65.00	110500	-	110500	12000	10000	22000	88500	110500	22000	88500
7	Small	62.27	60.00	61.92	99385	-	99385	13231	12615	25846	73538	92286	24000	68286
1	Medium	72.00	0.00	72.00	108000	-	108000	13500	14000	27500	80500	216000	55000	161000
3	Large	70.40	0.00	70.40	129720	-	129720	17300	15800	33100	96620	216200	55167	161033
12	Total	66.93	60.00	66.45	111800	-	111800	14586	13724	28310	83490	135092	34208	100883
Overall Non beneficiary														
-	Marginal	-	-	-	-	-	-	-	-	-	-	-	-	-
1	Small	55.00	0.00	55.00	82500	-	82500	10000	9000	19000	63500	82500	19000	63500
2	Medium	60.00	0.00	60.00	96000	-	96000	12833	11333	24167	71833	144000	36250	107750
3	Large	61.00	0.00	61.00	103750	-	103750	14000	14600	28600	75150	172917	47667	125250
6	Total	60.00	0.00	60.00	98806	-	98806	13167	12889	26056	72750	148208	39083	109125

Appendix 22: Production, Value of Output, Cost and Net Returns for Kharif Crops – Mung

HH	Farm Size	Production (quintals/acre)			Value of Main Product per Acre	Value of By Product Per Acre	Value of output(main + by-product) (Rs/acre)	Cost of production (Rs/acre)		Total Cost per Acre	Net returns (Farm business income) (Rs/acre)	Gross Farm income from cultivated area (Rs) per hh	Gross Farm Expenditure from cultivated area (Rs) per hh	Net Farm income from cultivated area (Rs) per hh
		Irrigated	Rainfed	Total				Material cost	Labour cost					
Ahmednagar beneficiary														
-	Marginal	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Small	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Medium	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Large	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Total	-	-	-	-	-	-	-	-	-	-	-	-	-
Ahmednagar Non beneficiary														
-	Marginal	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Small	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Medium	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Large	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Total	-	-	-	-	-	-	-	-	-	-	-	-	-
Yavatmal beneficiary														
T	Marginal	2.00	0.00	2.00	9600.00	0.00	9600.00	2500.00	3000.00	5500.00	4100.00	9600.00	5500.00	4100.00
-	Small	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Medium	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Large	-	-	-	-	-	-	-	-	-	-	-	-	-
1	Total	2.00	0.00	2.00	9600.00	0.00	9600.00	2500.00	3000.00	5500.00	4100.00	9600.00	5500.00	4100.00
Yavatmal Non beneficiary														
-	Marginal	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Small	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Medium	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Large	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Total	-	-	-	-	-	-	-	-	-	-	-	-	-
Overall beneficiary														
1	Marginal	2.00	0.00	2.00	9600.00	0.00	9600.00	2500.00	3000.00	5500.00	4100.00	9600.00	5500.00	4100.00
-	Small	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Medium	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Large	-	-	-	-	-	-	-	-	-	-	-	-	-
1	Total	2.00	0.00	2.00	9600.00	0.00	9600.00	2500.00	3000.00	5500.00	4100.00	9600.00	5500.00	4100.00
Overall Non beneficiary														
-	Marginal	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Small	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Medium	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Large	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Total	-	-	-	-	-	-	-	-	-	-	-	-	-

Appendix 23: Production, Value of Output, Cost and Net Returns for Kharif Crops – Maize

HH	Farm Size	Production (quintals/acre)			Value of Main Product per Acre	Value of By Product Per Acre	Value of output(main + by-product) (Rs/acre)	Cost of production (Rs/acre)		Total Cost per Acre	Net returns (Farm business income) (Rs/acre)	Gross Farm income from cultivated area (Rs) per hh	Gross Farm Expenditure from cultivated area (Rs) per hh	Net Farm income from cultivated area (Rs) per hh
		Irrigated	Rainfed	Total				Material cost	Labour cost					
Ahmednagar beneficiary														
-	Marginal	-	-	-	-	-	-	-	-	-	-	-	-	-
5	Small	6.33	6.00	6.25	12700	2153	14853	3563	3563	7125	7728	23765	11400	12365
4	Medium	8.29	7.00	8.00	15733	2556	18289	4222	3333	7556	10733	41150	17000	24150
6	Large	8.56	0.00	8.56	19574	3241	22815	5954	3630	9583	13231	102667	43125	59542
15	Total	8.18	6.50	8.02	17539	2903	20441	5165	3557	8722	11720	59962	25583	34378
Ahmednagar Non beneficiary														
1	Marginal	5.00	4.50	4.83	9788	2350	12138	2000	2000	4000	8138	9103	3000	6103
5	Small	5.56	0.00	5.56	11378	2400	13778	3667	2222	5889	7889	12400	5300	7100
1	Medium	7.00	0.00	7.00	15050	2450	17500	4000	3000	7000	10500	35000	14000	21000
4	Large	6.57	6.00	6.44	13622	2956	16578	4778	3222	8000	8578	37300	18000	19300
11	Total	6.25	5.83	6.19	12999	2712	15711	4246	2862	7108	8603	23209	10500	12709
Yavatmal beneficiary														
-	Marginal	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Small	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Medium	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Large	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Total	-	-	-	-	-	-	-	-	-	-	-	-	-
Yavatmal Non beneficiary														
-	Marginal	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Small	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Medium	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Large	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Total	-	-	-	-	-	-	-	-	-	-	-	-	-
Overall beneficiary														
-	Marginal	-	-	-	-	-	-	-	-	-	-	-	-	-
5	Small	6.33	6.00	6.25	12700	2153	14853	3563	3563	7125	7728	23765	11400	12365
4	Medium	8.29	7.00	8.00	15733	2556	18289	4222	3333	7556	10733	41150	17000	24150
6	Large	8.56	0.00	8.56	19574	3241	22815	5954	3630	9583	13231	102667	43125	59542
15	Total	8.18	6.50	8.02	17539	2903	20441	5165	3557	8722	11720	59962	25583	34378
Overall Non beneficiary														
1	Marginal	5.00	4.50	4.83	9788	2350	12138	2000	2000	4000	8138	9103	3000	6103
5	Small	5.56	0.00	5.56	11378	2400	13778	3667	2222	5889	7889	12400	5300	7100
1	Medium	7.00	0.00	7.00	15050	2450	17500	4000	3000	7000	10500	35000	14000	21000
4	Large	6.57	6.00	6.44	13622	2956	16578	4778	3222	8000	8578	37300	18000	19300
11	Total	6.25	5.83	6.19	12999	2712	15711	4246	2862	7108	8603	23209	10500	12709

Appendix 24: Production, Value of Output, Cost and Net Returns for Kharif Crops – Tur

HH	Farm Size	Production (quintals/acre)			Value of Main Product per Acre	Value of By Product Per Acre	Value of output (main + by-product) (Rs/acre)	Cost of production (Rs/acre)		Total Cost per Acre	Net returns (Farm business income) (Rs/acre)	Gross Farm income from cultivated area (Rs) per hh	Gross Farm Expenditure from cultivated area (Rs) per hh	Net Farm income from cultivated area (Rs) per hh
		Irrigated	Rainfed	Total				Material cost	Labour cost					
Ahmednagar beneficiary														
9	Marginal	3.80	3.00	3.74	21078	2926	24004	2167	5556	7722	16281	36006	11583	24422
10	Small	4.31	-	4.31	22562	5374	27935	2556	5090	7646	20289	27628	7562	20066
8	Medium	4.43	4.25	4.39	25278	3667	28944	3000	5167	8167	20778	32563	9188	23375
7	Large	3.18	3.14	3.17	18817	4125	22942	2188	4500	6688	16254	78657	22929	55729
34	Total	3.78	3.35	3.70	21046	3984	25030	2377	4963	7339	17690	41513	12173	29340
Ahmednagar Non beneficiary														
1	Marginal	3.75	0.00	3.75	16875	3000	19875	2000	2000	4000	15875	159000	32000	127000
4	Small	3.00	3.50	3.30	14540	2940	17480	2200	3000	5200	12280	21850	6500	15350
7	Medium	3.96	3.33	3.65	15488	3100	18588	2667	3500	6167	12421	31864	10571	21293
7	Large	0.00	3.26	3.26	15974	3844	19818	2640	3480	6120	13698	35389	10929	24461
19	Total	3.73	3.31	3.49	15819	3305	19125	2453	3107	5560	13565	37746	10974	26772
Yavatmal beneficiary														
16	Marginal	4.05	3.38	3.79	18782	2118	20900	3521	5897	9418	11482	11103	5003	6100
57	Small	3.82	4.95	4.48	22922	2649	25571	4053	5524	9578	15993	25234	9452	15782
15	Medium	6.13	4.50	5.22	28806	2889	31694	3511	5083	8594	23100	38033	10313	27720
10	Large	5.50	5.35	5.44	26660	3000	29660	2622	4600	7222	22438	66735	16250	50485
98	Total	4.67	4.84	4.76	24393	2722	27115	3612	5281	8893	18222	29121	9551	19570
Yavatmal Non beneficiary														
4	Marginal	4.00	2.50	2.80	12880	1700	14580	2200	3200	5400	9180	9113	3375	5738
30	Small	4.96	4.07	4.49	19804	1845	21649	3055	3582	6636	15013	19845	6083	13762
8	Medium	3.67	3.83	3.78	17167	2111	19278	3111	3389	6500	12778	21688	7313	14375
8	Large	3.25	5.38	4.21	18524	1379	19903	2517	3862	6379	13524	72150	23125	49025
50	Total	3.98	4.42	4.21	18654	1676	20331	2801	3662	6463	13868	27650	8790	18860
Overall beneficiary														
25	Marginal	3.87	3.29	3.76	20191	2614	22805	2690	5688	8377	14427	20068	7372	12696
67	Small	3.97	4.95	4.46	22868	3056	25924	3829	5459	9289	16635	25591	9170	16422
23	Medium	5.33	4.46	4.94	27630	3148	30778	3341	5111	8452	22326	36130	9922	26209
17	Large	4.23	4.35	4.27	22612	3581	26192	2398	4548	6946	19246	71644	19000	52644
132	Total	4.24	4.61	4.39	23225	3162	26387	3181	5170	8351	18036	32313	10226	22086
Overall Non beneficiary														
5	Marginal	3.76	2.50	3.52	15924	2690	18614	2048	2286	4333	14281	39090	9100	29990
34	Small	4.70	3.97	4.31	18994	2014	21008	2923	3492	6415	14592	20081	6132	13949
15	Medium	3.86	3.58	3.70	16207	2676	18883	2857	3452	6310	12574	26437	8833	17603
15	Large	3.25	4.34	3.92	17756	2122	19878	2554	3747	6301	13577	54995	17433	37562
69	Total	3.90	4.00	3.96	17647	2255	19902	2678	3464	6142	13760	30430	9391	21039

Appendix 25: Production, Value of Output, Cost and Net Returns for Kharif Crops – Soybean

HH	Farm Size	Production (quintals/acre)			Value of Main Product per Acre	Value of By Product Per Acre	Value of output (main + by-product)(Rs/acre)	Cost of production (Rs/acre)		Total Cost per Acre	Net returns (Farm business income) (Rs/acre)	Gross Farm income from cultivated area (Rs) per hh	Gross Farm Expenditure from cultivated area (Rs) per hh	Net Farm income from cultivated area (Rs) per hh
		Irrigated	Rainfed	Total				Material cost	Labour cost					
Ahmednagar beneficiary														
-	Marginal	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Small	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Medium	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Large	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Total	-	-	-	-	-	-	-	-	-	-	-	-	-
Ahmednagar Non beneficiary														
-	Marginal	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Small	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Medium	-	-	-	-	-	-	-	-	-	-	-	-	-
2	Large	5.00	5.00	5.00	19000	-	19000	6000	6750	12750	6250	38000	25500	12500
2	Total	5.00	5.00	5.00	19000	-	19000	6000	6750	12750	6250	38000	25500	12500
Yavatmal beneficiary														
10	Marginal	5.80	5.63	5.70	22630	3511	26140	3628	2957	6585	19555	30715	7738	22978
44	Small	6.32	6.27	6.30	25962	3679	29640	3358	3138	6496	23144	66017	14469	51548
13	Medium	6.88	7.73	7.26	28596	2538	31133	5823	6806	12629	18504	111362	45173	66188
9	Large	5.49	7.89	6.98	23882	3803	27685	5996	7370	13366	14319	183028	88361	94667
76	Total	6.26	7.08	6.66	25775	3458	29232	4632	5086	9717	19515	82985	27586	55399
Yavatmal Non beneficiary														
3	Marginal	5.00	3.67	4.29	10735	1824	12559	4000	4735	8735	3824	17792	12375	5417
20	Small	6.26	5.45	5.86	17865	1294	19159	2982	2759	5741	13418	40713	12200	28513
8	Medium	5.94	5.18	5.62	16377	1283	17660	2151	3104	5255	12406	58500	17406	41094
8	Large	5.99	6.38	6.05	15639	1572	17211	2206	2907	5113	12098	208688	62000	146688
39	Total	6.01	5.61	5.89	16187	1464	17651	2436	2946	5383	12269	77054	23497	53558
Overall beneficiary														
10	Marginal	5.80	5.63	5.70	22630	3511	26140	3628	2957	6585	19555	30715	7738	22978
44	Small	6.32	6.27	6.30	25962	3679	29640	3358	3138	6496	23144	66017	14469	51548
13	Medium	6.88	7.73	7.26	28596	2538	31133	5823	6806	12629	18504	111362	45173	66188
9	Large	5.49	7.89	6.98	23882	3803	27685	5996	7370	13366	14319	183028	88361	94667
76	Total	6.26	7.08	6.66	25775	3458	29232	4632	5086	9717	19515	82985	27586	55399
Overall Non beneficiary														
3	Marginal	5.00	3.67	4.29	10735	1824	12559	4000	4735	8735	3824	17792	12375	5417
20	Small	6.26	5.45	5.86	17865	1294	19159	2982	2759	5741	13418	40713	12200	28513
8	Medium	5.94	5.18	5.62	16377	1283	17660	2151	3104	5255	12406	58500	17406	41094
10	Large	5.95	6.29	6.01	15772	1510	17282	2356	3059	5416	11866	174550	54700	119850
41	Total	5.99	5.60	5.87	16252	1430	17682	2518	3034	5552	12131	75149	23595	51555

Appendix 26: Production, Value of Output, Cost and Net Returns for Kharif Crops – Udid

HH	Farm Size	Production (quintals/acre)			Value of Main Product per Acre	Value of By Product Per Acre	Value of output (main + by-product) (Rs/acre)	Cost of production (Rs/acre)		Total Cost per Acre	Net returns (Farm business income) (Rs/acre)	Gross Farm income from cultivated area (Rs) per hh	Gross Farm Expenditure from cultivated area (Rs) per hh	Net Farm income from cultivated area (Rs) per hh
		Irrigated	Rainfed	Total				Material cost	Labour cost					
Ahmednagar beneficiary														
-	Marginal	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Small	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Medium	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Large	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Total	-	-	-	-	-	-	-	-	-	-	-	-	-
Ahmednagar Non beneficiary														
-	Marginal	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Small	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Medium	-	-	-	-	-	-	-	-	-	-	-	-	-
5	Large	2.97	2.78	2.91	13775	888.89	14664	4722	5278	10000	4664	26395	18000	8395
5	Total	2.97	2.78	2.91	13775	888.89	14664	4722	5278	10000	4664	26395	18000	8395
Yavatmal beneficiary														
-	Marginal	-	-	-	-	-	-	-	-	-	-	-	-	-
1	Small	3.00	-	3.00	13500	3800	17300	4500.00	5000.00	9500.00	7800.00	17300.00	9500.00	7800.00
-	Medium	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Large	-	-	-	-	-	-	-	-	-	-	-	-	-
1	Total	3.00	-	3.00	13500	3800	17300	4500.00	5000.00	9500.00	7800.00	17300.00	9500.00	7800.00
Yavatmal Non beneficiary														
-	Marginal	-	-	-	-	-	-	-	-	-	-	-	-	-
1	Small	-	2.50	2.50	9500.00	-	9500.00	4000.00	4000.00	8000.00	1500.00	4750.00	4000.00	750.00
2	Medium	-	2.75	2.75	12375.00	2000.00	14375.00	4500.00	5250.00	9750.00	4625.00	14375.00	9750.00	4625.00
-	Large	-	-	-	-	-	-	-	-	-	-	-	-	-
3	Total	-	2.70	2.70	11800.00	1600.00	13400.00	4400.00	5000.00	9400.00	4000.00	11166.67	7833.33	3333.33
Overall beneficiary														
-	Marginal	-	-	-	-	-	-	-	-	-	-	-	-	-
1	Small	3.00	0.00	3.00	13500.00	3800.00	17300	4500	5000	9500	7800	17300	9500	7800
-	Medium	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Large	-	-	-	-	-	-	-	-	-	-	-	-	-
1	Total	3.00	0.00	3.00	13500.00	3800.00	17300	4500	5000	9500	7800	17300	9500	7800
Overall Non beneficiary														
	Marginal	-	-	-	-	-	-	-	-	-	-	-	-	-
1	Small	-	2.50	2.50	9500.00	-	9500	4000	4000	8000	1500	4750	4000	750
2	Medium	-	2.75	2.75	12375.00	2000.00	14375	4500	5250	9750	4625	14375	9750	4625
5	Large	2.97	2.78	2.91	13775.00	888.89	14664	4722	5278	10000	4664	26395	18000	8395
8	Total	2.97	2.75	2.86	13345.65	1043.48	14389	4652	5217	9870	4520	20684	14188	6497

Appendix 27: Production, Value of Output, Cost and Net Returns for Kharif Crops – Hulga

HH	Farm Size	Production (quintals/acre)			Value of Main Product per Acre	Value of By Product Per Acre	Value of output(main + by-product) (Rs/acre)	Cost of production (Rs/acre)		Total Cost per Acre	Net returns (Farm business income) (Rs/acre)	Gross Farm income from cultivated area (Rs) per hh	Gross Farm Expenditure from cultivated area (Rs) per hh	Net Farm income from cultivated area (Rs) per hh
		Irrigated	Rainfed	Total				Material cost	Labour cost					
Ahmednagar beneficiary														
-	Marginal	-	-	-	-	-	-	-	-	-	-	-	-	-
1	Small	-	1.25	1.25	5000.00	3000.00	8000	3500	3000	6500	1500	8000	6500	1500
3	Medium	-	2.00	2.00	10650.00	3250.00	13900	4125	4750	8875	5025	18533	11833	6700
3	Large	2.50	2.08	2.25	13500.00	3300.00	16800	5200	5700	10900	5900	28000	18167	9833
7	Total	2.50	1.94	2.05	11510.00	3250.00	14760	4600	5050	9650	5110	21086	13786	7300
Ahmednagar Non beneficiary														
-	Marginal	-	-	-	-	-	-	-	-	-	-	-	-	-
1	Small	1.75	-	1.75	9450.00	2000.00	11450	2000	2500	4500	6950	11450	4500	6950
2	Medium	2.00	-	2.00	11000.00	3000.00	14000	3125	4000	7125	6875	28000	14250	13750
2	Large	2.25	1.95	2.05	12112.50	3000.00	15113	3833	5333	9167	5946	22669	13750	8919
5	Total	2.00	1.95	1.99	11223.44	2875.00	14098	3250	4313	7563	6536	22558	12100	10458
Yavatmal beneficiary														
-	Marginal	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Small	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Medium	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Large	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Total	-	-	-	-	-	-	-	-	-	-	-	-	-
Yavatmal Non beneficiary														
-	Marginal	-	-	-	-	-	-	-	-	-	-	-	-	-
1	Small	-	1.50	1.50	8250.00	2000.00	10250.00	4000.00	3500.00	7500.00	2750.00	5125.00	3750.00	1375.00
1	Medium	-	1.70	1.70	8500.00	2500.00	11000.00	5500.00	5000.00	10500.00	500.00	11000.00	10500.00	500.00
-	Large	-	-	-	-	-	-	-	-	-	-	-	-	-
2.00	Total	-	1.63	1.63	8416.67	2333.33	10750.00	5000.00	4500.00	9500.00	1250.00	8062.50	7125.00	937.50
Overall beneficiary														
-	Marginal	-	-	-	-	-	-	-	-	-	-	-	-	-
1	Small	-	1.25	1.25	5000.00	3000.00	8000	3500	3000	6500	1500	8000	6500	1500
3	Medium	-	2.00	2.00	10650.00	3250.00	13900	4125	4750	8875	5025	18533	11833	6700
3	Large	2.50	2.08	2.25	13500.00	3300.00	16800	5200	5700	10900	5900	28000	18167	9833
7	Total	2.50	1.94	2.05	11510.00	3250.00	14760	4600	5050	9650	5110	21086	13786	7300
Overall Non beneficiary														
-	Marginal	-	-	-	-	-	-	-	-	-	-	-	-	-
2	Small	1.75	1.50	1.67	9050.00	2000.00	11050	2667	2833	5500	5550	8288	4125	4163
3	Medium	2.00	1.70	1.94	10500.00	2900.00	13400	3600	4200	7800	5600	22333	13000	9333
2	Large	2.25	1.95	2.05	12112.50	3000.00	15113	3833	5333	9167	5946	22669	13750	8919
7	Total	2.00	1.81	1.93	10780.26	2789.47	13570	3526	4342	7868	5701	18416	10679	7738

Appendix 28: Production, Value of Output, Cost and Net Returns for Kharif Crops – Sunflower

HH	Farm Size	Production (quintals/acre)			Value of Main Product per Acre	Value of By Product Per Acre	Value of output(main + by-product) (Rs/acre)	Cost of production (Rs/acre)		Total Cost per Acre	Net returns (Farm business income)(Rs/acre)	Gross Farm income from cultivated area (Rs) per hh	Gross Farm Expenditure from cultivated area (Rs) per hh	Net Farm income from cultivated area (Rs) per hh
		Irrigated	Rainfed	Total				Material cost	Labour cost					
Ahmednagar beneficiary														
-	Marginal	-	-	-	-	-	-	-	-	-	-	-	-	-
1	Small	-	2.00	2.00	7000.00	0.00	7000	2000	4500	6500	500	3500	3250	250
-	Medium	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Large	-	-	-	-	-	-	-	-	-	-	-	-	-
1	Total	-	2.00	2.00	7000.00	0.00	7000	2000	4500	6500	500	3500	3250	250
Ahmednagar Non beneficiary														
-	Marginal	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Small	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Medium	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Large	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Total	-	-	-	-	-	-	-	-	-	-	-	-	-
Yavatmal beneficiary														
-	Marginal	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Small	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Medium	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Large	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Total	-	-	-	-	-	-	-	-	-	-	-	-	-
Yavatmal Non beneficiary														
-	Marginal	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Small	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Medium	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Large	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Total	-	-	-	-	-	-	-	-	-	-	-	-	-
Overall beneficiary														
-	Marginal	-	-	-	-	-	-	-	-	-	-	-	-	-
1.00	Small	0.00	2.00	2.00	7000.00	0.00	7000	2000	4500	6500	500	3500	3250	250
-	Medium	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Large	-	-	-	-	-	-	-	-	-	-	-	-	-
1.00	Total	0.00	2.00	2.00	7000.00	0.00	7000	2000	4500	6500	500	3500	3250	250
Overall Non beneficiary														
-	Marginal	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Small	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Medium	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Large	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Total	-	-	-	-	-	-	-	-	-	-	-	-	-

Appendix 29: Production, Value of Output, Cost and Net Returns for Kharif Crops – Groundnut

HH	Farm Size	Production (quintals/acre)			Value of Main Product per Acre	Value of By Product Per Acre	Value of output (main + by-product) (Rs/acre)	Cost of production (Rs/acre)		Total Cost per Acre	Net returns (Farm business income) (Rs/acre)	Gross Farm income from cultivated area (Rs) per hh	Gross Farm Expenditure from cultivated area (Rs) per hh	Net Farm income from cultivated area (Rs) per hh
		Irrigated	Rainfed	Total				Material cost	Labour cost					
Ahmednagar beneficiary														
-	Marginal	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Small	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Medium	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Large	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Total	-	-	-	-	-	-	-	-	-	-	-	-	-
Ahmednagar Non beneficiary														
-	Marginal	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Small	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Medium	-	-	-	-	-	-	-	-	-	-	-	-	-
1	Large	5.00	-	5.00	25000	3000	28000	5000	6000	11000	17000	56000	22000	34000
1	Total	5.00	-	5.00	25000	3000	28000	5000	6000	11000	17000	56000	22000	34000
Yavatmal beneficiary														
-	Marginal	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Small	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Medium	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Large	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Total	-	-	-	-	-	-	-	-	-	-	-	-	-
Yavatmal Non beneficiary														
-	Marginal	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Small	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Medium	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Large	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Total	-	-	-	-	-	-	-	-	-	-	-	-	-
Overall beneficiary														
-	Marginal	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Small	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Medium	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Large	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Total	-	-	-	-	-	-	-	-	-	-	-	-	-
Overall Non beneficiary														
-	Marginal	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Small	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Medium	-	-	-	-	-	-	-	-	-	-	-	-	-
1	Large	5.00	0.00	5.00	25000	3000	28000	5000	6000	11000	17000	56000	22000	34000
1	Total	5.00	0.00	5.00	25000	3000	28000	5000	6000	11000	17000	56000	22000	34000

Appendix 30: Production, Value of Output, Cost and Net Returns for Kharif Crops – All Crops Kharif Season

HH	Farm Size	Production (quintals/acre)			Value of Main Product per Acre	Value of By Product Per Acre	Value of output (main + by-product) (Rs/acre)	Cost of production (Rs/acre)		Total Cost per Acre	Net returns (Farm business income) (Rs/acre)	Gross Farm income from cultivated area (Rs) per hh	Gross Farm Expenditure from cultivated area (Rs) per hh	Net Farm income from cultivated area (Rs) per hh
		Irrigated	Rainfed	Total				Material cost	Labour cost					
Ahmednagar beneficiary														
28	Marginal	5.56	2.92	5.30	15649	2494	18143	2704	4606	7310	10833	21480	8654	12826
42	Small	8.79	6.43	8.25	17627	2191	19817	3423	4489	7912	11905	41705	16652	25054
22	Medium	5.56	3.04	4.71	12582	1903	14486	3114	3788	6902	7584	68148	32470	35677
8	Large	9.99	2.79	8.86	23004	2965	25969	4784	4641	9425	16544	269425	97781	171644
100	Total	7.80	3.94	6.91	17168	2335	19503	3608	4307	7916	11588	60077	24383	35694
Ahmednagar Non beneficiary														
8	Marginal	3.67	4.50	3.68	13664	2381	16045	1979	2310	4289	11756	35599	9516	26083
22	Small	5.26	2.89	4.45	12308	1593	13901	2788	3201	5988	7913	28750	12385	16365
11	Medium	6.57	2.69	5.27	13629	1890	15520	3067	3664	6731	8789	104757	45434	59323
9	Large	10.82	3.70	7.24	18497	1875	20372	4285	4795	9080	11292	186743	83233	103510
50	Total	7.18	3.24	5.71	15184	1863	17047	3378	3883	7261	9786	75006	31950	43056
Yavatmal beneficiary														
17	Marginal	3.76	4.27	3.98	17694	1992	19686	3123	3755	6879	12807	34450	12038	22413
58	Small	4.91	4.41	4.65	21140	2284	23424	3152	3669	6822	16602	90767	26434	64333
15	Medium	5.55	4.97	5.25	23607	1675	25282	4135	5115	9250	16032	171073	62588	108485
10	Large	4.73	6.22	5.53	21736	2623	24358	4360	5600	9959	14399	272815	111545	161270
100	Total	4.92	4.97	4.95	21598	2214	23813	3653	4450	8103	15710	111444	37921	73523
Yavatmal Non beneficiary														
4	Marginal	3.78	2.91	3.31	11766	1231	12996	2913	3705	6618	6378	31679	16131	15548
30	Small	4.53	3.60	4.02	15535	912	16448	2690	2953	5642	10805	64146	22005	42140
8	Medium	4.16	3.51	3.83	14363	930	15293	2431	3161	5592	9701	122344	44734	77609
8	Large	4.95	4.62	4.86	15365	1181	16546	2264	3092	5356	11190	337131	109131	228000
50	Total	4.69	3.87	4.35	15141	1048	16189	2453	3075	5528	10661	114538	39112	75426
Overall beneficiary														
45	Marginal	4.91	4.00	4.68	16616	2256	18873	2902	4204	7106	11767	26380	9933	16448
100	Small	6.45	4.70	5.66	20148	2258	22406	3229	3901	7130	15276	70161	22326	47836
37	Medium	5.56	4.20	4.98	18041	1790	19831	3619	4445	8064	11767	109874	44680	65194
18	Large	7.76	5.61	6.95	22275	2768	25044	4540	5192	9732	15312	271308	105428	165881
200	Total	6.41	4.74	5.73	19840	2262	22102	3635	4393	8028	14074	85761	31152	54609
Overall Non beneficiary														
12	Marginal	3.69	2.99	3.55	12991	1973	14964	2310	2805	5115	9849	34292	11721	22571
52	Small	4.79	3.46	4.14	14632	1103	15735	2717	3022	5739	9995	49171	17935	31235
19	Medium	5.62	3.15	4.60	13969	1446	15415	2773	3431	6204	9211	112162	45139	67022
17	Large	6.46	4.17	5.66	16418	1414	17832	2943	3664	6608	11224	257514	95421	162093
100	Total	5.69	3.64	4.87	15158	1360	16518	2808	3385	6193	10325	94772	35531	59241
Overall Beneficiary and Non Beneficiary														
57	Marginal	4.52	3.74	4.33	15513	2170	17684	2722	3778	6500	11184	28046	10309	17737
152	Small	5.91	4.25	5.14	18263	1863	20127	3054	3601	6655	13472	62980	20824	42157
56	Medium	5.58	3.78	4.83	16401	1651	18052	3278	4037	7315	10737	110650	44836	65814
35	Large	7.02	4.84	6.23	19011	2014	21024	3650	4340	7991	13034	264608	100567	164041
300	Total	6.06	4.29	5.35	17889	1886	19775	3283	3962	7245	12531	88764	32612	56153

Appendix 31: Production, Value of Output, Cost and Net Returns for Rabi Crops – Gram

HH	Farm Size	Production (quintals/acre)			Value of Main Product per Acre	Value of By Product Per Acre	Value of output(main + by-product) (Rs/acre)	Cost of production (Rs/acre)		Total Cost per Acre	Net returns (Farm business income) (Rs/acre)	Gross Farm income from cultivated area (Rs) per hh	Gross Farm Expenditure from cultivated area (Rs) per hh	Net Farm income from cultivated area (Rs) per hh
		Irrigated	Rainfed	Total				Material cost	Labour cost					
Ahmednagar beneficiary														
26	Marginal	4.81	3.88	4.67	22829	2211	25039	4459	4842	9301	15738	20128	7477	12651
40	Small	5.34	3.62	5.09	22273	2363	24636	4019	4363	8382	16254	26946	9168	17778
19	Medium	5.36	3.40	4.96	23888	2235	26122	5278	5624	10902	15220	33684	14058	19626
8	Large	5.24	0.00	5.24	24378	2797	27176	5541	6878	12419	14757	62844	28719	34125
93	Total	5.23	3.60	5.00	23110	2379	25489	4653	5175	9828	15661	29504	11376	18128
Ahmednagar Non beneficiary														
8	Marginal	4.63	3.00	4.41	19609	1462	21072	2297	3716	6014	15058	24364	6953	17411
21	Small	4.76	3.54	4.43	18791	1757	20549	3479	5404	8883	11666	22995	9940	13055
11	Medium	4.78	3.00	4.68	19505	1921	21426	2395	4211	6605	14821	37009	11409	25600
9	Large	4.30	0.00	4.30	17182	1909	19091	2970	4833	7803	11288	35000	14306	20694
49	Total	4.62	3.40	4.47	18712	1800	20512	2894	4705	7599	12913	28570	10584	17985
Yavatmal beneficiary														
5	Marginal	4.00	0.00	4.00	18358	4500	22858	3763	2474	6237	16621	43430	11850	31580
15	Small	5.66	5.00	5.55	25387	3652	29039	3424	2190	5614	23425	50818	9825	40993
7	Medium	5.78	0.00	5.78	24185	4500	28685	3907	3611	7519	21167	55321	14500	40821
7	Large	5.44	0.00	5.44	24656	4125	28781	3094	3594	6688	22094	65786	15286	50500
34	Total	5.37	5.00	5.34	23936	4067	28003	3492	2870	6362	21641	53740	12210	41531
Yavatmal Non beneficiary														
-	Marginal	-	-	-	-	-	-	-	-	-	-	-	-	-
6	Small	4.29	4.00	4.25	16700	1688	18388	2563	3125	5688	12700	24517	7583	16933
3	Medium	4.00	0.00	4.00	12587	2133	14720	2467	2867	5333	9387	36800	13333	23467
4	Large	4.24	0.00	4.24	14381	1524	15905	2238	3357	5595	10310	167000	58750	108250
13	Total	4.21	4.00	4.21	14470	1626	16096	2313	3261	5574	10522	71192	24654	46538
Overall beneficiary														
31	Marginal	4.53	3.88	4.46	21432	2926	24358	4242	4102	8344	16014	23886	8182	15704
55	Small	5.46	4.16	5.26	23441	2846	26287	3796	3548	7344	18943	33456	9347	24109
26	Medium	5.53	3.40	5.25	23993	3039	27033	4791	4909	9700	17333	39510	14177	25333
15	Large	5.33	0.00	5.33	24507	3413	27920	4406	5355	9761	18159	64217	22450	41767
127	Total	5.28	3.91	5.13	23422	3016	26438	4215	4305	8520	17918	35993	11599	24394
Overall Non beneficiary														
8	Marginal	4.63	3.00	4.41	19609	1462	21072	2297	3716	6014	15058	24364	6953	17411
27	Small	4.63	3.60	4.38	18260	1740	20000	3246	4825	8071	11929	23333	9417	13917
14	Medium	4.55	3.00	4.49	17547	1981	19528	2415	3830	6245	13283	36964	11821	25143
13	Large	4.26	0.00	4.26	15171	1632	16803	2444	3774	6218	10585	75615	27981	47635
62	Total	4.42	3.46	4.35	16772	1720	18492	2628	4045	6673	11819	37507	13534	23972

Appendix 32: Production, Value of Output, Cost and Net Returns for Rabi Crops – Wheat

HH	Farm Size	Production (quintals/acre)			Value of Main Product per Acre	Value of By Product Per Acre	Value of output (main + by-product) (Rs/acre)	Cost of production (Rs/acre)		Total Cost per Acre	Net returns (Farm business income) (Rs/acre)	Gross Farm income from cultivated area (Rs) per hh	Gross Farm Expenditure from cultivated area (Rs) per hh	Net Farm income from cultivated area (Rs) per hh
		Irrigated	Rainfed	Total				Material cost	Labour cost					
Ahmednagar beneficiary														
3	Marginal	4.71	-	4.71	11786	2857	14643	3714	5571	9286	5357	8542	5417	3125
14	Small	6.51	3.00	6.28	16089	2967	19056	4951	6221	11172	7884	20757	12170	8588
8	Medium	5.58	-	5.58	15103	2824	17927	5368	6789	12158	5769	21288	14438	6851
8	Large	8.84	-	8.84	25826	3165	28991	6324	6459	12784	16207	67041	29563	37478
33	Total	7.22	3.00	7.12	19716	3014	22730	5556	6414	11969	10761	30996	16322	14674
Ahmednagar Non beneficiary														
1	Marginal	4.00	-	4.00	9700	2800	12500	3500	4200	7700	4800	12500	7700	4800
7	Small	6.00	-	6.00	14513	2719	17231	4469	5500	9969	7263	19693	11393	8300
4	Medium	6.00	-	6.00	15848	2804	18652	5196	5957	11152	7500	26813	16031	10781
6	Large	7.09	-	7.09	20217	3113	23330	6174	5913	12087	11243	44717	23167	21550
18	Total	6.40	-	6.40	17121	2913	20034	5338	5731	11070	8965	29217	16143	13074
Yavatmal beneficiary														
3	Marginal	8.00	-	8.00	22076	2357	24433	4857	5738	10595	13838	42758	18542	24217
10	Small	7.26	-	7.26	20429	2429	22858	5726	6129	11855	11003	35430	18375	17055
8	Medium	7.15	-	7.15	21315	2962	24277	5846	6231	12077	12200	39450	19625	19825
4	Large	9.15	-	9.15	27323	3269	30592	5769	6577	12346	18246	49713	20063	29650
25	Total	7.63	-	7.63	22043	2727	24771	5658	6183	11842	12929	39881	19065	20816
Yavatmal Non beneficiary														
1	Marginal	4.50	-	4.50	12150	2300	14450	4000	5000	9000	5450	28900	18000	10900
7	Small	6.93	-	6.93	18627	2600	21227	5233	6067	11300	9927	22743	12107	10636
3	Medium	7.58	-	7.58	20608	2583	23192	5417	6125	11542	11650	46383	23083	23300
4	Large	7.20	-	7.20	18380	3100	21480	5560	6500	12060	9420	53700	30150	23550
15	Total	7.00	-	7.00	18488	2769	21257	5308	6167	11475	9782	36137	19507	16630
Overall beneficiary														
6	Marginal	7.18	-	7.18	19504	2482	21986	4571	5696	10268	11718	25650	11979	13671
24	Small	6.90	3.00	6.77	18276	2696	20972	5341	6175	11516	9456	26871	14755	12116
16	Medium	6.49	-	6.49	18692	2903	21596	5644	6467	12111	9485	30369	17031	13338
12	Large	8.92	-	8.92	26215	3192	29407	6180	6490	12670	16737	61265	26396	34869
58	Total	7.41	3.00	7.36	20815	2879	23694	5604	6305	11909	11785	34826	17504	17321
Overall Non beneficiary														
2	Marginal	4.33	-	4.33	11333	2467	13800	3833	4733	8567	5233	20700	12850	7850
14	Small	6.45	-	6.45	16503	2661	19165	4839	5774	10613	8552	21218	11750	9468
7	Medium	6.81	-	6.81	18279	2691	20970	5309	6043	11351	9619	35200	19054	16146
10	Large	7.14	-	7.14	19363	3107	22470	5888	6186	12074	10395	48310	25960	22350
13	Total	6.70	-	6.70	17795	2842	20637	5323	5946	11269	9368	32362	17672	14690

Appendix 33: Production, Value of Output, Cost and Net Returns for Rabi Crops – Jowar

HH	Farm Size	Production (quintals/acre)			Value of Main Product per Acre	Value of By Product Per Acre	Value of output (main + by-product) (Rs/acre)	Cost of production (Rs/acre)		Total Cost per Acre	Net returns (Farm business income) (Rs/acre)	Gross Farm income from cultivated area (Rs) per hh	Gross Farm Expenditure from cultivated area (Rs) per hh	Net Farm income from cultivated area (Rs) per hh
		Irrigated	Rainfed	Total				Material cost	Labour cost					
Ahmednagar beneficiary														
3	Marginal	4.00	3.00	3.50	7600.00	7050	14650	3500	3250	6750	7900	9767	4500	5267
9	Small	5.27	4.20	4.84	11204.00	7400	18604	3760	4120	7880	10724	25839	10944	14894
14	Medium	4.33	3.76	4.03	8862.39	6624	15486	4615	4881	9495	5991	60286	36964	23321
8	Large	4.86	3.25	4.62	12623.08	7327	19950	7096	5462	12558	7392	64838	40813	24025
34	Total	4.66	3.74	4.28	10173.16	6927	17101	5158	4905	10063	7037	47781	28118	19663
Ahmednagar Non beneficiary														
2	Marginal	3.50	2.50	3.00	6781.25	6500	13281	2250	2750	5000	8281	6641	2500	4141
10	Small	4.58	3.77	4.25	10585.94	6766	17352	3234	3344	6578	10773	27763	10525	17238
8	Medium	4.54	3.96	4.35	11051.35	6541	17592	3078	3946	7024	10568	40681	16244	24438
8	Large	4.90	2.75	4.62	11455.43	7826	19282	4152	4522	8674	10608	55434	24938	30497
28	Total	4.71	3.61	4.41	11009.94	7107	18117	3529	3987	7516	10601	37851	15704	22148
Yavatmal beneficiary														
-	Marginal	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Small	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Medium	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Large	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Total	-	-	-	-	-	-	-	-	-	-	-	-	-
Yavatmal Non beneficiary														
-	Marginal	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Small	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Medium	-	-	-	-	-	-	-	-	-	-	-	-	-
1	Large	-	3.50	3.50	10500.00	10000	20500	4500	9000	13500	7000	41000	27000	14000
1	Total	-	3.50	3.50	10500.00	10000	20500	4500	9000	13500	7000	41000	27000	14000
Overall beneficiary														
3	Marginal	4.00	3.00	3.50	7600.00	7050	14650	3500	3250	6750	7900	9767	4500	5267
9	Small	5.27	4.20	4.84	11204.00	7400	18604	3760	4120	7880	10724	25839	10944	14894
14	Medium	4.33	3.76	4.03	8862.39	6624	15486	4615	4881	9495	5991	60286	36964	23321
8	Large	4.86	3.25	4.62	12623.08	7327	19950	7096	5462	12558	7392	64838	40813	24025
34	Total	4.66	3.74	4.28	10173.16	6927	17101	5158	4905	10063	7037	47781	28118	19663
Overall Non beneficiary														
2	Marginal	3.50	2.50	3.00	6781.25	6500	13281	2250	2750	5000	8281	6641	2500	4141
10	Small	4.58	3.77	4.25	10585.94	6766	17352	3234	3344	6578	10773	27763	10525	17238
8	Medium	4.54	3.96	4.35	11051.35	6541	17592	3078	3946	7024	10568	40681	16244	24438
9	Large	4.90	3.05	4.53	11379.00	8000	19379	4180	4880	9060	10319	53831	25167	28664
29	Total	4.71	3.60	4.38	10993.08	7202	18196	3561	4153	7714	10482	37960	16093	21867

Appendix 34: Production, Value of Output, Cost and Net Returns for Rabi Crops – Onion

HH	Farm Size	Production (quintals/acre)			Value of Main Product per Acre	Value of By Product Per Acre	Value of output (main + by-product) (Rs/acre)	Cost of production (Rs/acre)		Total Cost per Acre	Net returns (Farm business income) (Rs/acre)	Gross Farm income from cultivated area (Rs) per hh	Gross Farm Expenditure from cultivated area (Rs) per hh	Net Farm income from cultivated area (Rs) per hh
		Irrigated	Rainfed	Total				Material cost	Labour cost					
Ahmednagar beneficiary														
17	Marginal	72.50	0.00	72.50	65570	-	65570	12120	14480	26600	38970	48213	19559	28654
16	Small	72.32	65.00	70.95	65320	-	65320	14395	14704	29099	36222	87325	38901	48424
11	Medium	75.13	72.00	74.47	71045	-	71045	14832	19053	33884	37161	306784	146318	160466
4	Large	67.86	0.00	67.86	63071	-	63071	15286	22571	37857	25214	110375	66250	44125
48	Total	73.35	70.00	72.82	68254	-	68254	14378	17632	32011	36243	125687	58946	66740
Ahmednagar Non beneficiary														
0	Marginal	-	-	-	-	-	-	-	-	-	-	-	-	-
5	Small	62.17	0.00	62.17	48587	-	48587	10783	12783	23565	25022	55875	27100	28775
4	Medium	59.44	63.33	61.67	48060	-	48060	10762	12762	23524	24536	126156	61750	64406
1	Large	80.00	0.00	80.00	74000	-	74000	12000	15000	27000	47000	74000	27000	47000
10	Total	62.67	63.33	62.90	49739	-	49739	10841	12899	23739	26000	85800	40950	44850
Yavatmal beneficiary														
-	Marginal	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Small	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Medium	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Large	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Total	-	-	-	-	-	-	-	-	-	-	-	-	-
Yavatmal Non beneficiary														
-	Marginal	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Small	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Medium	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Large	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Total	-	-	-	-	-	-	-	-	-	-	-	-	-
Overall beneficiary														
11	Marginal	72.50	0.00	72.50	65570	-	65570	12120	14480	26600	38970	48213	19559	28654
16	Small	72.32	65.00	70.95	65320	-	65320	14395	14704	29099	36222	87325	38901	48424
11	Medium	75.13	72.00	74.47	71045	-	71045	14832	19053	33884	37161	306784	146318	160466
4	Large	67.86	0.00	67.86	63071	-	63071	15286	22571	37857	25214	110375	66250	44125
48	Total	73.35	70.00	72.82	68254	-	68254	14378	17632	32011	36243	125687	58946	66740
Overall Non beneficiary														
0	Marginal	-	-	-	-	-	-	-	-	-	-	-	-	-
5	Small	62.17	0.00	62.17	48587	-	48587	10783	12783	23565	25022	55875	27100	28775
4	Medium	59.44	63.33	61.67	48060	-	48060	10762	12762	23524	24536	126156	61750	64406
1	Large	80.00	0.00	80.00	74000	-	74000	12000	15000	27000	47000	74000	27000	47000
10	Total	62.67	63.33	62.90	49739	-	49739	10841	12899	23739	26000	85800	40950	44850

Appendix 35: Production, Value of Output, Cost and Net Returns for Rabi Crops – All Crops Rabi Season

HH	Farm Size	Production (quintals/acre)			Value of Main Product per Acre	Value of By Product Per Acre	Value of output (main + by-product) (Rs/acre)	Cost of production (Rs/acre)		Total Cost per Acre	Net returns (Farm business income) (Rs/acre)	Gross Farm income from cultivated area (Rs) per hh	Gross Farm Expenditure from cultivated area (Rs) per hh	Net Farm income from cultivated area (Rs) per hh
		Irrigated	Rainfed	Total				Material cost	Labour cost					
Ahmednagar beneficiary														
28	Marginal	30.50	3.68	27.43	35870	1758	37628	6950	8034	14984	22644	49924	19880	30044
42	Small	20.80	18.64	20.42	29681	2596	32277	6527	7017	13543	18734	71385	29953	41432
22	Medium	33.54	19.23	28.91	33723	3254	36977	8355	10098	18453	18524	228588	114073	114515
8	Large	12.77	3.25	12.22	24264	4297	28561	7300	7811	15111	13450	249909	132219	117691
100	Total	24.39	17.19	22.92	30873	3124	33997	7475	8541	16016	17981	114243	53820	60422
Ahmednagar Non beneficiary														
8	Marginal	4.50	2.86	4.24	17588	2029	19617	2400	3673	6073	13544	27587	8541	19046
22	Small	13.17	3.65	10.85	18900	3217	22117	4343	5596	9939	12178	53534	24057	29477
11	Medium	10.91	31.29	15.84	21782	3230	25013	4564	5977	10541	14472	122220	51507	70714
9	Large	6.74	2.75	6.51	16413	4756	21169	4375	5130	9505	11664	122308	54917	67392
50	Total	9.66	15.20	10.66	18964	3613	22576	4294	5447	9741	12835	76873	33168	43705
Yavatmal beneficiary														
17	Marginal	5.42	-	5.42	19681	3737	23419	4153	3636	7788	15631	20319	6757	13562
58	Small	6.32	5.00	6.19	23546	3198	26744	4278	3653	7931	18813	19251	5709	13542
15	Medium	6.45	-	6.45	22777	3745	26523	4858	4896	9755	16768	46857	17233	29623
10	Large	6.51	-	6.51	25427	3878	29304	3867	4456	8322	20982	65935	18725	47210
100	Total	6.27	5.00	6.22	23214	3556	26770	4319	4134	8453	18317	28242	8918	19325
Yavatmal Non beneficiary														
4	Marginal	4.50	-	4.50	12150	2300	14450	4000	5000	9000	5450	7225	4500	2725
30	Small	5.66	4.00	5.55	17632	2129	19761	3855	4548	8403	11358	10210	4342	5868
8	Medium	5.59	-	5.59	16152	2333	18485	3778	4315	8093	10393	31194	13656	17538
8	Large	4.81	3.50	4.76	14978	2130	17107	2937	4148	7085	10022	115475	47825	67650
50	Total	5.08	3.67	5.03	15582	2166	17748	3263	4268	7531	10217	30171	12802	17369
Overall beneficiary														
45	Marginal	22.74	3.68	21.18	31269	2320	33590	6155	6784	12939	20651	38740	14923	23817
100	Small	16.03	15.84	16.00	27779	2783	30561	5829	5973	11803	18758	41148	15891	25256
37	Medium	27.48	19.23	25.25	31938	3334	35272	7785	9250	17034	18238	154913	74814	80099
18	Large	11.18	3.25	10.83	24547	4195	28742	6465	6995	13459	15282	147701	69167	78535
200	Total	19.41	16.48	18.93	29043	3227	32270	6721	7488	14209	18061	71242	31369	39873
Overall Non beneficiary														
12	Marginal	4.50	2.86	4.28	16767	2070	18837	2642	3874	6515	12322	20799	7194	13606
52	Small	11.18	3.68	9.65	18615	2972	21586	4233	5360	9593	11993	28539	12683	15857
19	Medium	9.59	31.29	13.78	20652	3050	23702	4406	5643	10049	13653	83893	35570	48324
17	Large	5.75	3.05	5.62	15682	3418	19100	3642	4630	8272	10828	119093	51579	67513
100	Total	7.97	14.18	8.79	17838	3131	20968	3951	5054	9005	11964	53522	22985	30537
Overall Beneficiary and Non Beneficiary														
57	Marginal	19.19	3.44	17.74	28320	2269	30589	5441	6192	11632	18957	34963	13296	21667
152	Small	14.46	10.94	13.86	24681	2847	27527	5290	5766	11056	16472	36834	14794	22041
56	Medium	21.86	21.98	21.89	28635	3251	31886	6796	8194	14990	16896	130817	61499	69318
35	Large	8.28	3.14	8.05	19813	3780	23593	4958	5732	10689	12904	133806	60624	73181
300	Total	14.91	15.76	15.04	24865	3206	28071	5678	6540	12218	15853	65336	28574	36761

Appendix 36: Production, Value of Output, Cost and Net Returns for Summer Crops – Groundnut

HH	Farm Size	Production (quintals/acre)			Value of Main Product per Acre	Value of By Product Per Acre	Value of output (main + by-product) (Rs/acre)	Cost of production (Rs/acre)		Total Cost per Acre	Net returns (Farm business income) (Rs/acre)	Gross Farm income from cultivated area (Rs) per hh	Gross Farm Expenditure from cultivated area (Rs) per hh	Net Farm income from cultivated area (Rs) per hh
		Irrigated	Rainfed	Total				Material cost	Labour cost					
Ahmednagar beneficiary														
1	Marginal	4.00	-	4.00	16000	3500	19500	3000	3500	6500	13000	9750	3250	6500
5	Small	5.60	-	5.60	21050	3900	24950	3350	3460	6810	18140	24950	6810	18140
5	Medium	5.13	5.64	5.33	20741	3519	24259	5148	5000	10148	14111	131000	54800	76200
1	Large	7.00	-	7.00	35000	4000	39000	5500	6000	11500	27500	39000	11500	27500
12	Total	5.29	5.64	5.40	21142	3590	24731	4858	4778	9636	15096	69042	26900	42142
Ahmednagar Non beneficiary														
-	Marginal	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Small	-	-	-	-	-	-	-	-	-	-	-	-	-
4	Medium	5.00	4.00	4.71	18679	3171	21850	5000	4800	9800	12050	76475	34300	42175
-	Large	-	-	-	-	-	-	-	-	-	-	-	-	-
4	Total	5.00	4.00	4.71	18679	3171	21850	5000	4800	9800	12050	76475	34300	42175
Yavatmal beneficiary														
1	Marginal	4.50	0.00	4.50	17325	-	17325	5500	4500	10000	7325	17325	10000	7325
-	Small	-	-	-	-	-	-	-	-	-	-	-	-	-
1	Medium	5.00	0.00	5.00	22500	3000	25500	6000	5000	11000	14500	51000	22000	29000
1	Large	6.50	0.00	6.50	31200	3500	34700	7000	6500	13500	21200	138800	54000	84800
3	Total	5.79	0.00	5.79	26732	2857	29589	6500	5786	12286	17304	69042	28667	40375
Yavatmal Non beneficiary														
-	Marginal	-	-	-	-	-	-	-	-	-	-	-	-	-
1	Small	4.00	0.00	4.00	17600	2500	20100	6000	4750	10750	9350	20100	10750	9350
-	Medium	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Large	-	-	-	-	-	-	-	-	-	-	-	-	-
1	Total	4.00	0.00	4.00	17600	2500	20100	6000	4750	10750	9350	20100	10750	9350
Overall beneficiary														
2	Marginal	4.33	-	4.33	16883	1167	18050	4667	4167	8833	9217	13538	6625	6913
5	Small	5.60	-	5.60	21050	3900	24950	3350	3460	6810	18140	24950	6810	18140
6	Medium	5.11	5.64	5.31	20862	3483	24345	5207	5000	10207	14138	117667	49333	68333
2	Large	6.60	-	6.60	31960	3600	35560	6700	6400	13100	22460	88900	32750	56150
15	Total	5.41	5.64	5.47	22108	3463	25571	5142	4952	10094	15477	69042	27253	41788
Overall Non beneficiary														
-	Marginal	-	-	-	-	-	-	-	-	-	-	-	-	-
1	Small	4.00	-	4.00	17600	2500	20100	6000	4750	10750	9350	20100	10750	9350
4	Medium	5.00	4.00	4.71	18679	3171	21850	5000	4800	9800	12050	76475	34300	42175
-	Large	-	-	-	-	-	-	-	-	-	-	-	-	-
5	Total	4.91	4.00	4.67	18607	3127	21733	5067	4797	9863	11870	65200	29590	35610

Appendix 37: Production, Value of Output, Cost and Net Returns for Summer Crops – Kadwal (fodder)

HH	Farm Size	Production (quintals/acre)			Value of Main Product per Acre	Value of By Product Per Acre	Value of output (main + by-product) (Rs/acre)	Cost of production (Rs/acre)		Total Cost per Acre	Net returns (Farm business income) (Rs/acre)	Gross Farm income from cultivated area (Rs) per hh	Gross Farm Expenditure from cultivated area (Rs) per hh	Net Farm income from cultivated area (Rs) per hh
		Irrigated	Rainfed	Total				Material cost	Labour cost					
Ahmednagar beneficiary														
-	Marginal	-	-	-	-	-	-	-	-	-	-	-	-	-
3	Small	5.08	0.00	5.08	57500.00	0.00	57500	2000	2208	4208	53292	23000	1683	21317
-	Medium	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Large	-	-	-	-	-	-	-	-	-	-	-	-	-
3	Total	5.08	0.00	5.08	57500.00	0.00	57500	2000	2208	4208	53292	23000	1683	21317
Ahmednagar Non beneficiary														
-	Marginal	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Small	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Medium	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Large	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Total	-	-	-	-	-	-	-	-	-	-	-	-	-
Yavatmal beneficiary														
-	Marginal	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Small	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Medium	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Large	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Total	-	-	-	-	-	-	-	-	-	-	-	-	-
Yavatmal Non beneficiary														
-	Marginal	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Small	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Medium	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Large	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Total	-	-	-	-	-	-	-	-	-	-	-	-	-
Overall beneficiary														
-	Marginal	-	-	-	-	-	-	-	-	-	-	-	-	-
3.00	Small	5.08	0.00	5.08	57500.00	0.00	57500	2000	2208	4208	53292	23000	1683	21317
-	Medium	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Large	-	-	-	-	-	-	-	-	-	-	-	-	-
3.00	Total	5.08	0.00	5.08	57500.00	0.00	57500	2000	2208	4208	53292	23000	1683	21317
Overall Non beneficiary														
-	Marginal	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Small	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Medium	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Large	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Total	-	-	-	-	-	-	-	-	-	-	-	-	-

Appendix 38: Production, Value of Output, Cost and Net Returns for Summer Crops – All Crops Summer Season

HH	Farm Size	Production (quintals/acre)			Value of Main Product per Acre	Value of By Product Per Acre	Value of output (main + by-product) (Rs/acre)	Cost of production (Rs/acre)		Total Cost per Acre	Net returns (Farm business income) (Rs/acre)	Gross Farm income from cultivated area (Rs) per hh	Gross Farm Expenditure from cultivated area (Rs) per hh	Net Farm income from cultivated area (Rs) per hh
		Irrigated	Rainfed	Total				Material cost	Labour cost					
Ahmednagar beneficiary														
28	Marginal	4.00	0.00	4.00	16000	3500	19500	3000	3500	6500	13000	348	116	232
42	Small	5.50	0.00	5.50	28105	3145	31250	3089	3218	6306	24944	4613	931	3682
22	Medium	5.13	5.64	5.33	20741	3519	24259	5148	5000	10148	14111	29773	12455	17318
8	Large	7.00	0.00	7.00	35000	4000	39000	5500	6000	11500	27500	4875	1438	3438
100	Total	5.28	5.64	5.39	22399	3465	25865	4759	4689	9448	16416	8975	3279	5697
Ahmednagar Non beneficiary														
8	Marginal	-	-	-	-	-	-	-	-	-	-	-	-	-
22	Small	-	-	-	-	-	-	-	-	-	-	-	-	-
11	Medium	5.00	4.00	4.71	18679	3171	21850	5000	4800	9800	12050	27809	12473	15336
9	Large	-	-	-	-	-	-	-	-	-	-	-	-	-
50	Total	5.00	4.00	4.71	18679	3171	21850	5000	4800	9800	12050	6118	2744	3374
Yavatmal beneficiary														
17	Marginal	4.50	0.00	4.50	17325	0	17325	5500	4500	10000	7325	1019	588	431
58	Small	-	-	-	-	-	-	-	-	-	-	-	-	-
15	Medium	5.00	0.00	5.00	22500	3000	25500	6000	5000	11000	14500	3400	1467	1933
10	Large	6.50	0.00	6.50	31200	3500	34700	7000	6500	13500	21200	13880	5400	8480
100	Total	5.79	0.00	5.79	26732	2857	29589	6500	5786	12286	17304	2071	860	1211
Yavatmal Non beneficiary														
4	Marginal	-	-	-	-	-	-	-	-	-	-	-	-	-
30	Small	4.00	0.00	4.00	17600	2500	20100	6000	4750	10750	9350	670	358	312
8	Medium	-	-	-	-	-	-	-	-	-	-	-	-	-
8	Large	-	-	-	-	-	-	-	-	-	-	-	-	-
50	Total	4.00	0.00	4.00	17600	2500	20100	6000	4750	10750	9350	402	215	187
Overall beneficiary														
45	Marginal	4.33	0.00	4.33	16883	1167	18050	4667	4167	8833	9217	602	294	307
100	Small	5.50	0.00	5.50	28105	3145	31250	3089	3218	6306	24944	1938	391	1547
37	Medium	5.11	5.64	5.31	20862	3483	24345	5207	5000	10207	14138	19081	8000	11081
18	Large	6.60	0.00	6.60	31960	3600	35560	6700	6400	13100	22460	9878	3639	6239
200	Total	5.39	5.64	5.46	23126	3363	26490	5052	4873	9924	16565	5523	2069	3454
Overall Non beneficiary														
12	Marginal	-	-	-	-	-	-	-	-	-	-	-	-	-
52	Small	4.00	0.00	4.00	17600	2500	20100	6000	4750	10750	9350	387	207	180
19	Medium	5.00	4.00	4.71	18679	3171	21850	5000	4800	9800	12050	16100	7221	8879
17	Large	-	-	-	-	-	-	-	-	-	-	-	-	-
100	Total	4.91	4.00	4.67	18607	3127	21733	5067	4797	9863	11870	3260	1480	1781
Overall Beneficiary and Non Beneficiary														
57	Marginal	4.33	-	4.33	16883	1167	18050	4667	4167	8833	9217	475	232	243
152	Small	5.29	-	5.29	26646	3056	29701	3493	3431	6924	22778	1407	328	1079
56	Medium	5.07	5.20	5.12	20151	3381	23533	5140	4935	10074	13458	18070	7736	10334
35	Large	6.60	-	6.60	31960	3600	35560	6700	6400	13100	22460	5080	1871	3209
300	Total	5.25	5.20	5.24	21851	3244	25094	5063	4847	9910	15185	4769	1873	2896

Appendix 39: Production, Value of Output, Cost and Net Returns for Perennial Crops – Lemon

HH	Farm Size	Production (quintals/acre)			Value of Main Product per Acre	Value of By Product Per Acre	Value of output (main + by-product) (Rs/acre)	Cost of production (Rs/acre)		Total Cost per Acre	Net returns (Farm business income) (Rs/acre)	Gross Farm income from cultivated area (Rs) per hh	Gross Farm Expenditure from cultivated area (Rs) per hh	Net Farm income from cultivated area (Rs) per hh
		Irrigated	Rainfed	Total				Material cost	Labour cost					
Ahmednagar beneficiary														
3	Marginal	29.17	-	29.17	46667	-	46667	9500	11167	20667	26000	46667	20667	26000
7	Small	26.43	-	26.43	48179	-	48179	9714	13500	23214	24964	48179	23214	24964
6	Medium	24.55	-	24.55	45966	-	45966	10000	13603	23603	22362	55542	28521	27021
2	Large	30.00	-	30.00	60000	-	60000	12000	14000	26000	34000	135000	58500	76500
18	Total	26.92	-	26.92	49678	-	49678	10253	13316	23569	26109	60028	28479	31549
Ahmednagar Non beneficiary				-			-							
1	Marginal	20.00	-	20.00	32000	-	32000	7000	7500	14500	17500	8000	3625	4375
4	Small	25.00	-	25.00	43125	-	43125	8750	9625	18375	24750	43125	18375	24750
-	Medium	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Large	-	-	-	-	-	-	-	-	-	-	-	-	-
5	Total	24.71	-	24.71	42471	-	42471	8647	9500	18147	24324	36100	15425	20675
Yavatmal beneficiary														
-	Marginal	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Small	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Medium	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Large	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Total	-	-	-	-	-	-	-	-	-	-	-	-	-
Yavatmal Non beneficiary														
-	Marginal	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Small	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Medium	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Large	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Total	-	-	-	-	-	-	-	-	-	-	-	-	-
Overall beneficiary														
3	Marginal	29.17	-	29.17	46667	-	46667	9500	11167	20667	26000	46667	20667	26000
7	Small	26.43	-	26.43	48179	-	48179	9714	13500	23214	24964	48179	23214	24964
6	Medium	24.55	-	24.55	45966	-	45966	10000	13603	23603	22362	55542	28521	27021
2	Large	30.00	-	30.00	60000	-	60000	12000	14000	26000	34000	135000	58500	76500
18	Total	26.92	-	26.92	49678	-	49678	10253	13316	23569	26109	60028	28479	31549
Overall Non beneficiary									-					
1	Marginal	20.00	-	20.00	32000	-	32000	7000	7500	14500	17500	8000	3625	4375
4	Small	25.00	-	25.00	43125	-	43125	8750	9625	18375	24750	43125	18375	24750
-	Medium	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Large	-	-	-	-	-	-	-	-	-	-	-	-	-
5	Total	24.71	-	24.71	42471	-	42471	8647	9500	18147	24324	36100	15425	20675

Appendix 40: Production, Value of Output, Cost and Net Returns for Perennial Crops – Pomegranate

HH	Farm Size	Production (quintals/acre)			Value of Main Product per Acre	Value of Bio Product Per Acre	Value of output (main + by-product) (Rs/acre)	Cost of production (Rs/acre)		Total Cost per Acre	Net returns (Farm business income) (Rs/acre)	Gross Farm income from cultivated area (Rs) per hh	Gross Farm Expenditure from cultivated area (Rs) per hh	Net Farm income from cultivated area (Rs) per hh
		Irrigated	Rainfed	Total				Material cost	Labour cost					
Ahmednagar beneficiary														
5	Marginal	41.88	-	41.88	162500	-	162500	22500	22500	45000	117500	130000	36000	94000
7	Small	57.63	-	57.63	230974	-	230974	19000	22105	41105	189868	313464	55786	257679
2	Medium	52.00	-	52.00	208000	-	208000	25000	24000	49000	159000	260000	61250	198750
-	Large	-	-	-	-	-	-	-	-	-	-	-	-	-
14	Total	52.81	-	52.81	210266	-	210266	20813	22500	43313	166953	240304	49500	190804
Ahmednagar Non beneficiary														
-	Marginal	-	-	-	-	-	-	-	-	-	-	-	-	-
2	Small	45.00	-	45.00	168750	-	168750	20000	17500	37500	131250	168750	37500	131250
-	Medium	-	-	-	-	-	-	-	-	-	-	-	-	-
1	Large	55.00	-	55.00	192500	-	192500	20000	25000	45000	147500	577500	135000	442500
3	Total	51.00	-	51.00	183000	-	183000	20000	22000	42000	141000	305000	70000	235000
Yavatmal beneficiary														
-	Marginal	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Small	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Medium	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Large	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Total	-	-	-	-	-	-	-	-	-	-	-	-	-
Yavatmal Non beneficiary														
-	Marginal	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Small	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Medium	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Large	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Total	-	-	-	-	-	-	-	-	-	-	-	-	-
Overall beneficiary														
5	Marginal	41.88	-	41.88	162500	-	162500	22500	22500	45000	117500	130000	36000	94000
7	Small	57.63	-	57.63	230974	-	230974	19000	22105	41105	189868	313464	55786	257679
2	Medium	52.00	-	52.00	208000	-	208000	25000	24000	49000	159000	260000	61250	198750
-	Large	-	-	-	-	-	-	-	-	-	-	-	-	-
14	Total	52.81	-	52.81	210266	-	210266	20813	22500	43313	166953	240304	49500	190804
Overall Non beneficiary														
-	Marginal	-	-	-	-	-	-	-	-	-	-	-	-	-
2	Small	45.00	-	45.00	168750	-	168750	20000	17500	37500	131250	168750	37500	131250
-	Medium	-	-	-	-	-	-	-	-	-	-	-	-	-
1	Large	55.00	-	55.00	192500	-	192500	20000	25000	45000	147500	577500	135000	442500
3	Total	51.00	-	51.00	183000	-	183000	20000	22000	42000	141000	305000	70000	235000

Appendix 41: Production, Value of Output, Cost and Net Returns for Perennial Crops – Sugarcane

HH	Farm Size	Production (Quintals/acre)			Value of Main Product per Acre	Value of By Product Per Acre	Value of output (main + by-product) (Rs/acre)	Cost of production (Rs/acre)		Total Cost per Acre	Net returns (Farm business income) (Rs/acre)	Gross Farm income from cultivated area (Rs) per hh	Gross Farm Expenditure from cultivated area (Rs) per hh	Net Farm income from cultivated area (Rs) per hh
		Irrigated	Rainfed	Total				Material cost	Labour cost					
Ahmednagar beneficiary														
2	Marginal	500.00	-	500.00	123636	12727	136364	15455	12000	27455	108909	187500	37750	149750
10	Small	501.39	-	501.39	128750	12806	141556	17472	12583	30056	111500	254800	54100	200700
7	Medium	524.00	-	524.00	144100	18500	162600	23250	15950	39200	123400	464571	112000	352571
1	Large	570.00	-	570.00	145350	20000	165350	24000	16000	40000	125350	3307000	800000	2507000
20	Total	531.36	-	531.36	139037	17045	156082	21432	14790	36222	119860	474100	110025	364075
Ahmednagar Non beneficiary														
-	Marginal	-	-	-	-	-	-	-	-	-	-	-	-	-
5	Small	542.31	-	542.31	134981	17154	152135	17000	10885	27885	124250	197775	36250	161525
3	Medium	483.33	-	483.33	130667	11667	142333	17167	13000	30167	112167	284667	60333	224333
1	Large	555.00	-	555.00	144300	12000	156300	19000	14000	33000	123300	312600	66000	246600
9	Total	519.66	-	519.66	134481	14172	148653	17345	12190	29534	119119	239497	47583	191914
Yavatmal beneficiary														
-	Marginal	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Small	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Medium	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Large	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Total	-	-	-	-	-	-	-	-	-	-	-	-	-
Yavatmal Non beneficiary														
-	Marginal	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Small	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Medium	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Large	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Total	-	-	-	-	-	-	-	-	-	-	-	-	-
Overall beneficiary														
2	Marginal	500.00	-	500.00	123636	12727	136364	15455	12000	27455	108909	187500	37750	149750
10	Small	501.39	-	501.39	128750	12806	141556	17472	12583	30056	111500	254800	54100	200700
7	Medium	524.00	-	524.00	144100	18500	162600	23250	15950	39200	123400	464571	112000	352571
1	Large	570.00	-	570.00	145350	20000	165350	24000	16000	40000	125350	3307000	800000	2507000
20	Total	531.36	-	531.36	139037	17045	156082	21432	14790	36222	119860	474100	110025	364075
Overall Non beneficiary														
-	Marginal	-	-	-	-	-	-	-	-	-	-	-	-	-
5	Small	542.31	-	542.31	134981	17154	152135	17000	10885	27885	124250	197775	36250	161525
3	Medium	483.33	-	483.33	130667	11667	142333	17167	13000	30167	112167	284667	60333	224333
1	Large	555.00	-	555.00	144300	12000	156300	19000	14000	33000	123300	312600	66000	246600
9	Total	519.66	-	519.66	134481	14172	148653	17345	12190	29534	119119	239497	47583	191914

Appendix 42: Production, Value of Output, Cost and Net Returns for Perennial Crops – Grape

HH	Farm Size	Production (quintals/acre)			Value of Main Product per Acre	Value of By Product Per Acre	Value of output (main + by-product) (Rs/acre)	Cost of production (Rs/acre)		Total Cost per Acre	Net returns (Farm business income) (Rs/acre)	Gross Farm income from cultivated area (Rs) per hh	Gross Farm Expenditure from cultivated area (Rs) per hh	Net Farm income from cultivated area (Rs) per hh
		Irrigated	Rainfed	Total				Material cost	Labour cost					
Ahmednagar beneficiary														
-	Marginal	-	-	-	-	-	-	-	-	-	-	-	-	-
6	Small	91.89	0.00	91.89	183778	0	183778	16759	18056	34815	148963	413500	78333	335167
-	Medium	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Large	-	-	-	-	-	-	-	-	-	-	-	-	-
6	Total	91.89	0.00	91.89	183778	0	183778	16759	18056	34815	148963	413500	78333	335167
Ahmednagar Non beneficiary														
-	Marginal	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Small	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Medium	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Large	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Total	-	-	-	-	-	-	-	-	-	-	-	-	-
Yavatmal beneficiary														
-	Marginal	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Small	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Medium	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Large	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Total	-	-	-	-	-	-	-	-	-	-	-	-	-
Yavatmal Non beneficiary														
-	Marginal	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Small	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Medium	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Large	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Total	-	-	-	-	-	-	-	-	-	-	-	-	-
Overall beneficiary														
-	Marginal	-	-	-	-	-	-	-	-	-	-	-	-	-
6	Small	91.89	0.00	91.89	183778	0	183778	16759	18056	34815	148963	413500	78333	335167
-	Medium	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Large	-	-	-	-	-	-	-	-	-	-	-	-	-
6	Total	91.89	0.00	91.89	183778	0	183778	16759	18056	34815	148963	413500	78333	335167
Overall Non beneficiary														
-	Marginal	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Small	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Medium	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Large	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Total	-	-	-	-	-	-	-	-	-	-	-	-	-

Appendix 43: Production, Value of Output, Cost and Net Returns for Perennial Crops – All Crops Perennial

HH	Farm Size	Production (quintals/acre)			Value of Main Product per Acre	Value of By Product Per Acre	Value of output (main + by-product) (Rs/acre)	Cost of production (Rs/acre)		Total Cost per Acre	Net returns (Farm business income) (Rs/acre)	Gross Farm income from cultivated area (Rs) per hh	Gross Farm Expenditure from cultivated area (Rs) per hh	Net Farm income from cultivated area (Rs) per hh
		Irrigated	Rainfed	Total				Material cost	Labour cost					
Ahmednagar beneficiary														
28	Marginal	167.18	-	167.18	115897	3590	119487	16513	16051	32564	86923	41607	11339	30268
42	Small	229.13	-	229.13	152708	4802	157510	16443	16141	32583	124927	180012	37238	142774
22	Medium	362.62	-	362.62	125555	12437	137992	20168	16055	36223	101769	186602	48983	137619
8	Large	470.82	-	470.82	129673	16327	146000	21796	15633	37429	108571	447125	114625	332500
100	Total	312.06	-	312.06	137252	9246	146498	18609	15999	34608	111890	164078	38761	125316
Ahmednagar Non beneficiary														
8	Marginal	20.00	-	20.00	32000	-	32000	7000	7500	14500	17500	1000	453	547
22	Small	297.20	-	297.20	110990	8920	119910	14840	11540	26380	93530	68131	14989	53142
11	Medium	483.33	-	483.33	130667	11667	142333	17167	13000	30167	112167	77636	16455	61182
9	Large	255.00	-	255.00	173220	4800	178020	19600	20600	40200	137820	98900	22333	76567
50	Total	332.42	-	332.42	128231	8653	136883	16347	13774	30121	106762	65020	14308	50712
Yavatmal beneficiary														
17	Marginal	-	-	-	-	-	-	-	-	-	-	-	-	-
58	Small	-	-	-	-	-	-	-	-	-	-	-	-	-
15	Medium	-	-	-	-	-	-	-	-	-	-	-	-	-
10	Large	-	-	-	-	-	-	-	-	-	-	-	-	-
100	Total	-	-	-	-	-	-	-	-	-	-	-	-	-
Yavatmal Non beneficiary														
4	Marginal	-	-	-	-	-	-	-	-	-	-	-	-	-
30	Small	-	-	-	-	-	-	-	-	-	-	-	-	-
8	Medium	-	-	-	-	-	-	-	-	-	-	-	-	-
8	Large	-	-	-	-	-	-	-	-	-	-	-	-	-
50	Total	-	-	-	-	-	-	-	-	-	-	-	-	-
Overall beneficiary														
45	Marginal	167.18	-	167.18	115897	3590	119487	16513	16051	32564	86923	25889	7056	18833
100	Small	229.13	-	229.13	152708	4802	157510	16443	16141	32583	124927	75605	15640	59965
37	Medium	362.62	-	362.62	125555	12437	137992	20168	16055	36223	101769	110953	29125	81828
18	Large	470.82	-	470.82	129673	16327	146000	21796	15633	37429	108571	198722	50944	147778
200	Total	312.06	-	312.06	137252	9246	146498	18609	15999	34608	111890	82039	19381	62658
Overall Non beneficiary														
12	Marginal	20.00	-	20.00	32000	-	32000	7000	7500	14500	17500	667	302	365
52	Small	297.20	-	297.20	110990	8920	119910	14840	11540	26380	93530	28825	6341	22483
19	Medium	483.33	-	483.33	130667	11667	142333	17167	13000	30167	112167	44947	9526	35421
17	Large	255.00	-	255.00	173220	4800	178020	19600	20600	40200	137820	52359	11824	40535
100	Total	332.42	-	332.42	128231	8653	136883	16347	13774	30121	106762	32510	7154	25356
Overall Beneficiary and Non Beneficiary														
57	Marginal	163.50	-	163.50	113800	3500	117300	16275	15838	32113	85188	20579	5634	14945
152	Small	243.19	-	243.19	144089	5653	149742	16112	15190	31302	118440	59601	12459	47142
56	Medium	382.88	-	382.88	126413	12308	138720	19664	15542	35206	103514	88558	22475	66083
35	Large	434.24	-	434.24	137054	14373	151427	21424	16475	37898	113529	127631	31943	95689
300	Total	315.62	-	315.62	135674	9142	144816	18214	15610	33823	110992	65529	15305	50224

Appendix 44: Production, Value of Output, Cost and Net Returns for All Crops – All Crops Aggregate

HH	Farm Size	Production (quintals/acre)			Value of Main Product per Acre	Value of By Product Per Acre	Value of output (main + by-product) (Rs/acre)	Cost of production (Rs/acre)		Total Cost per Acre	Net returns (Farm business income) (Rs/acre)	Gross Farm income from cultivated area (Rs) per hh	Gross Farm Expenditure from cultivated area (Rs) per hh	Net Farm income from cultivated area (Rs) per hh
		Irrigated	Rainfed	Total				Material cost	Labour cost					
Ahmednagar beneficiary														
28	Marginal	38.35	3.35	35.09	37112	2293	39405	6336	7565	13901	25504	113360	39990	73370
42	Small	66.45	11.95	58.00	50192	2908	53100	7292	7828	15120	37980	297716	84774	212942
22	Medium	69.51	11.27	51.82	34376	3729	38104	7418	8027	15445	22659	513110	207981	305130
8	Large	81.02	2.90	73.58	38206	5327	43533	8110	7400	15510	28023	971334	346063	625272
100	Total	67.90	10.10	56.87	40229	3699	43928	7426	7779	15206	28722	347372	120243	227130
Ahmednagar Non beneficiary														
8	Marginal	4.11	3.06	4.04	15330	2225	17555	2184	2879	5062	12493	64186	18509	45676
22	Small	53.21	3.24	40.41	26551	3194	29745	4886	5284	10171	19574	150415	51431	98984
11	Medium	35.08	11.67	28.44	21813	2894	24707	4365	4990	9355	15352	332423	125868	206555
9	Large	21.57	3.63	15.85	23266	3053	26319	4867	5486	10354	15966	407951	160483	247468
50	Total	33.06	6.41	25.78	23075	2978	26053	4515	5084	9599	16454	223016	82169	140847
Yavatmal beneficiary														
17	Marginal	4.53	4.27	4.46	18330	2514	20844	3509	3733	7242	13602	55788	19383	36405
58	Small	5.29	4.43	4.89	21517	2427	23944	3329	3667	6996	16948	110018	32143	77875
15	Medium	5.84	4.97	5.49	23421	2117	25538	4311	5068	9379	16159	221330	81288	140042
10	Large	5.33	6.22	5.72	22609	2852	25461	4356	5440	9796	15665	352630	135670	216960
100	Total	5.35	4.97	5.19	21954	2466	24420	3808	4409	8217	16203	141757	47699	94059
Yavatmal Non beneficiary														
4	Marginal	4.00	2.91	3.51	11831	1413	13244	3098	3926	7023	6220	38904	20631	18273
30	Small	4.76	3.61	4.20	15794	1066	16860	2850	3152	6001	10859	75026	26705	48320
8	Medium	4.58	3.51	4.14	14675	1174	15849	2666	3362	6027	9822	153538	58391	95147
8	Large	4.91	4.57	4.83	15269	1417	16686	2432	3355	5786	10900	452606	156956	295650
50	Total	4.80	3.86	4.48	15232	1267	16499	2618	3309	5927	10572	145111	52129	92982
Overall beneficiary														
45	Marginal	27.88	3.93	24.04	30332	2373	32705	5315	6182	11497	21208	91611	32205	59405
100	Small	40.98	6.14	29.80	34969	2653	37621	5188	5619	10807	26814	188851	54248	134603
37	Medium	52.04	8.96	37.69	31035	3237	34272	6470	7125	13595	20677	394821	156619	238202
18	Large	56.37	5.49	43.93	31391	4246	35637	6470	6544	13013	22624	627610	229178	398432
200	Total	46.59	6.90	34.99	32493	3177	35670	5895	6352	12247	23423	244565	83971	160594
Overall Non beneficiary														
12	Marginal	4.09	2.96	3.89	14327	1992	16319	2446	3179	5624	10695	55758	19217	36542
52	Small	31.27	3.49	20.66	20684	2033	22717	3775	4121	7896	14820	106921	37166	69755
19	Medium	25.92	8.14	20.08	19360	2303	21663	3781	4430	8211	13451	257103	97457	159646
17	Large	10.87	4.11	9.14	18398	2057	20456	3385	4189	7574	12882	428965	158824	270142
100	Total	19.40	4.98	14.99	19100	2111	21212	3554	4185	7738	13473	184064	67149	116914
Overall Beneficiary and Non Beneficiary														
57	Marginal	22.13	3.67	19.09	26404	2279	28683	4611	5445	10056	18628	84063	29471	54592
152	Small	37.99	5.17	26.80	30287	2450	32736	4725	5128	9853	22883	160823	48404	112418
56	Medium	42.96	8.68	31.60	26995	2914	29909	5540	6192	11732	18177	348095	136546	211549
35	Large	32.45	4.75	25.52	24514	3087	27601	4837	5297	10134	17467	531125	195006	336120
300	Total	35.66	6.13	26.90	27203	2766	29969	4968	5485	10452	19516	224398	78364	146034

Appendix 44.1: Production, Value of Output, Cost and Net Returns for All Crops – All Crops Aggregate (Overall Beneficiary and Non Beneficiary based on Net Operated Land)

HH	Farm Size	Production (quintals/acre)			Value of Main Product per Acre	Value of By Product Per Acre	Value of output (main + by-product) (Rs/acre)	Cost of production (Rs/acre)		Total Cost per Acre	Net returns (Farm business income) (Rs/acre)	Gross Farm income from cultivated area (Rs) per hh	Gross Farm Expenditure from cultivated area (Rs) per hh	Net Farm income from cultivated area (Rs) per hh
		Irrigated	Rainfed	Total				Material cost	Labour cost					
Ahmednagar beneficiary														
28	Marginal	38.35	3.35	35.09	37112	2293	39405	6336	7565	13901	25504	72646	25627	47018
42	Small	66.45	11.95	58.00	50192	2908	53100	7292	7828	15120	37980	210365	59900	150464
22	Medium	69.51	11.27	51.82	34376	3729	38104	7418	8027	15445	22659	259800	105307	154493
8	Large	81.02	2.90	73.58	38206	5327	43533	8110	7400	15510	28023	756386	269486	486900
100	Total	68.49	8.39	58.11	40895	3751	44646	7456	7743	15199	29447	226361	77060	149301
Ahmednagar Non beneficiary														
8	Marginal	4.11	3.06	4.04	15330	2225	17555	2184	2879	5062	12493	29075	8384	20692
22	Small	53.21	3.24	40.41	26551	3194	29745	4886	5284	10171	19574	129458	44267	85191
11	Medium	35.08	11.67	28.44	21813	2894	24707	4365	4990	9355	15352	196533	74415	122118
9	Large	21.57	3.63	15.85	23266	3053	26319	4867	5486	10354	15966	396247	155885	240362
50	Total	33.56	5.61	25.78	23514	3019	26532	4633	5193	9827	16706	176175	65249	110926
Yavatmal beneficiary														
17	Marginal	4.53	4.27	4.46	18330	2514	20844	3509	3733	7242	13602	39849	13845	26004
58	Small	5.29	4.43	4.89	21517	2427	23944	3329	3667	6996	16948	97118	28376	68742
15	Medium	5.84	4.97	5.49	23421	2117	25538	4311	5068	9379	16159	174510	64090	110420
10	Large	5.33	6.22	5.72	22609	2852	25461	4356	5440	9796	15665	291528	112164	179364
100	Total	5.36	4.96	5.18	21964	2468	24432	3791	4386	8178	16254	118432	39642	78790
Yavatmal Non beneficiary														
4	Marginal	4.00	2.91	3.51	11831	1413	13244	3098	3926	7023	6220	32282	17119	15164
30	Small	4.76	3.61	4.20	15794	1066	16860	2850	3152	6001	10859	65754	23404	42350
8	Medium	4.58	3.51	4.14	14675	1174	15849	2666	3362	6027	9822	126792	48216	78576
8	Large	4.91	4.57	4.83	15269	1417	16686	2432	3355	5786	10900	354578	122953	231625
50	Total	4.78	4.03	4.47	15241	1260	16501	2627	3306	5932	10569	119054	42799	76255
Overall beneficiary														
45	Marginal	27.88	3.93	24.04	30332	2373	32705	5315	6182	11497	21208	61158	21499	39659
100	Small	40.98	6.14	29.80	34969	2653	37621	5188	5619	10807	26814	151236	43444	107792
37	Medium	52.04	8.96	37.69	31035	3237	34272	6470	7125	13595	20677	233735	92718	141017
18	Large	56.37	5.49	43.93	31391	4246	35637	6470	6544	13013	22624	501769	183223	318546
200	Total	46.61	6.50	34.93	32658	3185	35843	5852	6286	12138	23705	177779	60202	117577
Overall Non beneficiary														
12	Marginal	4.09	2.96	3.89	14327	1992	16319	2446	3179	5624	10695	31278	10779	20499
52	Small	31.27	3.49	20.66	20684	2033	22717	3775	4121	7896	14820	92943	32305	60638
19	Medium	25.92	8.14	20.08	19360	2303	21663	3781	4430	8211	13451	172734	65472	107262
17	Large	10.87	4.11	9.14	18398	2057	20456	3385	4189	7574	12882	367606	136109	231497
100	Total	20.20	4.76	14.90	19175	2101	21277	3560	4187	7747	13529	147396	53670	93726
Overall Beneficiary and Non Beneficiary														
57	Marginal	22.13	3.67	19.09	26404	2279	28683	4611	5445	10056	18628	53905	18898	35007
152	Small	37.99	5.17	26.80	30287	2450	32736	4725	5128	9853	22883	132321	39826	92495
56	Medium	42.96	8.68	31.60	26995	2914	29909	5540	6192	11732	18177	215774	84641	131133
35	Large	32.45	4.75	25.52	24514	3087	27601	4837	5297	10134	17467	440830	161853	278977
300	Total	35.66	6.13	26.90	135674	9142	144816	18214	15610	33823	110992	65529	15305	50224

Appendix 45: Average Yield/Productivity of Major Crops Grown by Selected Farmers (for the reference year 2018-19) –Beneficiary (Ahmednagar)

(Qtl/Acre)

Crop	Marginal	Small	Medium	Large	Total
Irrigated Area					
Kharif					
Bajra	3.27	3.84	2.83	2.75	3.28
Cotton	0.00	3.47	2.80	3.50	3.11
Onion	65.00	62.27	72.00	70.40	66.93
Maize	-	6.33	8.29	8.56	8.18
Tur	3.80	4.31	4.43	3.18	3.78
Hulga	-	-	-	2.50	2.50
Total					
Rabi					
Gram	4.81	5.34	5.36	5.24	5.23
Wheat	4.71	6.51	5.58	8.84	7.22
Jowar	4.00	5.27	4.33	4.86	4.66
Onion	72.50	72.32	75.13	67.86	73.35
Total					
Summer					
Groundnut	4.00	5.60	5.13	7.00	5.29
Kadwal	-	5.08	-	-	5.08
Total					
Perennial					
Lemon	29.17	26.43	24.55	30.00	26.92
Pomegranate	41.88	57.63	52.00	0.00	52.81
Sugarcane	500.00	501.39	524.00	570.00	531.36
Grapes	-	91.89	-	-	91.89
Total					
Gross Irrigated Area					
Unirrigated Area					
Kharif					
Bajra	4.00	4.05	2.91	2.67	3.25
Cotton	2.00	2.35	2.40	-	2.33
Onion	-	60.00	-	-	60.00
Maize	-	6.00	7.00	-	6.50
Tur	3.00	-	4.25	3.14	3.35
Hulga	-	1.25	2.00	2.08	1.94
Sunflower	-	2.00	-	-	2.00
Total					
Rabi					
Gram	3.88	3.62	3.40	-	3.60
Wheat	-	3.00	-	-	3.00
Jowar	3.00	4.20	3.76	3.25	3.74
Onion	-	65.00	72.00	-	70.00
Total					
Summer					
Groundnut	-	-	5.64	-	5.64
Total					
Perennial					
Total					
Gross unirrigated Area					
Gross Crop Area					

Appendix 46: Average Yield/Productivity of Major Crops Grown by Selected Farmers (for the reference year 2018-19) –Non-Beneficiary (Ahmednagar)

(Qtl/Acre)

Crop	Marginal	Small	Medium	Large	Total
Irrigated Area					
Kharif					
Bajra	3.15	3.64	2.98	2.75	3.15
Cotton	4.50	2.55	2.67	2.86	2.84
Onion	-	55.00	60.00	61.00	60.00
Maize	5.00	5.56	7.00	6.57	6.25
Tur	-	3.00	3.96	-	3.73
Soyabean	-	-	-	5.00	5.00
Udid	-	-	-	2.97	2.97
Hulga	-	1.75	2.00	2.25	2.00
Groundnut	-	-	-	5.00	5.00
Total					
Rabi					
Gram	4.63	4.76	4.78	4.30	4.62
Wheat	4.00	6.00	6.00	7.09	6.40
Jowar	3.50	4.58	4.54	4.90	4.71
Onion	-	62.17	59.44	80.00	62.67
Total					
Summer					
Groundnut	-	-	5.00	-	5.00
Total					
Perennial					
Lemon	20.00	25.00	-	-	24.71
Pomegranate	-	45.00	-	55.00	51.00
Sugarcane	-	542.31	483.33	555.00	519.66
Total					
Gross Irrigated Area					
Unirrigated Area					
Kharif					
Bajra	-	4.14	2.56	4.26	3.59
Cotton	-	2.19	2.35	2.75	2.36
Maize	4.50	-	-	6.00	5.83
Tur	-	3.50	3.33	3.26	3.31
Soyabean	-	-	-	5.00	5.00
Udid	-	-	-	2.78	2.78
Hulga	-	-	-	1.95	1.95
Total					
Rabi					
Gram	3.00	3.54	3.00	-	3.40
Jowar	2.50	3.77	3.96	2.75	3.61
Onion	-	-	63.33	0.00	63.33
Total					
Summer					
Groundnut	-	-	4.00	-	4.00
Total					
Perennial					
Total					
Gross unirrigated Area					
Gross Crop Area					

Appendix 47: Average Yield/Productivity of Major Crops Grown by Selected Farmers (for the reference year 2018-19) –Beneficiary (Yavatmal)

(Qtl/Acre)

Crop	Marginal	Small	Medium	Large	Total
Irrigated Area					
Kharif					
Cotton	2.04	2.68	3.00	2.87	2.75
Green Gram (mung)	2.00	-	-	-	2.00
Tur	4.05	3.82	6.13	5.50	4.67
Soyabean	5.80	6.32	6.88	5.49	6.26
Udid	-	3.00	-	-	3.00
Total					
Rabi					
Gram	4.00	5.66	5.78	5.44	5.37
Wheat	8.00	7.26	7.15	9.15	7.63
Total					
Summer					
Groundnut	4.50	-	5.00	6.50	5.79
Total					
Perennial					
Total					
Gross Irrigated Area					
Unirrigated Area					
Kharif					
Cotton	2.00	2.36	2.56	2.58	2.44
Tur	3.38	4.95	4.50	5.35	4.84
Soyabean	5.63	6.27	7.73	7.89	7.08
Total					
Rabi					
Gram	-	5.00	-	-	5.00
Total					
Summer					
Total					
Perennial					
Total					
Gross unirrigated Area					
Gross Crop Area					

Appendix 48: Average Yield/Productivity of Major Crops Grown by Selected Farmers (for the reference year 2018-19) –Non-Beneficiary (Yavatmal)

(Qtl/Acre)

Crop	Marginal	Small	Medium	Large	Total
Irrigated Area					
Kharif					
Cotton	2.50	2.22	2.22	2.30	2.26
Tur	4.00	4.96	3.67	3.25	3.98
Soyabean	5.00	6.26	5.94	5.99	6.01
Total					
Rabi					
Gram	-	4.29	4.00	4.24	4.21
Wheat	4.50	6.93	7.58	7.20	7.00
Total					
Summer					
Groundnut	-	4.00	-	-	4.00
Total					
Perennial					
Total					
Gross Irrigated Area					
Unirrigated Area					
Kharif					
Cotton	2.05	2.00	2.08	2.16	2.06
Tur	2.50	4.07	3.83	5.38	4.42
Soyabean	3.67	5.45	5.18	6.38	5.61
Udid	-	2.50	2.75	-	2.70
Hulga	-	1.50	1.70	-	1.63
Total					
Rabi					
Gram	-	4.00	-	-	4.00
Jowar	-	-	-	3.50	3.50
Total					
Summer					
Total					
Perennial					
Total					
Gross unirrigated Area					
Gross Crop Area					

Appendix 49: Average Yield/Productivity of Major Crops Grown by Selected Farmers (for the reference year 2018-19) –Overall Beneficiary Farmers

(Qtl/Acre)

Crop	Marginal	Small	Medium	Large	Total
Irrigated Area					
Kharif					
Bajra	3.27	3.84	2.83	2.75	3.28
Cotton	2.04	2.87	2.89	3.07	2.87
Onion	65.00	62.27	72.00	70.40	66.93
Green Gram (mung)	2.00	-	-	-	2.00
Maize	-	6.33	8.29	8.56	8.18
Tur	3.87	3.97	5.33	4.23	4.24
Soyabean	5.80	6.32	6.88	5.49	6.26
Udid	-	3.00	-	-	3.00
Hulga	-	-	-	2.50	2.50
Total					
Rabi					
Gram	4.53	5.46	5.53	5.33	5.28
Wheat	7.18	6.90	6.49	8.92	7.41
Jowar	4.00	5.27	4.33	4.86	4.66
Onion	72.50	72.32	75.13	67.86	73.35
Total					
Summer					
Groundnut	4.33	5.60	5.11	6.60	5.41
Kadwal	-	5.08	-	-	5.08
Total					
Perennial					
Lemon	29.17	26.43	24.55	30.00	26.92
Pomegranate	41.88	57.63	52.00	-	52.81
Sugarcane	500.00	501.39	524.00	570.00	531.36
Grapes	-	91.89	-	-	91.89
Total					
Gross Irrigated Area					
Unirrigated Area					
Kharif					
Bajra	4.00	4.05	2.91	2.67	3.25
Cotton	2.00	2.36	2.53	2.58	2.42
Onion	-	60.00	-	-	60.00
Maize	-	6.00	7.00	-	6.50
Tur	3.29	4.95	4.46	4.35	4.61
Soyabean	5.63	6.27	7.73	7.89	7.08
Hulga	-	1.25	2.00	2.08	1.94
Sunflower	-	2.00	-	-	2.00
Total					
Rabi					
Gram	3.88	4.16	3.40	-	3.91
Wheat	-	3.00	-	-	3.00
Jowar	3.00	4.20	3.76	3.25	3.74
Onion	-	65.00	72.00	-	70.00
Total					
Summer					
Groundnut	-	-	5.64	-	5.64
Total					
Perennial					
Total					
Gross unirrigated Area					
Gross Crop Area					

Appendix 50: Average Yield/Productivity of Major Crops Grown by Selected Farmers (for the reference year 2018-19) –Overall Non-Beneficiary Farmers

(Qtl/Acre)

Crop	Marginal	Small	Medium	Large	Total
Irrigated Area					
Kharif					
Bajra	3.15	3.64	2.98	2.75	3.15
Cotton	3.61	2.31	2.44	2.46	2.47
Onion	-	55.00	60.00	61.00	60.00
Maize	5.00	5.56	7.00	6.57	6.25
Tur	3.76	4.70	3.86	3.25	3.90
Soyabean	5.00	6.26	5.94	5.95	5.99
Udid	-	-	-	2.97	2.97
Hulga	-	1.75	2.00	2.25	2.00
Groundnut	-	-	-	5.00	5.00
Total					
Rabi					
Gram	4.63	4.63	4.55	4.26	4.42
Wheat	4.33	6.45	6.81	7.14	6.70
Jowar	3.50	4.58	4.54	4.90	4.71
Onion	-	62.17	59.44	80.00	62.67
Total					
Summer					
Groundnut	-	4.00	5.00	-	4.91
Total					
Perennial					
Lemon	20.00	25.00	-	-	24.71
Pomegranate	-	45.00	-	55.00	51.00
Sugarcane	-	542.31	483.33	555.00	519.66
Total					
Gross Irrigated Area					
Unirrigated Area					
Kharif					
Bajra	-	4.14	2.56	4.26	3.59
Cotton	2.05	2.05	2.17	2.28	2.14
Maize	4.50	-	-	6.00	5.83
Tur	2.50	3.97	3.58	4.34	4.00
Soyabean	3.67	5.45	5.18	6.29	5.60
Udid	-	2.50	2.75	2.78	2.75
Hulga	-	1.50	1.70	1.95	1.81
Total					
Rabi					
Gram	3.00	3.60	3.00	-	3.46
Jowar	2.50	3.77	3.96	3.05	3.60
Onion	-	-	63.33	-	63.33
Total					
Summer					
Groundnut	-	-	4.00	-	4.00
Total					
Perennial					
Total					
Gross Unirrigated Area					
Gross Crop Area					

Appendix 51: Production, Value of Output, Cost and Net Returns for Rabi Crops – Gram and Tur Combine

HH	Farm Size	Production (quintals/acre)			Value of Main Product per Acre	Value of By Product Per Acre	Value of output(main + by-product) (Rs/acre)	Cost of production (Rs/acre)		Total Cost per Acre	Net returns (Farm business income) (Rs/acre)	Gross Farm income from cultivated area (Rs) per hh	Gross Farm Expenditure from cultivated area (Rs) per hh	Net Farm income from cultivated area (Rs) per hh
		Irrigated	Rainfed	Total				Material cost	Labour cost					
Ahmednagar beneficiary														
26	Marginal	4.39	3.68	4.30	22142	2491	24633	3560	5122	8682	15951	24211	8533	15678
40	Small	5.13	3.62	4.94	22326	2918	25244	3750	4497	8247	16998	27082	8847	18235
19	Medium	5.11	3.64	4.81	24261	2619	26881	4666	5501	10167	16713	33352	12615	20737
8	Large	4.25	3.14	4.07	21238	3547	24785	3647	5535	9182	15602	70223	26017	44207
93	Total	4.74	3.50	4.56	22401	2931	25331	3870	5102	8972	16359	32719	11589	21130
Ahmednagar Non beneficiary														
8	Marginal	4.19	3.00	4.10	18341	2175	20517	2159	2920	5080	15437	39324	9736	29588
21	Small	4.58	3.53	4.23	18046	1965	20011	3254	4982	8237	11774	22812	9390	13422
11	Medium	4.57	3.29	4.28	17950	2377	20327	2500	3935	6435	13892	35008	11083	23925
9	Large	4.30	3.26	3.85	16661	2743	19404	2828	4250	7078	12327	35170	12828	22342
49	Total	4.43	3.34	4.12	17686	2334	20020	2738	4138	6876	13144	31134	10693	20441
Yavatmal beneficiary														
5	Marginal	4.02	3.38	3.90	18558	3375	21933	3649	4090	7739	14194	18800	6633	12167
15	Small	4.71	4.96	4.82	23706	2968	26674	3853	4464	8317	18358	30564	9530	21035
7	Medium	5.91	4.50	5.46	26825	3579	30405	3681	4452	8133	22271	43534	11645	31889
7	Large	5.47	5.35	5.44	25827	3468	29295	2818	4182	7000	22295	66344	15853	50491
34	Total	5.05	4.85	4.98	24218	3237	27455	3566	4359	7924	19530	35462	10236	25226
Yavatmal Non beneficiary														
-	Marginal	4.00	2.50	2.80	12880	1700	14580	2200	3200	5400	9180	9113	3375	5738
6	Small	4.73	4.06	4.44	19104	1810	20914	2944	3479	6423	14492	20624	6333	14290
3	Medium	3.90	3.83	3.88	15085	2121	17206	2818	3152	5970	11236	25809	8955	16855
4	Large	3.97	5.38	4.23	16073	1465	17538	2352	3563	5915	11623	103767	35000	68767
13	Total	4.13	4.41	4.21	16737	1653	18390	2578	3478	6056	12335	36635	12063	24571
Overall beneficiary														
31	Marginal	4.27	3.55	4.17	20911	2795	23706	3590	4768	8358	15348	22182	7821	14361
55	Small	4.92	4.76	4.87	23162	2948	26111	3812	4477	8289	17822	29137	9250	19887
26	Medium	5.47	4.15	5.12	25504	3085	28588	4188	4993	9182	19407	37923	12180	25744
15	Large	4.81	4.35	4.72	23419	3509	26928	3253	4892	8145	18783	68163	20617	47545
127	Total	4.88	4.45	4.77	23327	3087	26413	3715	4723	8438	17975	34117	10899	23218
Overall Non beneficiary														
8	Marginal	4.18	2.69	3.94	17650	2115	19765	2165	2956	5120	14645	30028	7779	22249
27	Small	4.65	3.86	4.34	18633	1879	20512	3082	4148	7230	13281	21520	7586	13934
14	Medium	4.37	3.54	4.14	16955	2288	19243	2611	3663	6274	12969	31519	10276	21243
13	Large	4.04	4.34	4.12	16244	1836	18079	2490	3763	6253	11827	64569	22330	42238
62	Total	4.27	3.93	4.17	17171	1964	19136	2651	3780	6431	12705	33779	11352	22427

Appendix 52: Method of Sowing followed by Selected Households in reference year (%)

Row Labels	Marginal	Small	Medium	Large	Total
Ahmednagar-Beneficiary					
Broadcasting	1 (3.57)	10 (23.81)	3 (13.64)	1 (12.5)	15 (15)
Drill sown	11 (39.29)	11 (26.19)	10 (45.45)	6 (75)	38 (38)
Line Sown	16 (57.14)	21 (50)	9 (40.91)	1 (12.5)	47 (47)
Total Ahmednagar Beneficiary	28 (100)	42 (100)	22 (100)	8 (100)	100 (100)
Ahmednagar-Non Beneficiary					
Broadcasting	2 (25)	2 (9.09)	1 (9.09)	1 (11.11)	6 (12)
Drill sown	3 (37.5)	10 (45.45)	5 (45.45)	6 (66.67)	24 (48)
Line Sown	3 (37.5)	10 (45.45)	5 (45.45)	2 (22.22)	20 (40)
Total Ahmednagar Non Beneficiary	8 (100)	22 (100)	11 (100)	9 (100)	50 (100)
Yavatmal-Beneficiary					
Broadcasting	1 (5.88)	13 (22.41)	4 (26.67)	6 (60)	24 (24)
Drill sown	11 (64.71)	41 (70.69)	8 (53.33)	3 (30)	63 (63)
Line Sown	5 (29.41)	4 (6.9)	3 (20)	1 (10)	13 (13)
Total Yavatmal Beneficiary	17 (100)	58 (100)	15 (100)	10 (100)	100 (100)
Yavatmal -Non Beneficiary					
Broadcasting	1 (25)	8 (26.67)	1 (12.5)	2 (25)	12 (24)
Drill sown	2 (50)	18 (60)	7 (87.5)	5 (62.5)	32 (64)
Line Sown	1 (25)	4 (13.33)	(0)	1 (12.5)	6 (12)
Total Yavatmal Non Beneficiary	4 (100)	30 (100)	8 (100)	8 (100)	50 (100)
Overall Beneficiary					
Broadcasting	2 (4.44)	23 (23)	7 (18.92)	7 (38.89)	39 (19.5)
Drill sown	22 (48.89)	52 (52)	18 (48.65)	9 (50)	101 (50.5)
Line Sown	21 (46.67)	25 (25)	12 (32.43)	2 (11.11)	60 (30)
Total Beneficiary	45 (100)	100 (100)	37 (100)	18 (100)	200 (100)
Overall Non Beneficiary					
Broadcasting	3 (25.00)	10 (19.23)	2 (10.53)	3 (17.65)	18 18.00)
Drill sown	5 (41.67)	28 (53.85)	12 (63.16)	11 (64.71)	56 (56.00)
Line Sown	4 (33.33)	14 (26.92)	5 (26.32)	3 (17.65)	26 (26.00)
Total Non-Beneficiary	12 (100)	52 (100)	19 (100)	17 (100)	100 (100)

Appendix 53: Distribution of Seed Minikit (Numbers)

Agency	Marginal	Small	Medium	Large	Total
Ahmednagar Beneficiary					
KVK	-	-	-	-	-
Agricultural Departments	28	42	22	8	100
Gram Panchayat	-	-	-	-	-
Others	-	-	-	-	-
Total Beneficiary	28	42	22	8	100
Ahmednagar Non beneficiary					
KVK	-	-	-	-	-
Agricultural Departments	-	-	-	-	-
Gram Panchayat	-	-	-	-	-
Others	-	-	-	-	-
Total Non-Beneficiary	-	-	-	-	-
Yavatmal Beneficiary					
KVK	-	-	-	-	-
Agricultural Departments	17	58	15	10	100
Gram Panchayat	-	-	-	-	-
Others	-	-	-	-	-
Total Beneficiary	17	58	15	10	100
Yavatmal Non Beneficiary					
KVK	-	-	-	-	-
Agricultural Departments	-	-	-	-	-
Gram Panchayat	-	-	-	-	-
Others	-	-	-	-	-
Total Non-Beneficiary	-	-	-	-	-
Overall Beneficiary					
KVK	-	-	-	-	-
Agricultural Departments	45	100	37	18	200
Gram Panchayat	-	-	-	-	-
Others	-	-	-	-	-
Total beneficiary	45	100	37	18	200
Overall Non Beneficiary					
KVK	-	-	-	-	-
Agricultural Departments	-	-	-	-	-
Gram Panchayat	-	-	-	-	-
Others	-	-	-	-	-
Total Non-Beneficiary	-	-	-	-	-

Appendix 54: Documents Submitted to Avail Seed Minikit (Combine Number and Percent)

Documents	Marginal	Small	Medium	Large	Grand Total
Ahmednagar Beneficiary					
1	8 (28.57)	16 (38.1)	3 (13.64)	2 (25.00)	29 (29.00)
1,2	16 (57.14)	11 (26.19)	8 (36.36)	3 (37.50)	38 (38.00)
1,2,3	2 (7.15)	12 (28.57)	5 (22.73)	1 (12.50)	20 (20.00)
1,3	1 (3.57)	1 (2.38)	4 (18.18)	1 (12.50)	7 (7.00)
2,3	1 (3.57)	2 (4.76)	2 (9.09)	1 (12.50)	6 (6.00)
Total	28 (100.00)	42 (100.00)	22 (100.00)	8 (100.00)	100 (100.00)
Ahmednagar Non Beneficiary					
1	-	-	-	-	-
2	-	-	-	-	-
3	-	-	-	-	-
4	-	-	-	-	-
Yavatmal Beneficiary					
1	2 (11.76)	4 (6.90)	2 (13.33)	2 (20.00)	10 (10.00)
1,2	10 (58.84)	43 (74.14)	7 (46.67)	4 (40.00)	64 (64.00)
1,2,3	2 (11.76)	5 (8.62)	3 (20)	2 (20.00)	12 (12.00)
1,3	1 (5.88)	5 (8.62)	2 (13.33)	1 (10.00)	9 (9.00)
2,3	2 (11.76)	1 (1.72)	1 (6.67)	1 (10.00)	5 (5.00)
Total	17 (100.00)	58 (100.00)	15 (100.00)	10 (100.00)	100 (100)
Yavatmal Non beneficiary					
1	-	-	-	-	-
2	-	-	-	-	-
3	-	-	-	-	-
4	-	-	-	-	-
Overall Beneficiary					
1	10 (22.22)	20 (20.00)	5 (13.51)	4 (22.22)	39 (19.50)
1,2	26 (57.78)	54 (54.00)	15 (40.54)	7 (38.89)	102 (51.00)
1,2,3	4 (8.89)	17 (17.00)	8 (21.62)	3 (16.67)	32 (16.00)
1,3	2 (4.44)	6 (6.00)	6 (16.22)	2 (11.11)	16 (8.00)
2,3	3 (6.67)	3 (3.00)	3 (8.11)	2 (11.11)	11 (5.50)
Total	45 (100.00)	100 (100.00)	37 (100)	18 (100)	200 (100)
Overall Non Beneficiary					
1	-	-	-	-	-
1,2	-	-	-	-	-
1,2,3	-	-	-	-	-
1,3	-	-	-	-	-
2,3	-	-	-	-	-
Total	-	-	-	-	-

Source: Primary Data

Code Note: 1=Adhar Card, 2= Pahani (land records), 3= Bank Passbook

Appendix 55: Criteria for Farmer Selection (Combine Number and Percent)

Criteria	Marginal	Small	Medium	Large	Grand Total
Ahmednagar Beneficiary					
1	17 (60.71)	23 (54.76)	10 (45.45)	2 (25.00)	52 (52.00)
2	2 (7.14)	1 (2.38)	1 (4.55)	5 (62.50)	9 (9.00)
3	2 (7.14)	5 (11.9)	1 (4.55)	1 (12.50)	9 (9.00)
4	3 (10.71)	2 (4.76)	-	-	5 (5.00)
1,2	1 (3.57)	2 (4.76)	4 (18.18)	-	7 (7.00)
1,2,3	2 (7.14)	5 (11.9)	2 (9.09)	-	9 (9.00)
2,3	1 (3.57)	4 (9.52)	4 (18.18)	-	9 (9.00)
Total	28 (100.00)	42 (100.00)	22 (100.00)	8 (100.00)	100 (100.00)
Ahmednagar Non Beneficiary					
1	-	-	-	-	-
2	-	-	-	-	-
3	-	-	-	-	-
4	-	-	-	-	-
Total	-	-	-	-	-
Yavatmal Beneficiary					
1	1 (5.88)	12 (20.69)	1 (6.67)	1 (10.00)	15 (15.00)
2	2 (11.76)	9 (15.52)	7 (46.67)	2 (20.00)	20 (20.00)
3	1 (5.88)	7 (12.07)	2 (13.33)	1 (10.00)	11 (11.00)
4	4 (23.53)	11 (18.97)	2 (13.33)	2 (20.00)	19 (19.00)
1,2	1 (5.88)	1 (1.72)	2 (13.33)	1 (10.00)	5 (5.00)
1,2,3	4 (23.53)	7 (12.07)	1 (6.67)	1 (10.00)	13 (13.00)
2,3	4 (23.53)	11 (18.97)	-	2 (20.00)	17 (17.00)
Total	17 (100)	58 (100)	15 (100)	10 (100)	100 (100.00)
Yavatmal Non Beneficiary					
1	-	-	-	-	-
2	-	-	-	-	-
3	-	-	-	-	-
4	-	-	-	-	-
Total	-	-	-	-	-
Overall Beneficiary					
1	18 (40.00)	35 (35.00)	11 (29.73)	3 (16.67)	67 (33.50)
2	4 (8.89)	10 (10.00)	8 (21.62)	7 (38.89)	29 (14.50)
3	3 (6.67)	12 (12.00)	3 (8.11)	2 (11.11)	20 (10.00)
4	7 (15.56)	13 (13.00)	2 (5.41)	2 (11.11)	24 (12.00)
1,2	2 (4.44)	3 (3.00)	6 (16.22)	1 (5.56)	12 (6.00)
1,2,3	6 (13.33)	12 (12.00)	3 (8.11)	1 (5.56)	22 (11.00)
2,3	5 (11.11)	15 (15.00)	4 (10.81)	2 (11.11)	26 (13.00)
Total	45 (100.00)	100 (100.00)	37 (100.00)	18 (100)	200 (100)
Overall non Beneficiary					
1	-	-	-	-	-
2	-	-	-	-	-
3	-	-	-	-	-
4	-	-	-	-	-
Total	-	-	-	-	-

Source: Primary Data

Code Note: 1Any Interested Farmer, 2= SC/ST Farmer,3= Small . Marginal Farmer, 4=BPL Farmer

Appendix 56: Financial details of Seed Minikit

Farm Size	Amount Charged	Amount Reimbursed	Reimbursed Through		Duration of Reimbursement
	(Rs/Kit)	(Rs/Kit)	(Rs/Kit)		(months)
			Cash	Bank	
Ahmednagar Beneficiary					
Marginal	-	-	-	-	-
Small	-	-	-	-	-
Medium	-	-	-	-	-
Large	-	-	-	-	-
Total	-	-	-	-	-
Ahmednagar Non beneficiary					
Marginal	-	-	-	-	-
Small	-	-	-	-	-
Medium	-	-	-	-	-
Large	-	-	-	-	-
Total	-	-	-	-	-
Yavatmal Beneficiary					
Marginal	-	-	-	-	-
Small	-	-	-	-	-
Medium	-	-	-	-	-
Large	-	-	-	-	-
Total	-	-	-	-	-
Yavatmal Non beneficiary					
Marginal	-	-	-	-	-
Small	-	-	-	-	-
Medium	-	-	-	-	-
Large	-	-	-	-	-
Total	-	-	-	-	-
Overall beneficiary					
Marginal	-	-	-	-	-
Small	-	-	-	-	-
Medium	-	-	-	-	-
Large	-	-	-	-	-
Total	-	-	-	-	-
Overall Non beneficiary					
Marginal	-	-	-	-	-
Small	-	-	-	-	-
Medium	-	-	-	-	-
Large	-	-	-	-	-
Total	-	-	-	-	-

Source: Primary Data

Appendix 57: Content of the Seed Minikit

Farm Size	POP	PSP culture (100gms)	Rhizobium (100gms)	PSP and Rhizobium	Total
Ahmednagar Beneficiary					
Marginal	-	-	28(100.00)	-	28(100.00)
Small	-	-	42(100.00)	-	42(100.00)
Medium	-	-	22(100.00)	-	22(100.00)
Large	-	-	8(100.00)	-	8(100.00)
Total	-	-	100(100.00)	-	100(100.00)
Ahmednagar Non Beneficiary					
Marginal	-	-	-	-	-
Small	-	-	-	-	-
Medium	-	-	-	-	-
Large	-	-	-	-	-
Total	-	-	-	-	-
Yavatmal Beneficiary					
Marginal	-	2(11.76)	10(58.82)	5(29.41)	17(100.00)
Small	-	2(3.45)	55(94.83)	1(1.72)	58(100.00)
Medium	-	3(20.00)	11(73.33)	1(6.67)	15(100.00)
Large	-	1(10.00)	7(70.00)	2(20.00)	10(100.00)
Total	-	8(8.00)	83(83.00)	9(9.00)	100(100.00)
Yavatmal Non Beneficiary					
Marginal	-	-	-	-	-
Small	-	-	-	-	-
Medium	-	-	-	-	-
Large	-	-	-	-	-
Total	-	-	-	-	-
Overall Beneficiary					
Marginal	-	2(4.44)	38(84.44)	5(11.11)	45(100.00)
Small	-	2(2.00)	97(97)	1(1.00)	100(100.00)
Medium	-	3(8.11)	33(89.19)	1(2.70)	37(100.00)
Large	-	1(5.56)	15(83.33)	2(11.11)	18(100.00)
Total	-	8(4.00)	183(91.50)	9(4.50)	200(100.00)
Overall Non beneficiary					
Marginal	-	-	-	-	-
Small	-	-	-	-	-
Medium	-	-	-	-	-
Large	-	-	-	-	-
Total	-	-	-	-	-

Appendix 58: Seed purchased by the farmer for the reference year through seed minikits

Crop	Quantity (kgs) Average	Price (Rs/ kit) Avg.	Source of purchase (%)					Distance from farm (kms) Avg.	Transport Cost (Rs/Kit) Average
			KVK	RSK	Private Dealer	Co-op society	Total		
Ahmednagar Beneficiary									
Marginal	8.00	-	-	28 (100)	-	-	28 (100)	23.75	15.71
Small	8.00	-	-	42 (100)	-	-	42 (100)	16.14	13.21
Medium	8.00	-	-	22 (100)	-	-	22 (100)	14.59	12.73
Large	8.00	-	-	8 (100)	-	-	8 (100)	11.13	10.00
Total	8.00	-	-	100 (100)	-	-	100 (100)	17.53	13.55
Ahmednagar Non Beneficiary									
Marginal	-	-	-	-	-	-	-	-	-
Small	-	-	-	-	-	-	-	-	-
Medium	-	-	-	-	-	-	-	-	-
Large	-	-	-	-	-	-	-	-	-
Total	-	-	-	-	-	-	-	-	-
Yavatmal Beneficiary									
Marginal	4.00	-	-	17 (100)	-	-	17 (100)	6.12	10.29
Small	4.00	-	-	58 (100)	-	-	58 (100)	8.16	12.33
Medium	4.00	-	-	15 (100)	-	-	15 (100)	7.53	11.67
Large	4.00	-	-	10 (100)	-	-	10 (100)	9.20	14.00
Total	4.00	-	-	100 (100)	-	-	100 (100)	8.26	12.05
Yavatmal Non Beneficiary									
Marginal	-	-	-	-	-	-	-	-	-
Small	-	-	-	-	-	-	-	-	-
Medium	-	-	-	-	-	-	-	-	-
Large	-	-	-	-	-	-	-	-	-
Total	-	-	-	-	-	-	-	-	-
Overall Beneficiary									
Marginal	6.49	-	-	45 (100)	-	-	45 (100)	17.09	13.67
Small	5.68	-	-	100 (100)	-	-	100 (100)	11.51	12.70
Medium	6.38	-	-	37 (100)	-	-	37 (100)	11.73	12.30
Large	5.78	-	-	18 (100)	-	-	18 (100)	12.50	12.22
Total	6.00	-	-	200 (100)	-	-	200 (100)	12.90	12.80
Overall Non Beneficiary									
Marginal	-	-	-	-	-	-	-	-	-
Small	-	-	-	-	-	-	-	-	-
Medium	-	-	-	-	-	-	-	-	-
Large	-	-	-	-	-	-	-	-	-
Total	-	-	-	-	-	-	-	-	-

Note: Since the minikits were provided by the government agency, it did not involve any extra cost (price) for the packet other than transport cost.

Appendix 59: Seed purchased by the farmer from other sources in the reference year

Crop	Quantity (kgs) Average	Price (Rs/ kit) Average	Source of purchase (Number and Percent)					Distance from farm (kms) Average	Transportation Cost (Rs/kg) Average
			KVK	RSK	Private Dealer	Co-op society	Total		
Ahmednagar Beneficiary									
Marginal	17.14	57.14	-	-	5 (71.43)	2 (28.57)	7 (100.00)	17.14	1.67
Small	21.33	90.00	-	-	7 (63.64)	4 (36.36)	11 (100.00)	10.78	2.24
Medium	25.20	71.50	-	-	8 (72.73)	3 (27.27)	11 (100.00)	12.60	2.90
Large	30.00	73.33	-	-	2 (33.33)	4 (66.67)	6 (100.00)	12.00	2.25
Total	23.25	73.91	-	-	22 (62.86)	13 (37.14)	35 (100.00)	12.97	2.37
Ahmednagar Non Beneficiary									
Marginal	-	-	-	-	-	-	-	-	-
Small	-	-	-	-	-	-	-	-	-
Medium	-	-	-	-	-	-	-	-	-
Large	-	-	-	-	-	-	-	-	-
Total	-	-	-	-	-	-	-	-	-
Yavatmal Beneficiary									
Marginal	4.00	75.00	-	-	3 (75)	1 (25)	4 (100.00)	8.25	5.31
Small	3.75	60.00	-	-	3 (75)	1 (25)	4 (100.00)	9.00	7.33
Medium	8.00	80.00	-	-	2 (66.67)	1 (33.33)	3 (100.00)	7.33	5.83
Large	7.29	65.71	-	-	5 (71.43)	2 (28.57)	7 (100.00)	5.29	3.72
Total	5.89	68.89	-	-	13 (72.22)	5 (27.78)	18 (100.00)	7.11	4.95
Yavatmal Non Beneficiary									
Marginal	-	-	-	-	-	-	-	-	-
Small	-	-	-	-	-	-	-	-	-
Medium	-	-	-	-	-	-	-	-	-
Large	-	-	-	-	-	-	-	-	-
Total	-	-	-	-	-	-	-	-	-
Overall Beneficiary									
Marginal	12.36	63.64	-	-	8 (72.73)	3 (27.27)	11 (100.00)	13.91	2.10
Small	15.92	80.77	-	-	10 (66.67)	5 (33.33)	15 (100.00)	10.23	2.61
Medium	21.23	73.46	-	-	10 (71.43)	4 (28.57)	14 (100.00)	11.38	3.15
Large	17.77	69.23	-	-	7 (53.85)	6 (46.15)	13 (100.00)	8.38	2.58
Total	17.00	72.10	-	-	35 (66.04)	18 (33.96)	53 (100.00)	10.86	2.69
Overall Non Beneficiary									
Marginal	-	-	-	-	-	-	-	-	-
Small	-	-	-	-	-	-	-	-	-
Medium	-	-	-	-	-	-	-	-	-
Large	-	-	-	-	-	-	-	-	-
Total	-	-	-	-	-	-	-	-	-

Note: Farmer has Purchased Extra seed due to less size of seed minikits.

Appendix 60: Marketing channels through which pulses sold by the selected households (Percent of output)

Farm Size	Wholesale market	Local market	Village directly	Co-operative	Government agencies	Intermediaries at farm gate	Merchant Or pre-arranged Contract	Others	Aggregate
Ahmednagar Beneficiary– Gram (Bengal Gram)									
Marginal	82.10	-	-	-	-	-	-	-	82.10
Small	83.91	-	-	-	-	-	-	-	83.91
Medium	83.33	-	-	-	-	-	-	-	83.33
Large	86.17	-	-	-	-	-	-	-	86.17
Total	83.63	-	-	-	-	-	-	-	83.63
Ahmednagar Non-Beneficiary– Gram (Bengal Gram)									
Marginal	85.00	-	-	-	-	-	-	-	85.00
Small	89.29	-	-	-	-	-	-	-	89.29
Medium	85.50	-	-	-	-	-	-	-	85.50
Large	90.00	-	-	-	-	-	-	-	90.00
Total	88.16	-	-	-	-	-	-	-	88.16
Yavatmal Beneficiary– Tur (Red gram)									
Marginal	80.69	-	-	-	-	-	-	-	80.69
Small	89.83	-	-	-	-	-	-	-	89.83
Medium	85.33	-	-	-	-	-	-	-	85.33
Large	86.86	-	-	-	-	-	-	-	86.86
Total	87.50	-	-	-	-	-	-	-	87.50
Yavatmal Non Beneficiary– Tur (Red gram)									
Marginal	86.76	-	-	-	-	-	-	-	86.76
Small	90.07	-	-	-	-	-	-	-	90.07
Medium	89.36	-	-	-	-	-	-	-	89.36
Large	92.04	-	-	-	-	-	-	-	92.04
Total	90.67	-	-	-	-	-	-	-	90.67
Overall Beneficiary– Gram and Tur									
Marginal	81.46	-	-	-	-	-	-	-	81.46
Small	87.84	-	-	-	-	-	-	-	87.84
Medium	84.26	-	-	-	-	-	-	-	84.26
Large	86.56	-	-	-	-	-	-	-	86.56
Total	85.86	-	-	-	-	-	-	-	85.86
Overall Non Beneficiary– Gram and Tur									
Marginal	85.45	-	-	-	-	-	-	-	85.45
Small	89.69	-	-	-	-	-	-	-	89.69
Medium	87.11	-	-	-	-	-	-	-	87.11
Large	91.27	-	-	-	-	-	-	-	91.27
Total	89.44	-	-	-	-	-	-	-	89.44

Appendix 61: Awareness of distribution of Seed Minikit (%)

Source	Marginal	Small	Medium	Large	Total
Ahmednagar-Beneficiary					
Agriculture Officer (RSK)	15 (53.57)	32 (76.19)	14 (63.64)	4 (50)	65 (65)
Farmer Facilitator	-	-	-	-	-
Fellow Farmer	13 (46.43)	10 (23.81)	8 (36.36)	4 (50)	35 (35)
Print & Visual media	-	-	-	-	-
Wall writing	-	-	-	-	-
KVK official	-	-	-	-	-
Agricultural University	-	-	-	-	-
Others	-	-	-	-	-
Total Beneficiary	28 (100)	42 (100)	22 (100)	8 (100)	100 (100)
Ahmednagar Non Beneficiary					
Agriculture Officer (RSK)	-	-	-	-	-
Farmer Facilitator	-	-	-	-	-
Fellow Farmer	-	-	-	-	-
Print & Visual media	-	-	-	-	-
Wall writing	-	-	-	-	-
KVK official	-	-	-	-	-
Agricultural University	-	-	-	-	-
Others	-	-	-	-	-
Total Non Beneficiary	-	-	-	-	-
Yavatmal Beneficiary					
Agriculture Officer (RSK)	12 (70.59)	50 (86.21)	8 (53.33)	5 (50)	75 (75)
Farmer Facilitator	-	-	-	-	-
Fellow Farmer	5 (29.41)	8 (13.79)	7 (46.67)	5 (50)	25 (25)
Print & Visual media	-	-	-	-	-
Wall writing	-	-	-	-	-
KVK official	-	-	-	-	-
Agricultural University	-	-	-	-	-
Others	-	-	-	-	-
Total Beneficiary	17 (100)	58 (100)	15 (100)	10 (100)	100 (100)
Yavatmal Non Beneficiary					
Agriculture Officer (RSK)	-	-	-	-	-
Farmer Facilitator	-	-	-	-	-
Fellow Farmer	-	-	-	-	-
Print & Visual media	-	-	-	-	-
Wall writing	-	-	-	-	-
KVK official	-	-	-	-	-
Agricultural University	-	-	-	-	-
Others	-	-	-	-	-
Total Non-Beneficiary	-	-	-	-	-
Overall Beneficiary					
Agriculture Officer (RSK)	27 (60)	82 (82)	22 (59.46)	9 (50)	140 (70)
Farmer Facilitator	-	-	-	-	-
Fellow Farmer	18 (40)	18 (18)	15 (40.54)	9 (50)	60 (30)
Print & Visual media	-	-	-	-	-
Wall writing	-	-	-	-	-
KVK official	-	-	-	-	-
Agricultural University	-	-	-	-	-
Others	-	-	-	-	-
Overall Beneficiary	45 (100)	100 (100)	37 (100)	18 (100)	200 (100)
Overall Non- Beneficiary					
Agriculture Officer (RSK)	-	-	-	-	-
Farmer Facilitator	-	-	-	-	-
Fellow Farmer	-	-	-	-	-
Print & Visual media	-	-	-	-	-
Wall writing	-	-	-	-	-
KVK official	-	-	-	-	-
Agricultural University	-	-	-	-	-
Others	-	-	-	-	-
Overall Non Beneficiary	-	-	-	-	-

Appendix 62: Farmers Opinion regarding distribution of Seed Minikit for the reference year

Opinion		Marginal	Small	Medium	Large	Total
Ahmednagar Beneficiary						
1.Is seed minikit distribution advantageous	Yes	26 (92.86)	39 (92.86)	20 (90.91)	7 (87.50)	92 (92.00)
	No	2 (7.14)	3 (7.14)	2 (9.09)	1 (12.50)	8 (8.00)
	Total	28 (100.00)	42 (100.00)	22 (100.00)	8 (100.00)	100 (100.00)
	1	22 (78.57)	24 (57.14)	10 (45.45)	-	56 (56.00)
	2	-	-	-	-	-
	3	1 (3.57)	4 (9.52)	2 (9.09)	3 (37.50)	10 (10.00)
	4	1 (3.57)	-	-	-	1 (1.00)
	1,2	1 (3.57)	-	1 (4.55)	-	2 (2.00)
	1,2,3	-	3 (7.14)	3 (13.64)	-	6 (6.00)
	1,3	1 (3.57)	8 (19.05)	3 (13.64)	3 (37.50)	15 (15.00)
	2,3	-	-	1 (4.55)	1 (12.50)	2 (2.00)
	No Comments	2 (7.14)	3 (7.14)	2 (9.09)	1 (12.50)	8 (8.00)
	Total	28 (100.00)	42 (100.00)	22 (100.00)	8 (100.00)	100 (100.00)
Ahmednagar Non-Beneficiary						
	1	-	-	-	-	-
	2	-	-	-	-	-
	3	-	-	-	-	-
Yavatmal Beneficiary						
1.Is seed minikit distribution advantageous	Yes	15 (88.24)	53 (91.38)	14 (93.33)	9 (90.00)	91 (91.00)
	No	2 (11.76)	5 (8.62)	1 (6.67)	1 (10.00)	9 (9.00)
	Total	17 (100.00)	58 (100.00)	15 (100.00)	10 (100.00)	100 (100.00)
	1	6 (35.29)	17 (29.31)	6 (40.00)	8 (80.00)	37 (37.00)
	2	3 (17.65)	1 (1.72)	-	1 (10.00)	5 (5.00)
	3	-	1 (1.72)	-	-	1 (1.00)
	4	-	-	-	-	
	1,2	6 (35.29)	27 (46.55)	6 (40.00)	-	39 (39.00)
	1,2,3	-	1 (1.72)	1 (6.67)	-	2 (2.00)
	1,3	-	5 (8.62)	1 (6.67)	-	6 (6.00)
	2,3	-	1 (1.72)	-	-	1 (1.00)
	No Comments	2 (11.76)	5 (8.62)	1 (6.67)	1 (10.00)	9 (9.00)
	Total	17 (100.00)	58 (100.00)	15 (100.00)	10 (100.00)	100 (100.00)
Yavatmal Non-Beneficiary						
	1	-	-	-	-	-
	2	-	-	-	-	-
	3	-	-	-	-	-
Overall Beneficiary						
1.Is seed minikit distribution advantageous	Yes	41 (91.11)	92 (92.00)	34 (91.89)	16 (88.89)	183 (91.5)
	No	4 (8.89)	8 (8.00)	3 (8.11)	2 (11.11)	17 (8.50)
	Total	45 (100.00)	100 (100.00)	37 (100.00)	18 (100.00)	200 (100.00)
	1	28 (62.22)	41 (41.00)	16 (43.24)	8 (44.44)	93 (46.50)
	2	3 (6.67)	1 (1.00)	0 (0.00)	1 (5.56)	5 (2.50)
	3	1 (2.22)	5 (5.00)	2 (5.41)	3 (16.67)	11 (5.50)
	4	1 (2.22)	-	-	-	1 (0.50)
	1,2	7 (15.56)	27 (27.00)	7 (18.92)	-	41 (20.50)
	1,2,3		4 (4.00)	4 (10.81)	-	8 (40)
	1,3	1 (2.22)	13 (13.00)	4 (10.81)	3 (16.67)	21 (10.50)
	2,3	-	1 (1.00)	1 (2.70)	1 (5.56)	3 (1.50)
	No Comments	4 (8.89)	8 (8.00)	3 (8.11)	2 (11.11)	17 (8.50)
	Total	45 (100.00)	100 (100.00)	37 (100.00)	18 (100.00)	200 (100.00)
Overall Non Beneficiary						
1	-	-	-	-	-	-
2	-	-	-	-	-	-
3	-	-	-	-	-	-

Code: Yield difference = 1; Quality difference = 2;More profitable = 3;short duration of crop = 4;Any other = 5

Appendix 63: Farmers Opinion regarding Quantity of seed supplied in Seed Minikit for the reference year

Sufficient in Quantity	Marginal	Small	Medium	Large	Total
Ahmednagar Beneficiary– Gram (Bengal Gram)					
1. Yes	19 (67.86)	26 (61.90)	16 (72.73)	7 (87.50)	68 (68.00)
2. No	9 (32.14)	16 (38.10)	6 (27.27)	1 (12.50)	32 (32.00)
Total	28 (100.00)	42 (100.00)	22 (100.00)	8 (100.00)	100 (100.00)
Opinion –if not Sufficient then how much quantity in kgs should be distributed					
1 Kg	-	-	-	-	-
2 Kg	-	-	-	-	-
3 Kg	-	-	-	-	-
4 Kg	-	-	-	-	-
5 Kg	-	-	-	-	-
16 Kg	5 (55.56)	11 (68.75)	4 (66.67)	1 (100)	21 (65.63)
20 Kg	-	1 (6.25)	-	-	1 (3.13)
25 Kg	2 (22.22)	1 (6.25)	-	-	3 (9.38)
30 Kg	1 (11.11)	1 (6.25)	1 (16.67)	-	3 (9.38)
40 Kg	1 (11.11)	2 (12.50)	1 (16.67)	-	4 (12.50)
Total	9 (100.00)	16 (100.00)	6 (100.00)	1 (100.00)	32 (100.00)
Yavatmal Beneficiary– Tur (Red gram)					
1. Yes	13 (76.47)	51 (87.93)	15 (100.00)	10 (100.00)	89 (89.00)
2. No	4 (23.53)	7 (12.07)	-	-	11 (11.00)
Total	17 (100.00)	58 (100.00)	15 (100.00)	10 (100.00)	100 (100.00)
Opinion –if not Sufficient then how much quantity in kgs should be distributed					
1 Kg	-	-	-	-	-
2 Kg	-	-	-	-	-
3 Kg	-	-	-	-	-
4 Kg	-	-	-	-	-
5 Kg	4 (100.00)	7 (100.00)	-	-	11 (100.00)
16 Kg	-	-	-	-	-
20 Kg	-	-	-	-	-
25 Kg	-	-	-	-	-
30 Kg	-	-	-	-	-
40 Kg	-	-	-	-	-
Total	4 (100.00)	7 (100.00)	-	-	11 (100.00)
Overall Beneficiary– Gram and Tur					
1. Yes	32 (71.11)	77 (77.00)	31 (83.78)	17 (94.44)	157 (78.50)
2. No	13 (28.89)	23 (23.00)	6 (16.22)	1 (5.56)	43 (21.50)
Total	45 (100.00)	100 (100.00)	37 (100.00)	18 (100.00)	200 (100.00)
Opinion –if not Sufficient then how much quantity in kgs should be distributed					
1 Kg	-	-	-	-	-
2 Kg	-	-	-	-	-
3 Kg	-	-	-	-	-
4 Kg	-	-	-	-	-
5 Kg	4 (30.78)	7 (30.42)	-	-	11 (25.57)
16 Kg	5 (38.46)	11 (47.83)	4 (66.67)	1 (100.00)	21 (48.84)
20 Kg	-	1 (4.35)	-	-	1 (2.33)
25 Kg	2 (15.38)	1 (4.35)	-	-	3 (6.98)
30 Kg	1 (7.69)	1 (4.35)	1 (16.67)	-	3 (6.98)
40 Kg	1 (7.69)	2 (8.70)	1 (16.67)	-	4 (9.30)
Total	13 (100.00)	23 (100.00)	6 (100.00)	1 (100.00)	43 (100.00)

Appendix 64: Farmers Opinion regarding Quality of Seed Supplied in Seed Minikit for the Reference Year

Quality better than seed available in market (%)	Marginal	Small	Medium	Large	Total
Ahmednagar Beneficiary– Gram (Bengal Gram)					
1. Yes	23 (82.14)	37 (88.1)	20 (90.91)	6 (75)	86 (86)
2. No	5 (17.86)	5 (11.9)	2 (9.09)	2 (25)	14 (14)
Total	28 (100)	42 (100)	22 (100)	8 (100)	100 (100)
Opinion –Provide reasons					
Disease occurrence increased	2 (40)	-	1 (50)	-	3 (21.43)
Use of pesticides & insecticides increased	1 (20)	2 (40)	-	1 (50)	4 (28.57)
More HYV seeds required	1 (20)	2 (40)	1 (50)	1 (50)	5 (35.71)
Drought resistance variety is required	1 (20)	1 (20)	-	-	2 (14.29)
Total	5 (100)	5 (100)	2 (100)	2 (100)	14 (100)
Yavatmal Beneficiary– Tur (Red gram)					
1. Yes	11 (64.71)	47 (81.03)	12 (80)	7 (70)	77 (77)
2. No	6 (35.29)	11 (18.97)	3 (20)	3 (30)	23 (23)
Total	17 (100)	58 (100)	15 (100)	10 (100)	100 (100)
Opinion –Provide reasons					
Disease occurrence increased	2 (33.33)	-	1 (33.33)	-	3 (13.04)
Use of pesticides & insecticides increased	1 (16.67)	1 (9.09)	-	-	2 (8.7)
More HYV seeds required	1 (16.67)	5 (45.45)	2 (66.67)	2 (66.67)	10 (43.48)
Drought resistance variety is required	2 (33.33)	5 (45.45)	-	1 (33.33)	8 (34.78)
Total	6 (100)	11 (100)	3 (100)	3 (100)	23 (100)
Overall Beneficiary– Gram and Tur					
1. Yes	34 (75.56)	84 (84)	32 (86.49)	13 (72.22)	163 (81.5)
2. No	11 (24.44)	16 (16)	5 (13.51)	5 (27.78)	37 (18.5)
Total					
Opinion –Provide reasons					
Disease occurrence increased	4 (36.36)	-	2 (40)	-	6 (16.22)
Use of pesticides & insecticides increased	2 (18.18)	3 (18.75)	-	1 (20)	6 (16.22)
More HYV seeds required	2 (18.18)	7 (43.75)	3 (60)	3 (60)	15 (40.54)
Drought resistance variety is required	3 (27.27)	6 (37.5)	-	1 (20)	10 (27.03)
Total	11 (100)	16 (100)	5 (100)	5 (100)	37 (100)

Appendix 65: Farmers Opinion regarding Timeliness of Distribution of Seed Minikit

Timely distribution of Kit (%)	Marginal	Small	Medium	Large	Total
Ahmednagar Beneficiary					
1. Yes	24 (85.71)	37 (88.10)	16 (72.73)	4 (50.00)	81 (8100)
2. No	4 (14.29)	5 (11.90)	6 (27.27)	4 (50.00)	19 (19.00)
Total	28 (100.00)	42 (100.00)	22 (100.00)	8 (100.00)	100 (100.00)
Opinion – If no Provide reasons					
Higher distance of farm to Grampanchayat supplying information about kit	1 (25.00)	2 (40.00)	1 (16.67)	-	4 (21.05)
Lack of information about documents required for the kit	2 (50.00)	2 (40.00)	4 (66.67)	3 (75.00)	11 (57.89)
Information spread about the scheme is very low	1 (25.00)	1 (20.00)	1 (16.67)	1 (25.00)	4 (21.05)
Total	4 (100.00)	5 (100.00)	6 (100.00)	4 (100.00)	19 (100.00)
Yavatmal Beneficiary					
1. Yes	17 (100.00)	45 (77.59)	14 (93.33)	10 (100.00)	86 (86.00)
2. No	-	13 (22.41)	1 (6.67)	-	14 (14.00)
Total	17 (100.00)	58 (100.00)	15 (100.00)	10 (100.00)	100 (100.00)
Opinion – If no Provide reasons					
Higher distance of farm to Grampanchayat supplying information about kit	-	1 (7.69)	-	-	1 (7.14)
Lack of information about documents required for the kit	-	6 (46.15)	1 (100.00)	-	7 (50.00)
Information spread about the scheme is very low	-	6 (46.15)	-	-	6 (42.86)
Total	-	13 (100.00)	1 (100.00)	-	14 (100.00)
Overall Beneficiary					
1. Yes	41 (91.11)	82 (82.00)	30 (81.08)	14 (77.78)	167 (83.50)
2. No	4 (8.89)	18 (18.00)	7 (18.92)	4 (22.22)	33 (16.50)
Total	45 (100.00)	100 (100.00)	37 (100.00)	18 (100.00)	200 (100.00)
Opinion – If no Provide reasons					
Higher distance of farm to Grampanchayat supplying information about kit	1 (25.00)	3 (16.67)	1 (14.29)	-	5 (15.15)
Lack of information about documents required for the kit	2 (50.00)	8 (44.44)	5 (71.43)	3 (75.00)	18 (54.55)
Information spread about the scheme is very low	1 (25.00)	7 (38.89)	1 (14.29)	1 (25.00)	10 (30.30)
Total	4 (100.00)	18 (100.00)	7 (100.00)	4 (100.00)	33 (100.00)

Appendix 66: Major issues faced by farmers in availing the Seed Minikit (%)

Issues	Marginal	Small	Medium	Large	Total
Ahmednagar Beneficiary					
Provision of seed minikits to all farmers instead of some selected farmers	1 (3.57)	1 (2.38)	1 (4.55)	2 (25.00)	5 (5.00)
Seed supplied is inadequate	-	2 (4.76)	3 (13.64)		5 (5.00)
Lack of creation of awareness about minikit	17 (60.71)	34 (80.95)	16 (72.73)	4 (50.00)	71 (71.00)
No Comments	3 (10.71)	3 (7.14)	2 (9.09)	2 (25.00)	10 (10.00)
No Problem	7 (25.00)	2 (4.76)	-	-	9 (9.00)
Total	28 (100.00)	42 (100.00)	22 (100.00)	8 (100.00)	100 (100.00)
Yavatmal Beneficiary					
Provision of seed minikits to all farmers instead of some selected farmers	-	2 (3.45)	-	-	2 (2.00)
Seed supplied is inadequate	-	3 (5.17)	-	-	3 (3.00)
Lack of creation of awareness about minikit	17 (100.00)	49 (84.48)	15 (100.00)	10 (100.00)	91 (91.00)
No Comments	-	3 (5.17)	-	-	3 (3.00)
No Problem	-	1 (1.72)	-	-	1 (1.00)
Total	17 (100.00)	58 (100.00)	15 (100.00)	10 (100.00)	100 (100.00)
Overall Beneficiary					
Provision of seed minikits to all farmers instead of some selected farmers	1 (2.22)	3 (3.00)	1 (2.70)	2 (11.11)	7 (3.50)
Seed supplied is inadequate		5 (5.00)	3 (8.11)		8 (4.00)
Lack of creation of awareness about minikit	34 (75.56)	83 (83.00)	31 (83.78)	14 (77.78)	162 (81.00)
No Comments	3 (6.67)	6 (6.00)	2 (5.41)	2 (11.11)	13 (6.50)
No Problem	7 (15.56)	3 (3.00)	-	-	10 (5.00)
Total	45 (100.00)	100 (100.00)	37 (100.00)	18 (100.00)	200 (100.00)

Appendix 67: Major Problems Faced by Farmers in Availing the Seed Minikit (%)

Problems	Marginal	Small	Medium	Large	Total
Ahmednagar Beneficiary					
Lack of creation of awareness among farmers	1 (3.57)	-	-	-	1 (1.00)
No provision of on farm/ door step delivery of kits	2 (7.14)	1 (2.38)	1 (4.55)	2 (25.00)	6 (6.00)
Many documents demanded to avail kits	-	-	-	-	-
Random selection/ distribution of kits	5 (17.86)	6 (14.29)	3 (13.64)	2 (25.00)	16 (16.00)
No Problem	20 (71.43)	35 (83.33)	18 (81.82)	4 (50.00)	77 (77.00)
Total	28 (100.00)	42 (100.00)	22 (100.00)	8 (100.00)	100 (100.00)
Yavatmal Beneficiary					
Lack of creation of awareness among farmers	-	2 (3.45)	-	1 (10.00)	3 (3.00)
No provision of on farm/ door step delivery of kits	-	-	-	-	
Many documents demanded to avail kits	-	3 (5.17)	-	-	3 (3.00)
Random selection/ distribution of kits	-	4 (6.90)	-	-	4 (4.00)
No Problem	17 (100.00)	49 (84.48)	15 (100.00)	9 (90.00)	90 (90.00)
Total	17 (100.00)	58 (100.00)	15 (100.00)	10 (100.00)	100 (100.00)
Overall Beneficiary					
Lack of creation of awareness among farmers	1 (2.22)	2 (2.00)	-	1 (5.56)	4 (2.00)
No provision of on farm/ door step delivery of kits	2 (4.44)	1 (1.00)	1 (2.70)	2 (11.11)	6 (3.00)
Many documents demanded to avail kits	-	3 (3.00)	-	-	3 (1.50)
Random selection/ distribution of kits	5 (11.11)	10 (10.00)	3 (8.11)	2 (11.11)	20 (10.00)
No Problem	37 (82.22)	84 (84.00)	33 (89.19)	13 (72.22)	167 (83.50)
Total	45 (100.00)	100 (100.00)	37 (100.00)	18 (100.00)	200 (100.00)

Appendix 68: Measures to Improve the Effectiveness of the Scheme (%)

Measures	Marginal	Small	Medium	Large	Total
Ahmednagar Beneficiary					
Awareness should be created about scheme through pamphlet, hoarding, etc.	1 (3.57)	5 (12.20)	3 (13.04)	-	9 (9.00)
The market/ support price for pulses should increase	-	2 (4.88)	1 (4.35)	-	3 (3.00)
Supply the variety of the seed suitable for local conditions	-	-	2 (8.70)	2 (25.00)	4 (4.00)
Need to conduct workshop/ training programme for proper guidance about usage of minikit	-	-	1 (4.35)	-	1 (1.00)
Provision of fertilizer, pesticides, etc. along with minikit at subsidized rates	3 (10.71)	5 (12.2)	4 (17.39)	4 (50.00)	16 (16.00)
Provision of seed suitable for early and late sowing of crops	10 (35.71)	15 (36.59)	7 (30.43)	2 (25.00)	34 (34.00)
Wider coverage/distribution of seed minikits – inclusion of all the farmers	1 (3.57)	-	-	-	1 (1.00)
No Comments	12 (42.86)	14 (34.15)	5 (21.74)	-	31 (31.00)
No Problem	1 (3.57)	-	-	-	1 (1.00)
Total	28 (100.00)	41 (100.00)	23 (100.00)	8 (100.00)	100 (100.00)
Yavatmal Beneficiary					
Awareness should be created about scheme through pamphlet, hoarding, etc.	3 (17.65)	2 (3.45)		1 (10.00)	6 (6.00)
The market/ support price for pulses should increase	6 (35.29)	13 (22.41)	3 (20.00)	1 (10.00)	23 (23.00)
Supply the variety of the seed suitable for local conditions	1 (5.88)	3 (5.17)	-	1 (10.00)	5 (5.00)
Need to conduct workshop/ training programme for proper guidance about usage of minikit	-	-	1 (6.67)	-	1 (1.00)
Provision of fertilizer, pesticides, etc. along with minikit at subsidized rates	-	5 (8.62)	2 (13.33)	1 (10.00)	8 (8.00)
Provision of seed suitable for early and late sowing of crops	4 (23.53)	13 (22.41)	6 (40.00)	4 (40.00)	27 (27.00)
Wider coverage/distribution of seed minikits – inclusion of all the farmers	-	2 (3.45)	-	-	2 (2.00)
No Comments	3 (17.65)	17 (29.31)	3 (20.00)	2 (20.00)	25 (25.00)
No Problem	-	3 (5.17)	-	-	3 (3.00)
Total	17 (100)	58 (100.00)	15 (100.00)	10 (100.0)	100 (100.00)
Overall Beneficiary					
Awareness should be created about scheme through pamphlet, hoarding, etc.	4 (8.89)	7 (7.07)	3 (7.89)	1 (5.56)	15 (7.50)
The market/ support price for pulses should increase	6 (13.33)	15 (15.15)	4 (10.53)	1 (5.56)	26 (13.00)
Supply the variety of the seed suitable for local conditions	1 (2.22)	3 (3.03)	2 (5.26)	3 (16.67)	9 (4.50)
Need to conduct workshop/ training programme for proper guidance about usage of minikit	-	-	2 (5.26)	-	2 (1.00)
Provision of fertilizer, pesticides, etc. along with minikit at subsidized rates	3 (6.67)	10 (10.10)	6 (15.79)	5 (27.78)	24 (12.00)
Provision of seed suitable for early and late sowing of crops	14 (31.11)	28 (28.28)	13 (34.21)	6 (33.33)	61 (30.50)
Wider coverage/distribution of seed minikits – inclusion of all the farmers	1 (2.22)	2 (2.02)	-	-	3 (1.50)
No Comments	15 (33.33)	31 (31.31)	8 (21.05)	2 (11.11)	56 (28.00)
No Problem	1 (2.22)	3 (3.03)	-	-	4 (2.00)
Total	45 (100.00)	99 (100.00)	38 (100.00)	18 (100.0)	200 (100.00)

Appendix 69: Farmers Suggestions to Improve the Reach of the Scheme (%)

Suggestions	Marginal	Small	Medium	Large	Total
Ahmednagar Beneficiary					
Creation of more awareness about the scheme through various means	5 (17.86)	14 (33.33)	5 (22.73)	-	24 (24.00)
Distribution of seed to all pulse growing farmers	1 (3.57)	1 (2.38)	2 (9.09)	-	4 (4.00)
Appointment of more skilled and trained agril. officer/ assistants for proper dissemination of information	-	-	1 (4.55)	1 (12.50)	2 (2.00)
Provision of seed varieties as per soil and weather conditions	-	-		-	
Provision of seed minikits for other crops in addition to pulses	-	-	1 (4.55)	-	1 (1.00)
Provision of higher quantity of seed in minikit	-	1 (2.38)	1 (4.55)	-	2 (2.00)
Rise in market/ support prices for pulse crops	-			-	
Demonstration should be given before distributing the Seed minikit	18 (64.29)	24 (57.14)	10 (45.45)	-	52 (52.00)
No Problem	1 (3.57)	1 (2.38)	-	1 (12.50)	3 (3.00)
No Suggestions	3 (10.71)	1 (2.38)	2 (9.09)	6 (75.00)	12 (12.00)
Total	28 (100.00)	42 (100.00)	22 (100.00)	8 (100.00)	100 (100.00)
Yavatmal Beneficiary					
Creation of more awareness about the scheme through various means	5 (29.41)	8 (13.79)	4 (26.67)	2 (20.00)	19 (19.00)
Distribution of seed to all pulse growing farmers	3 (17.65)	10 (17.24)	3 (20.00)	-	16 (16.00)
Appointment of more skilled and trained agril. officer/ assistants for proper dissemination of information	1 (5.88)	-	-	-	1 (1.00)
Provision of seed varieties as per soil and weather conditions	-	5 (8.62)	1 (6.67)	-	6 (6.0)
Provision of seed minikits for other crops in addition to pulses	-	1 (1.72)		-	1 (1.0)
Provision of higher quantity of seed in minikit	-	-	-	-	-
Rise in market/ support prices for pulse crops	-	3 (5.17)	-	-	3 (3.0)
Demonstration should be given before distributing the Seed minikit	5 (29.41)	24 (41.38)	6 (40.00)	7 (70.00)	42 (42.00)
No Problem	2 (11.76)	7 (12.07)	-	-	9 (9.00)
No Suggestions	1 (5.88)	-	1 (6.67)	1 (10.00)	3 (3.00)
Total	17 (100.00)	58 (100.00)	15 (100.00)	10 (100.00)	100 (100)
Overall Beneficiary					
Creation of more awareness about the scheme through various means	10 (22.22)	22 (22.00)	9 (24.32)	2 (11.11)	43 (21.5)
Distribution of seed to all pulse growing farmers	4 (8.89)	11 (11.00)	5 (13.51)	-	20 (10)
Appointment of more skilled and trained agril. officer/ assistants for proper dissemination of information	1 (2.22)	-	1 (2.7)	1 (5.56)	3 (1.5)
Provision of seed varieties as per soil and weather conditions	-	5 (5.00)	1 (2.70)	-	6 (3)
Provision of seed minikits for other crops in addition to pulses	-	1 (1.00)	1 (2.70)	-	2 (1.00)
Provision of higher quantity of seed in minikit	-	1 (1.00)	1 (2.70)	-	2 (1.00)
Rise in market/ support prices for pulse crops	-	3 (3.00)	-	-	3 (1.50)
Demonstration should be given before distributing the Seed minikit	23 (51.11)	48 (48.00)	16 (43.24)	7 (38.89)	94 (47.00)
No Problem	3 (6.67)	8 (8.00)	-	1 (5.56)	12 (6.00)
No Suggestions	4 (8.89)	1 (1.00)	3 (8.11)	7 (38.89)	15 (7.50)
Total	45 (100.00)	100 (100.00)	37 (100.00)	18 (100.00)	200 (100.00)

ANNEXURE I: COMMENTS ON DRAFT REPORT BY DESIGNATED ALL INDIA COORDINATING CENTRE, ADRTC, INSTITUTE FOR SOCIAL AND ECONOMIC CHANGE (ISEC), BANGALORE, KARNATAKA

1. **Title of the draft report examined**

   Relevance and Distribution Efficiency of Seed Minikits of Pulses in Maharashtra

2. **Date of receipt of the Draft report:** 25th January 2021

3. **Date of dispatch of the comments:** 1 9th February 2021

4. **Comments on the Objectives of the study**

   The objectives of the study as proposed have been addressed albeit calculation mistakes need to be corrected.

5. **Comments on the methodology**

   The common methodology proposed for collection of primary data and tabulation of results has been followed.

6. **Comments on analysis, organization, presentation etc.**

Table 1.4 in your report indicates a sample of 300 households selected. However, Chapter 3 is written keeping 200 beneficiaries and 100 control households separately. Kindly browse through the chapter and table plan circulated earlier. Analysis in Chapter 3 is subject to total 300 households together. In Chapter 4 analysis is with reference to beneficiary and non beneficiary households. Therefore, in order to maintain consistency and facilitate the consolidation of the report, please calculate all the tables in chapter three for the aggregate clubbing beneficiary and non beneficiary together as the report submitted by all other centres also follow the same pattern. It will not be possible to include Maharashtra in the consolidated report without having aggregate tables in chapter 3.

Chapter 3: Tables 3.9 and 3.10 the gross and net income per household is calculated considering average gross cropped area and not net operated area. This table presents productivity and returns per acre, therefore the denominator should be net operated area and not the gross cropped area. Even aggregate figures calculated are also wrong. Kindly see the corrected figures given below in place of wrong figures quoted in red colour for the aggregate as given below. Similar corrections need to be carried out in Table 3.10.

Table 3.9: Value of Output, Cost and Net Returns for Survey Year – Aggregate of All Crops - Beneficiary

Farm Size	Production (quintals/acre)			Value of Output (main + by-product) (Rs/acre)	Cost of Production (Rs/acre)			Net Returns (Farm Business Income) (Rs/acre)	Farm Income Rs. Per HH	
	Irrigated	Rainfed	Total		Material Cost	Labour Cost	Total Cost		Gross	Net
Marginal	27.88	3.93	24.04	32705	5315	6182	11497	21208	91611	59405
Small	40.98	6.14	29.80	37621	5188	5619	10807	26814	188851	134603
Medium	52.04	8.96	37.69	34272	6470	7125	13595	20677	394821	238202
Large	56.37	5.49	43.93	35637	6470	6544	13013	22624	627610	398432
Total	46.59	6.90	34.99	35670	5895	6352	12247	23423	244565	160594

									61158	39659

									151236	107792
									233735	141017
									501769	318546
	46.61	6.50	34.93	35843	5852	6286	12138	23705	176923	116178

Table 4.6: Area under pulses should be reported as area per household and not the aggregate of the entire category of marginal, small, medium and large. Value of output by definition should b equal to productivity * net price. However, the value of output reported does not exactly translate into that. Check the data for consistency. Even the value of output, cost of production, net return reported in Tables 4.3, 4.4 and 4.6 do not match. There is duplicity in reporting and the same figures reported in two tables do not match. Table 4.18: provide area sown acres per household instead of sum total of marginal, small, medium and large. The details of seed purchased by beneficiary farmers and its cost, distance and transportation charges are given in Tables 4.20.1 and 4.20.2. However, the details of seeds purchased and its cost is not provided for non beneficiary farmers. Provide the information for non beneficiary farmers as well.

7. Overall view on acceptability of report

The draft report needs revisions. The revisions should be in accordance with the comments/suggestions. The soft copy of the revised report and revised final excel data should be sent to us at the earliest as it helps in consolidating the state reports.

ANNEXURE II: ACTION TAKEN BY THE AUTHORS ON THE COMMENTS OF THE DESIGNATED CENTRE FOR THE STUDY ENTITLED

"RELEVANCE AND DISTRIBUTION EFFICIENCY OF SEED MINIKITS OF PULSES IN MAHARASHTRA"

The author is thankful to the reviewer for the keen interest taken and the suggestions made by him on the report. The comments have been taken care of at length and **replies to these comments are given as follows:**

4. **Comments on the Objectives of the study:**
   Calculation mistakes have been corrected as suggested.

5. **Comments on the methodology:**
   No revision required.

6. **Comments on analysis, organization, presentation etc.**

   In view of suggestions extended, the analysis in Chapter 3 is now presented for 300 sampled households with 200 beneficiaries and 100 non-beneficiaries put together. All the tables in Chapter 3 have been presented by clubbing beneficiary and non-beneficiary together.

   Chapter 3: In view of the comment, the estimates in Tables 3.9 and 3.10 with respect to net income per household have now been provided on the basis of net operated area. The incorrect aggregate figures in Tables 3.9 and 3.10 have also been corrected as per the suggestion.

   Table 4.6: Area under pulses has now been reported on per household basis for various land holding size categories. Estimates related to value of output have also been revised in view of suggestion. Data consistency has been maintained. The estimates reported in Tables 4.3, 4.4 and 4.6 have now been matched and corrected. An additional Table 4.6.1 has been incorporated in order to maintain consistency in estimates. Further, since estimates presented in Tables 4.3, 4.4, 4.6 and 4.6.1 are interlinked with Tables 4.7, 4.8, 4.9, 4.10, 4.11, and 4.12, the estimates presented in Table 4.7 to Table 4.12 have also been revised. Table 4.18 now shows area sown estimates on per household basis. The details of seed purchased and its cost for non-beneficiary farmers have now been presented in Table 4.20.3.

7. **Overall view on acceptability of report:**

The report has been revised thoroughly in the light of the comments received from the designated All India Coordinating Centre, ADRTC, ISEC, Bangalore.

The final report is now being submitted for further necessary action.

Corrections have been incorporated as suggested.