COMPARATIVE ECONOMICS OF FARM PONDS BENEFICIARY AND NON-BENEFICIARY FARMERS IN MALEGAON TAHASIL OF WASHIM DISTRICT

THESIS

Submitted to
Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola
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MASTER OF SCIENCE
IN
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By
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Enrolment Number–KK/1215 **2018**

DECLARATION OF STUDENT

I hereby declare that the experimental work and its interpretation of the thesis entitled **"COMPARATIVE ECONOMICS OF FARM PONDS BENEFICIARY AND NON-BENEFICIARY FARMERS IN MALEGAON TAHASIL OF WASHIM DISTRICT"** or part there of has neither been submitted for any other degree or diploma of any University, nor the data have been derived from any thesis / publication of any University or Scientific Organization. The sources of material used and all assistance received during the course of investigation have been duly acknowledged.

Place: Akola **(Chakranarayan Ankita Dinkar)**
Date: ***/ /***2018 Enrolment No. KK/1215

CERTIFICATE

This is to certify that the thesis entitled **"COMPARATIVE ECONOMICS OF FARM PONDS BENEFICIARY AND NON – BENEFICIARY FARMERS IN MALEGAON TAHASIL OF WASHIM DISTRICT "** submitted in partial fulfilment of the requirement for the degree of **"Master of Science in Agriculture (Agricultural Economics)"** of Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola is a record of bonafide research work carried out by **CHAKRANARAYAN ANKITA DINKAR under** my guidance and supervision.

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Place: Akola. **(Chakranarayan Ankita)**

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Table of Content

(A) List of Tables

(B) List of Figure

(c) Abbreviations

%	-	Per cent
°C	-	Degree centigrade (Celsius)
/	-	Per
@	-	At the rate
Agril.	-	Agricultural
Avg.	-	Average
Dist.	-	District
Dr. PDKV	-	Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola
e.g.	-	Exampli gratia (For example)
et al.	-	Et alia (and others)
etc.	-	Et cetra
Fig.	-	Figure
Ha	-	Hectare
i.e.	-	That is
Kg.	-	Kilogram
Kh.	-	Kharif
M.S.	-	Maharashtra State
Mha	-	Million hectare
No.	-	Number (s)
q/ha	-	Quintals per hectare
qtl.	-	Quintal
Qty.	-	Quantity
resp.	-	Respectively
Rs.	-	Rupees
Sr. No.	-	Serial number
vis-à-vis	-	In relation to
Viz.,	-	Videlicet (namely)
B	-	Beneficiary
NB	-	Non-beneficiary

(D) THESIS ABSTRACT

a)	**Title of the thesis**	**:**	**"COMPARITIVE ECONOMICS OF FARM PONDS BENEFICIARY AND NON-BENEFICIARY FARMERS IN MALEGAON TAHASIL OF WASHIM DISTRICT"**
b)	**Name of student**	**:**	**CHAKRANARAYAN ANKITA DINKAR**
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ABSTRACT

Farm pond plays an important role in increasing agricultural production. This increase in production is due to availability of more water for irrigation on farms of beneficiary farmers. A farm pond is a large hole

dug out in the earth, usually square or rectangular in shape, which harvests rainwater and stores it for future use. Economic evaluation of farm pond is necessary for the effective implementation. The main objective of present study was to assess the impact of farm ponds on productivity of various inputs used by farmers. This study was undertaken in Malegaon Tahasil of Washim District. The study was based on a sample of 50 beneficiary and 50 non-beneficiary farmers data pertaining the year 2016-17 were collected by survey method from the beneficiary and non-beneficiary farmers. The data were tabulated, compiled and analyses to accomplish the objective of study.

The average size of holding at overall level for beneficiary farms was higher as compared to non-beneficiary farms. Average cropping intensity was 175.43 per cent in case of beneficiary farms, as against 162.90 per cent for non-beneficiary farms. Soybean, tur, and gram were the important crops grown by the farmers of both the groups.

Per hectare use of inputs were slightly higher on beneficiary farms than non-beneficiary farms. But, per hectare crop yield was much higher in beneficiary farms. This was obvious due to availability of farm ponds, which made water available for irrigation in farms of beneficiary farmers and thus, ultimately increasing the crop yield. The output input ratio for selected crops were higher in case of beneficiary farmers than non-beneficiary farmers.

The production function and marginal value product analysis revealed that the productivity of inputs used in crop production was higher in case of beneficiary farms than non-beneficiary farms. The higher input productivity on beneficiary farms was due to availability of irrigation in farms of beneficiary farms. The study concludes that since water scarcity is a predominant problem of the era and thus, irrigation facilities, farm pond is hope of substantial increase in irrigation facilities in future. Therefore, farmers should be made aware about benefits of farm ponds and more farm ponds should be constructed to increase productivity on farms.

CHAPTER I

INTRODUCTION

Indian economy is predominantly rural and agriculture oriented where the declining trend in the average size of the farm holding poses a serious problem. In agriculture 84 percent of the holding is less than 2 acres. Majority of them are dry lands and even irrigated areas depend on the vagaries of monsoon. In this context, if farmers concentrated on crop production they will be subjected to a high degree of uncertainty in income and employment. Hence, it is imperative to evolve suitable strategy for augmenting the income of the small and marginal farmers by combining to increase the productivity and supplement the income. In an agricultural country like India, the average land holding is very small. The population is steadily increasing without any possibility of increase in land area. The income from cropping for an average farmer is hardly sufficient to sustain his family. The farmer has to be assured of a regular income for a reasonable standard of living by including other enterprises in his farm and need to develop various structures like poultry, shed net, farm pond, watershed, etc. The integration of farm enterprises often suggested as the means for rapid economic development in India.

The challenges before Indian agriculture is to transform rainfed farming into more sustainable and productive system by giving social, economical and technological backup to the people who depend upon it. Moreover, the economy is mainly dependent on stability of crop production in rainfed areas. Construction of farm ponds is one of the beneficial programmes for harvesting excess rain water during rainy season; which is implemented by the State Agricultural Development under National Agricultural Development Programme (Rashtriya Krishi Vikas Yojana) etc. The excess rain water harvested in farm ponds play a vital role in stabilizing crop production through recycling during dry spell in *kharif* season and for protective irrigation in *rabi* season. The major works of Rain Water Harvesting Structure adopted in the watershed are check dams, farm ponds, nala bunds, contour bunds, vegetative covers etc. which play

major role in managing and conserving the soil and water resources. However, farm pond is perceived as best rain water harvesting structure by large majority of farmers.

Water is an essential and precious resource upon which our ecosystems and agricultural production depend. However, water a natural resource of the world constitutes, 1,384 million cubic kilometers of which around 97.39 per cent (i.e 1,348 million cubic kilometers) of water is in the oceans, which is salty in nature. Another 2.61 per cent (i.e. 36 million km^3) is fresh water of this 77.23 per cent (27.82 million km^3) is in the polar ice caps, icebergs and glaciers. Only small fraction of water resources (0.59 per cent or 8.2 million km^3) of the earth present on the ground, lakes, rivers and atmosphere and is useful to mankind. Whereas, more than 99 per cent of water present on the earth is not useful to mankind.

The role of water in the living organism has not changed since life's first creation in salt water billions of years ago and the water supports life, as we know it, giving our earth the name living planet. Our earth is also called the ‘Blue Planet’ because of the large quantities of water. The water is indispensable for life and is wonder liquid which is so useful in every one's life as it provides food from the sea, means of trade and transport, source of salt, minerals, oil and natural gas, energy generation etc.

1.1 Background Information

A farm pond is a large hole dug out in the earth, usually square or rectangular in shape, which harvest rainwater and stores it for future use. It has inlet to regulate inflow and an outlet to discharge excess water. The pond is surrounded by a small bund, which prevents erosion on the banks of pond. The size and depth depend on the amount of land available, the type of soil, the farmers water requirements, the cost of excavation, and the possible uses of the excavated earth. Water from the pond is conveyed to the fields manually, by pumping or by both methods. Farm pond size adopted by the farmers ranges 15×15×3 meter, 20×20×3 meter, 25×25×3 meter, and 30×30×3 meter according to size of land holding of a farmer.

Soil and water are the major natural resources essential for crop production. Efficient management and utilization of these resources is very important to increase crop productivity per unit area in particular and total agricultural production in general. One of the principle reasons for low agricultural productivity is irrigation which is one of the basic requirement for sustainable agricultural production in Indian condition particularly life saving irrigation. Agriculture is one of the largest and most important sectors in Indian economy. The main occupation of 65 per cent people in India is farming. India has ancient history of tank technology. Runoff collection in irrigation tanks exists in nearly every district in India, but they are more concentrated in coastal districts.

Net cultivated area of India is 143 million ha. Out of which rainfed / dryland area is 95 million ha. which is 60 per cent of net cultivated area and irrigated area is 47 million ha. which is 40 per cent of net cultivated area. Ponds are helpful in reducing floods, recharging ground water and providing drainage in high rainfall periods. An irrigation pond is durable asset providing a stream of benefits of several years. In Indian monsoon there is a certainty of overflow during peak rain and a small dam or ponds that collect and store runoff aims to increase ground water recharge and augment surface water supply. .Using this resource for supplementary irrigation and adopting improved agronomic practices can improve agricultural production in rainfed areas.

In Maharashtra 67.00 per cent rainfall is received during the monsoon season and it is unevenly distributed, which greatly affects agricultural production, hence irrigation facilities are necessary. Present irrigation potential of Maharashtra is only 18.21 per cent. To overcome the drought prone situation in drought affected districts, number of dug out type ponds (water storage structures) are necessary for harvesting of excess rain water on farmers field. The harvested water in farm ponds it being used for providing lifesaving irrigation to rainfed crops by lifting and applying to the fields. Farm ponds can also supply a water source for frost protection, recharge groundwater and provide a wide range of additional economic and environmental benefits. The present study will be helpful to

know the use of farm ponds in the agricultural development and with a need to know its impact on beneficiaries and non-beneficiaries especially in Malegaon Tahasil of Washim district.

Farm ponds are created in various states of India along with Maharashtra. The main aim of constructing farm pond is to make the availability of protective irrigation at critical growth stages of crop. In Maharashtra through various scheme of government the farm ponds are allotted to farmers namely, National Horticultural Mission, Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA) and Mahatma Phule Jal Abhiyan etc. The farm pond has a great impact on changing the crop productivity as well as cropping intensity. It also helps in changing the economic situation of farmers. The irrigated area also increases due to the construction of farm pond.The rainfall amount and its distribution during monsoon period are mostly erratic and uncertain coupled with occurrence of frequent droughts of several days to weeks affecting rainfed productivity drastically.

The excess rain water harvested in farm ponds play a vital role in stabilizing crop production through recycling during dry spell in *kharif* season and for protective irrigation in *rabi* season. Ponds can be filled by rainfall, as is common with farm and ranch ponds that are sited at a low point and serve to collect runoff from higher reaches in the watershed. Alternatively, farm ponds can be filled with well water from irrigation, which can then be recycled. The major works of Rain Water Harvesting Structure adopted in the watershed are check dams, farm ponds, nala bunds, contour bunds, vegetative covers etc. which play major role in managing and conserving the soil and water resources. However, farm pond is perceived as best rain water harvesting structure by large majority of farmers.

1.2 Need and importance of the study

Ground water availability is poor in many areas due to absence of aquifers and occurrence of hard rock lower layers. Farm pond is helpful in ground water recharge. Farm pond is believed to be better cost effective as compared to large scale canal irrigation. The farm ponds are

water harvesting structures used for several purposes of farm need, farm pond is used for storing the monsoon rain water, which is used for protective irrigation. A farm pond has found significant in the rainfed agriculture. Farm ponds are expected to have an impact on productivity, cropping intensity and annual income of the farmers.

The present study was carried out to assess the impact of farm ponds on those aspects of the farmers belonging to dryland district of selected area in Maharashtra region. Farm ponds are small water harvesting structure used for collection and storing runoff water. Farm ponds are constructed with varying size and may fulfilled several farm needs such as supply of the water to crops. Farm ponds can also supply a water source for frost protection, recharge groundwater and provide a wide range of additional economic and environmental benefits.

The present study will be helpful to know the use of farm ponds for the beneficiaries and non beneficiary farmers specially in Malegaon tahasil of Washim district of Maharashtra. The ground water level is also in depth. Therefore, farm pond is an important source of irrigation in this area. Farm ponds have a significant role in rainfed regions where annual rainfall is more than or equal to 500 mm. If average annual rainfall (AAR) varies between 500 mm to 750 mm, the farm ponds with capacity of 250 m^3 to 500 m^3 can be constructed. If AAR is more than 750 mm, the farm ponds with capacity more than 500 m^3 can be planned particularly in black soil regions without lining. It was observed from the field experience and if present rainfall pattern changes; at least two to three rainfall events producing considerable runoff are possible in a season making farm ponds an attractive proposition. In high rainfall semi-arid regions, these structures can be made as multiple use enterprises like protective/supplemental irrigation, fish culture or duck farming integrated with poultry. These structures provide localized water and food security by enhancing the crop productivity and climate resilience. Moreover, farm ponds conserve the natural resources like soil and nutrients apart from water and acts as flood control structure by reducing peak flows in the watersheds or given area of catchment. Therefore the present study was

carried out to know the “Impact of farm pond on beneficiary and non beneficiary farmers in Malegaon tahasil of Washim district with the following specific objectives for meaningful conclusion.

1.3 Scope of the Study

Constructing farm ponds to store and manage precious water better could be one of the solutions. It is an effective scalable technology for storing water. No doubt there are a number of factors that can make farming sustainable, but none of them can be as simple and elegant a solution as digging a farm pond. Historically, ponds and wells have always been a lifeline of Indian agriculture. Today, dug wells are beyond redemption as the water levels have receded to great depths but ponds continue to work well and are irrigating fields in many parts of the country. A farm pond is a large hole dug out in the earth, usually square or rectangular in shape, which harvests rainwater and stores it for future use. It has an inlet to regulate inflow and an outlet to discharge excess water. The pond is surrounded by a small bund, which prevents erosion on the banks of the pond. The size and depth depend on the amount of land available, the type of soil, the farmer’s water requirements, the cost of excavation, and the possible uses of the excavated earth. Water from the farm pond is conveyed to the fields manually, by pumping, or by both methods.

Once filled during the monsoon, the pond can be used to irrigate the fields. The consumption of diesel for irrigation also drops by one fifth as the pump needs less power to lift pond water. In case of heavy rains, the ponds cushion the impact of flooding. Water conservation at the farm-scale, in small, low-cost ponds, can change the face of production systems and smallholder livelihoods. Farm ponds can play in mitigating the consequences of droughts.

Government of India has announced to construct 500,000 ponds in rural areas under Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA) for asset creation in rural areas. preparedness. They proved to be more reliable in present times of erratic rainfall patterns. Construction of farm ponds can be a promising option for

rainwater storage that could allow for critical and life-saving irrigation of traditional crops. In accordance to which it is necessary to study the impact that farm ponds make on productivity of farmers in area of study. The present study is designed with this object in view. The title of the study is 'Comparitive economics of farm ponds beneficiary and non-beneficiary farmers in Malegaon Tahasil of Washim District'. The sample for present study was taken from Malegaon Tahasil of Washim District.

1.4 Objectives:

1) To study the socio-economic characteristics of selected beneficiary and non-beneficiary farmers.
2) To study the per hectare input utilization in major crops by the selected farmers.
3) To examine the economics of production of major crops of selected farmers.
4) To examine the impact of farm ponds on the productivity of various inputs.

1.5 Hypothesis:

1) Profitability of farm ponds beneficiary farmers is higher than non-beneficiary farmers.
2) There is positive impact of farm pond on productivity of various inputs.

1.6 Limitation of study

1) In this study, no reference is made for factors like risk and uncertainty, only those factors are considered which are under the control of farmers and contributes significantly towards the returns and use of resources.
2) The coverage of study area was limited. This is due to the fact that coverage of large area is beyond the capacity of investigator.
3) The primary data collected for the study were entirely based on memory of the cultivators because cultivators do not keep any records regarding their farm practices.
4) The data are pertaining to the agriculture year 2017-18 only. Hence, the generalization of result of research can be only made for study area.

CHAPTER II

REVIEW OF LITERATURE

Review of literature gives the guidelines from the past researchers and provides foundation to the theoretical frame work for the present investigation. The review of past literature makes the investigator to get an insight in to the methods and procedures to be followed. This chapter deals with review of concepts used in the study as viewed by different authors and review of related studies in the past. Several studies have been carried out in the recent years to show the changes in behaviour of cropping pattern in various states of India. The available literature relevant to the objectives of the present study was reviewed and presented in this chapter under the following headings.

2.1 Socio – economic characteristics.

2.2 Per hectare input utilization in major crops.

2.3 The economics of production of major crops.

2.4 Impact of productivity of various inputs.

2.1 Socio economic characteristics.

Atheeq and Venkatram (1989) examined the existing land use pattern followed by the farmers in the Kabbalanala watershed area project in Karnataka. They observed that the land use pattern of the farmers in watershed area was closer to the optimum since only 17 to 18 percent higher net return.

Hanumanthiah and Natraj (1989) examined the temporal variation under pre and post watershed management programme on several selected parameters in chinnarekur watershed in kurnol district of Andra Pradesh. The cropping pattern showed considerable variation due to implementation of watershed management activities. There was continuous increase in per capita income and spectacular increase in fertilizer consumption is post watershed programme period.

Kulkarni et al. (1989) examined the impact of anundhinalawatershed project in Dharwad district of Karnataka on

productivity, cropping intensity and profitability of crop. The study revealed that the productivity and profitability of the selected crops as well as cropping intensity practices were implemented. This could be attributed conservation practices implemented in watershed management area.

Pagire (1989) examined the impact of Kolhewadi watershed development project in Ahmednagar district of Maharashtra. The study revealed that the watershed development activities resulted in increasing the area under crops and diversification of cropping pattern. The productivity of different crops increased over base year due to adoption of watershed management activities. In case of sorghum (*Kharif*) and wheat the increase in per hectare yield was 85 per cent to 134 percent and 12 percent to 72 percent respectively. The increase in agricultural income ranged from 33 to 187 percent during *Kharif* and from 34 to 108 per cent during *Rabi* season.

Prasad et al. (1989) studied the impact of rendhar watershed management project in Jalauna district of Uttar Pradesh. The study revealed that the cropping intensity increased to 156.61 percent during 1987 – 1988 from 100.15 percent during base year and by two to four times as compared to non project area during 1987 – 88. This was possible due to watershed management activities. The returns were also higher in the project area as compared to non project area because of higher crop productivity.

Mahandule (1990) studied the impact of watershed development activities on resource use and return from farm in the drought prone area of western Maharashtra. He found that the various watershed development activities had proved to be effective in conservation of soil and water resources as a result of which the proportion of irrigated area and cropping intensity increased by 30 percent and 53 percent respectively over the base year. The substitution of high productivity crops for low productivity crops was also observed in watershed area. The utilization of human labour and bullock labour was increased by 6 percent and that of organic manures. Nitrogen and phosphorus by 22, 66 and 156 percent respectively over base year. The gross return, farm business income,

family labour income, farm investment income and net income increased by 123 percent, 147 percent, 227 percent, 175 per cent and 677 per cent respectively, over the base year as a result of implementation of project programme.

Ghosh (1991) carried out an evaluation of national watershed development programme in the district of Bankura, West Bengal. The study revealed that the cropping intensity in the project area which was 109 percent before introduction of watershed programme, increased to 118 percent after the commencement of programme. There was also an increase in yield of crops in project area over time. The per acre value of crops in project area which was 109 percent before introduction of watershed programme, increased to 118 percent. There was also an increase in yield of crops in project area increased from Rs. 1,788 to Rs. 2,776 in pre and post project period respectively.

Jahagirdar (1991) determined some growth parameters i. e. increase in cultivated area, irrigation facilities and increase in per hectare crop yield in Manali watershed development project in Akola district of Maharashtra. The study revealed that area under *Kharif* and *Rabi* crops increased as a result of watershed development activities. The cropping intensity increased from 104 percent to 115 percent during the project period.

Mishra (1991) examined the performance of watershed project in West Bengal. He observed that the availability of water from watershed works resulted in diversification in water from watershed works resulted in diversification in cropping pattern. It also led to substitution of less profitable crops by more profitable crops. The net contribution of watershed works in regards to increase in productivity of farm land during the period is Rs. 740 percent acre.

Singh and Gupta (1991) examined the impact of programme on crop productivity and socio – economic status of villages as well as benefit – cost ratio of investment for Bunga project in Ambala district of Haryana state. The study revealed that the adoption of new technology and assured supply of irrigation water resulted in increasing yield of crop

from 100 to 300 percent. Socio economic status of farmers also improved. The benefit cost ratio was more than unity indicating that the investment production was profitable in watershed project area.

Suryavanshi (1991) examined the Kolhewadi watershed development programme in Maharashtra. The study revealed that the soil and water conservation programmes resulted in increasing ground water table and reducing runoff and soil erosion. The number of effective irrigation wells increased from 34 to 74. The area under pulses, oilseed, cash crops, and horticultural crops had increased. The intensity of cropping also increased after implementation of the project. The economic assessment of project indicating that the project was viable in long run.

Desai et al. (2007) studied the impact of farm pond in Dharwad district of Karnataka, the study revealed that, the gross cropped area was more in case of with farm pond (110.04 ha) compared to without farm-pond (89.96 ha). The area under double cropping (30.18 per cent) has also increased with farm-pond as compared to without farm-pond (13.05 per cent) mainly because of better conservation of residual moisture in the *Rabi* season due to construction of farm-ponds. As a result, cropping intensity enhanced (141.42 per cent) in case of with farm pond. Construction of farm-ponds had brought about a perceptible change in cropping pattern by increasing area under *Rabi* crops by about 30.18 per cent in case with farm-pond compared to without farm-pond (13.05 per cent). The yield and net returns of all the crops were higher with farm-pond over without farm-pond. The household income (48.21per cent) and employment levels (4.08 per cent) were higher with farm-pond than without farm pond.

Palanisami et al. (2009) studied impacts of watershed development programmes experiences and evidences from Tamil Nadu study revealed that the watershed development programmes influence bio-physical and environmental aspects and thereby bring changes in the socio-economic conditions of the people. The socioeconomic indicators like changes in household income, per capita income, consumption expenditure, employment, migration, peoples' participation, household

assets and wage rates at the village level were considered for the impact assessment.

Singh and Prakash (2010) studied socio-economic impact of watershed development project in Manipur the study revealed that there was moderate increase in area under *Rabi* crops after the watershed project. The homestead lands were used for growing vegetables and cash crops in both *Kharif* and *Rabi* seasons. The area under vegetables and cash crops in homestead land also increased marginally after the watershed project. The overall cropping intensity increases negligibly from 103.64 per cent to 104.29 per cent. Annual average income per household increased to Rs.40226 (15 per cent increase) in Khamenlok watershed. Farm income from agriculture, fruits and livestock including fisheries increased about 4478 and 16.53 per cent after the implementation of the watershed project which indicates that income from fruits contributed a major share in increasing income of the watershed households. The relative share of farm income in the total household income also increased marginally from 77.5 per cent to 78.46 per cent. The off-farm income particularly from labour within the watershed increased by 20.47 per cent. This shows that watershed project is somewhat successful in increasing farm income and employment opportunities.

Mondala et al. (2012) studied impact of watershed development programmes on farm-specific technical efficiency: a study in Bundelkhand region of Madhya Pradesh the study revealed that the magnitudes of farm-specific socio-economic factors were higher in the watershed areas.

Prabha Lakshmi (2014) studied the socio-economic status of farmers before and after the construction of farm ponds in Vembudu village of Tamilnadu the study revealed that before farm ponds only vegetables like brinjal , tomato etc. are planted. After farm ponds, the crops like paddy, red gram, black gram were planted. The irrigated area was increased from 24.58 per cent of whole area before farm ponds to 40.28% after farm ponds. There is also a change in average net income of the households when comparing before and after farm ponds.

2.2 Per hectare input utilization in major crops

Saraswat et al. (1990) studied the impact of national watershed development programme in Bilaspur district of Himachal Pradesh. The study was conducted in the sub – watershed area of Kalol in Bilaspur district of Himachal Pradesh. Since the project was started a year ago the impact of the programme was not clearly visible but some findings were obtained. These are the cropping intensity ranged between 185.68 to 196.15 percent and 177 to 190.20 percent on beneficiary and non – beneficiary farm respectively. Marginal impact was observed on labour utilization. No impact of programme was observed on seed and fertilizer consumption. A slight change was observed in crop productivity.

Arya et al. (1991) determined the economic efficiency of watershed management system in Shivalik foothill villages. The study revealed that cropping intensity was 227 percent on supplemental irrigated farms as against 100 percent on rain fed. A significant change in input which resulted in higher per hectare net return was observed in the project area. Water management practices accounted for 50 per cent increase in net return for wheat crop and 32 percent in case of all crops taken together as compared to rain fed crop.

Mahandule (1991) examined the changes in resource structure and returns from crop production due to implementation of watershed development programme in western Maharashtra. The study showed that irrigated area and cropping intensity increased by 30 and 53 percent respectively. The use of human labour, bullock labour, manures and fertilizers increased by 6, 22, 66 and 56 percent respectively, as a result of implementation of watershed development programmes. The gross and net income also increased more than proportionately as compared to the increase in production cost. The various activities under watershed project proved to be more effective in conservation of soil and water resources.

Sindhu et al. (1991) determined economic viability of watershed project and its impact on productivity and income in Kandi area of Panjab. The study revealed that the cropping intensity increased

significantly due to project activities. The use of input factors in project area also increased significantly. The productivity, cropping intensity and gross and net return were higher in project area as compared to non – project area.

Singh and Thapaliyal (1991) examined the impact of national watershed development project in Jansi district of the Bundelkhand of Uttar Pradesh. The study revealed that the cropping intensity increased significantly due to implementation of watershed project. The use of inputs was more in watershed area than non watershed area. The average productivity of almost all crops in *Kharif* and *Rabi* except arhar and barly had increased after the implementation of national watershed development project.

Ramesh et al. (2001) reported that the small and large groups of farmers in Kabbalanala watershed area of Karnataka obtained comparatively higher productivity out of scarce resources than their counter parts in the non – watershed areas. They have also analyzed and found that , in respect of small farmers , in watershed area , except human labour , all other resources contributed significantly towards ragi cultivation, whereas for non – watershed farmers, land and farm yard manure (FYM) resources had shown negative effect on ragi cultivation.

2.3 Examine the economics of production of major crops

Anonymous (2013) studied that overall impact was noted as 71.97 per cent of farm ponds on the beneficiaries. It could, therefore be stated that there was definite positive impact of farm ponds on the beneficiaries in terms of change in occupation, annual income, cropping intensity and productivity of major crops.

Mane et al. (2015) studied the comparative analysis on impact of farm ponds on farmers economy in Amravati district the study revealed that In case of beneficiary farmers at overall level average gross return was Rs. 75042.46, while in case of non-beneficiary at overall level it was Rs. 44302.36 it means beneficiary farmers was more production than non-beneficiary. In case of beneficiary farmers at overall level average

gross return was Rs. 75042.46, while in case of non-beneficiary at overall level it was Rs. 44302.36 it means beneficiary farmers was more production than non-beneficiary. In case of beneficiary farmers at overall level the input-output ratio was 1:48, while in case of non-beneficiary farmers it was 1:37. It shows that beneficiary farmers were more profitable than non beneficiary farmers.

Chavai et al. (2015) studied the impact of farm ponds on beneficiary farmers of Maharashtra the study revealed that before category were having their annual income Rs. 150001 to 225000/- followed by, whereas equal proportion of the respondents (22.85 per cent) were having their annual income in the ranging above Rs. 300000, whereas (20.71 per cent) per cent were having annual income up to Rs. 75000 and only (12.85 per cent) and (10.73 per cent) of the beneficiary farmers having their annual income ranging from Rs. 225001 to 300000 and Rs. 150001 to 225000 respectively. After the construction of farm ponds majority of beneficiary farmers (27.85 per cent) were having their annual income in range of Rs. 75001 to 150000/-, followed by (27.14 per cent) beneficiaries found in the category of above Rs.300000, whereas, (24.28 per cent) were having annual income ranging from Rs. 150001 to 225000 and (20.73 per cent) of the beneficiary farmers having their annual income ranging from Rs. 225001 to 300000/-. The per cent change in annual income after construction of farm pond was 17.11 per cent .From the above findings it can be noted that after construction of farm ponds the annual income of beneficiaries were increased.

Deshmukh et al. (2017) studied impact assessment of farm ponds on beneficiaries in Latur, Renapur and Ausa tahsils of Latur district from Marathwada region of Maharashtra state study revealed that Mean crop productivity of cotton crop of beneficiaries was 20.07 and mean crop productivity of cotton crop of and 11.75 after and before use of farm pond respectively, Mean crop productivity of wheat of beneficiaries (after) was 19.20 and mean crop productivity of wheat of beneficiaries (before) was 9.17 respectively, Mean crop productivity of red gram of beneficiaries was 9.34 and 4.15, after and before use of farm pond respectively.

2.4 Examine the impact on productivity of various inputs

Alshi et al. (1991) examined the impact of land development activities on yield and income of crops in Gunj development project in Akola district of Maharashtra. The study revealed that due to land development activities like nalla training and reclamation of ill drained soil. The cropping intensity increased from 104.97 per cent in the base year (1984-1985) to 125.84 percent during 1989-90 year. Per hectare gross income increased to Rs. 2,772 during 1989 – 90 as compared to Rs. 1,579 during base year. Gross income per farm increased by about 88 percent over base year.All this was possible due to land development activities which resulted in conservation of soil and soil moisture.

Birdar (1991) examined the effectiveness and acceptance of technology and cost – benefit ratio in Muchkullanalla watershed located in drought – prone of Gulberga district of Karnataka. The study revealed that he crop yield increased by 80 to 100 percent and income of farmer doubled due to watershed activities. It is also revealed that the soil erosion in watershed area had reduced considerably and ground water charge increased in uniform soil moisture.

Hafeez et al. (1991) observed that the crop diversification constantly increased in the villages of Chitrawadi watershed project in Kolar district of Karnataka. The study revealed that benefit cost ratio was greater than unity in all crops in the project area. The common crops under diversification were Groundnut + Pigeon pea and Finger millet + Pigenpea for which benefit – cost ratio worked out to 1.06 and 1.46 respectively. This indicates higher returns on each rupee invested in the cultivation of these crops in the project area.

Ingle and Kude (1991) evaluated the compressive watershed development programme undertaken at Kapshiand Goregaon watershed area in Akola district of Maharashtra. The study revealed that the area under hybrid sorghum increased by 300 per cent in the project area. The cropping intensity however did not increase significantly.

Norman et al. (1991) examined the impact of national watershed development programme in Vadkarpathy area of Palkkad district of Kerala. The study revealed that about 25 percent beneficiaries were benefited by increased yield, irrigation potentials and change in cropping pattern. The increase in total income per household worked out to 6.5 percent in beneficiaries due to the watershed development programme.

Nema et al. (1991) examined the impact of Barkheda-Hat watershed development programme in district Guna of Madhya Pradesh. The study revealed that the intensity of cropping in watershed development programme area was higher by 13 to 20 percent than non watershed development programme area. The yields of most of the crops were substantially higher in watershed development programme area. Similarly income per hectare in watershed development programme area was higher as compared to non watershed development programme.

Singh and Kumar (1991) examined the major gains of Rendhar watershed project in Jalauna district of Uttar Pradesh. The study revealed that there has been an increase in cropping intensity and crop productivity in the area benefited with project. The gross cultivated area increased from 696 hectares to 1088.5 hectares as a result of project activities i. e. by 56.4 percent. The productivity of various crops also increased by 300 to 600 percent as a result of implementation of various programme under the project.

Sindhu et al. (1991) examined the impact of three major project namely Makkowal, Kotourmanhota watershed project and Atwarapur dam on productivity and income of beneficiaries in their respective command area, and analysed the benefit cost ratio of the project. Makkowal and Kotourmanhota project proved to be economically viable. The productivity and income of beneficiaries in the project area increased through increasing cropping intensity. Atwarapur dam proved to be non viable with low benefit cost ratio.

Timothy and Ravichandran (1991) carried out an economic analysis of watershed management programme in Annakkati region of Coimbator district of Tamilnadu. To study its impact on farm yield and

cropping pattern as well as water table gullies. The study revealed that by implementation of watershed project the cropping intensity increased by 12.68 percent. The average net return also increased due to introduction of new profitable crops in cropping system like cotton and cowpea.

Undirwade et al. (1991) examined the impact of watershed programme in Akola district in Maharashtra. The study revealed that as a watershed programme double cropped area increased by 577.38 percent, while cropping intensity increased from 104.97 percent to 134.06 percent. There was positive impact on resource use. The gross and net returns increased more than proportionately as compared to increase in production cost.

Kerr John et al. (2002) studied the watershed development project in Maharashtra and Andhra Pradesh the study showed that the mean annual net return per hectare was Rs. 30,589 on irrigated plots but only Rs. 2,989 on rainfed plot.

Palanisami et al. (2009) studied evaluation of watershed development programs in India using the economic surplus method study revealed that the change in yield due to watershed intervention across crops varied from 31 per cent in maize to a maximum of 36 per cent in cotton. This is the maximum change in yield due to watershed intervention. Reduction in marginal cost due to the supply shift ranged from 33 per cent in vegetables to 64 per cent in sorghum. Net cost change due to watershed developmental activities varied from 32 per cent in vegetables to 60 per cent in the case of sorghum.

Andure (Yawale) et al. (2011) studied of the impact of farm pond on the farmers in Amravati talukaregion from the study it was observed that there is a significant increase in yield of crops after construction of farm pond. Also there is a moderate increase in area under irrigation. After construction of farm pond increment in yield of crops and increase in area under irrigation are recorded this improves the farmer's economy.

Ambati et al. (2011) studied validation of farm pond size for irrigation during drought two supplemental irrigations at flowering stage along with application of deficient micronutrients on shallow and medium soils to Bt hybrid cotton.(G.hirsutum L) resulted in increased seed cotton yield by 50 per cent and 44 per cent, which was verified during 2008 and 2009 seasons in Yavatmal district.

Mondala et al. (2012) studied impact of watershed development programmes on farm-specific technical efficiency: a study in Bundelkhand region of Madhya Pradesh the study revealed that the average per hectare output for all the crops was found to be higher in the watershed than the control villages.

Mondala et al. (2013) studied decomposition of productivity growth in watersheds: a study in Bundelkhand region of Madhya Pradesh, India the analysis showed that per hectare output in watershed villages over control villages were 14, 44 and 30 per cent higher in case of wheat, gram and soybean, respectively. Decomposition of causative factors which influenced the differences indicated that the effect of watershed technology contributed mostly which accounted for 11.05, 37.62 and 35.19 per cent in wheat, Bengal gram and soybean, respectively. This implies that with the present level of resource use by the farmers at control areas output could be increased by about 11, 38 and 35 per cent.

CHAPTER III

METHODOLOGY

The data were collected and analyzed into meaningful information to draw conclusions in order to review the comparative economics of farm ponds beneficiary and non-beneficiary farmers in Malegaon Tahasil of Washim district. The object of any investigation is to draw the useful conclusion in the light of objectives of the study in order to derive the meaningful conclusion. It is essential to the investigator to adopt appropriate method and procedure. Keeping this in view, this chapter has been devoted to explain the methodology adopted during the course of study. The present investigation was undertaken to study the “Comparative Economics of Farm Ponds Beneficiary and Non-beneficiary Farmers in Malegaon Tahasil of Washim District." This chapter deals with the sources of data, period of study and analytical procedure used to draw the inferences.

The study entitled "Comparative Economic of Farm Ponds Beneficiary and Non-beneficiary Farmers in Malegaon Tahasil of Washim District” was undertaken with the following objectives.

1) To study the socio-economic characteristics of the selected beneficiary and non-beneficiary farmers.
2) To study the per hectare input utilization in major crops by the selected farmers.
3) To examine the economics of production of major crops of selected farmers.
4) To examine the impact of farm ponds on the productivity of various inputs.

3.1 Selection of Sample:

The total sample of 100 farmers was selected purposively of which 50 beneficiary farmers and 50 non-beneficiary farmers were selected for the present study.

Malegaon Tahasil covers 122 villages. Out of these 10 villages were selected for present study namely Ghata, Bramhanwada ,Marsul, Medashi, Shirpur, Pangari(kute) kolegaon, Mungala Mirzapur Ridhora. These villages were purposively selected taking into consideration, availability of at least five farm ponds in each village and their accessibility. List of farm pond beneficiary farmers from these villages was prepared with the help of officials of the State Department of Agriculture who are stationed at Malegaon tahasil. In total 50 beneficiary farmers were selected for the study by selecting 5 beneficiary farmers from each village. In order to analyze the impact of farm pond availability on productivity of farmers it would have been more appropriate to compare current data of the beneficiaries with the bench mark data. However the benchmark data of the selected beneficiary farmers was not available from any source. Hence, a matching sample of 50 non beneficiary farmers from same area; by selecting 5 non beneficiary farmers from each village was collected for comparison. Thus, totally 100 famers from Malegaon tahasil were selected for this study.

3.2 Period of study:

The primary data were collected from selected sample for the year 2017-18.

3.3 Collection of data:

The sample farmers for present study were personally contacted and primary data was collected from them in a specially structured schedule, and data on following variables were collected.

3.3.1 A) Resource availability and its use:

It included the information on land availability, fallow land, cropped area, area under irrigation, farm assets like farm implements, farm investment, etc.

3.3.2 B) Input-output data:

This included data on quantity of inputs that has been used by farmers like human labors (family and hired), seeds, pesticides, fertilizers and farm yard manures. Data on various farm operations along

with labor use for these operations was collected. Data on total production (main and by produce) was recorded for crops that farmers will grow.

3.3.3 C) Marketing and prices:

Data on inputs used by farmers, for crop production and prices at which farmers sold the produce, were collected.

3.4 Analytical Tools:

3.4.1 A) Socio-economic characteristics:

First objective of study was calculated by simple tabular analysis. Following characteristics of the selected farmers were studied:

a) Education

b) Family size

c) Land use pattern and cropping intensity.

d) Cropping pattern.

e) Availability of capital assets

f) Investment in fixed capital assets.

3.4.2 B) Economics of production:

To examine the impact of farm pond activity and productivity of various inputs, the production function analysis was used. Per farm production function for beneficiary and non-beneficiary farmers was estimated.

3.4.3 C) Production function analysis:

The impact of farm pond activity and productivity of various inputs was determined by using the production function analysis where per farm production function for beneficiary and non-beneficiary farmers was also estimated.

$$Y = ax_1^{b1}\, x_2^{b2}\, x_3^{b3}\, x_4^{b4} x_5^{b5} x_6^{b6} \ldots\ldots x_n^{bn}.\, e^n$$

Where,

Y = Gross income in Rs. Per farm.

X_1 = Land area in hectares per farm.

X_2 = Human labour in Rs. per farm.

X_3 = Bullock labour in Rs. per farm.

X_4 = Expenditure on manure in Rs. Per farm

X_5 = Expenditure on fertilizers in Rs. Per farm.

X_6 = Working capital in Rs. Per farm.

a = Intercept.

$b_1$to b_n= Regression coefficient of the concerned factors.

3.4.4 D) Estimation of MVP:

The impact of farm pond activities on factor productivity was examined by estimating marginal value products (MVP) of the factor inputs. MVP was calculated using following formula:

$$MVP = b_i \frac{Y}{Xi}$$

Where,

MVP = Marginal value of products,

Y = the estimated output when all the inputs (x`s) were held at their geometric mean level,

b_i = the regression coefficient of the concerned input factor and

X_i = the geometric mean of the i^{th} factor.

CHAPTER IV

SOCIO-ECONOMIC STATUS OF THE WASHIM DISTRICT

The present chapter is devoted to discuss, in brief some of the socio-economic features of Washim district of Maharashtra just to facilitate comparison and to get better idea of the economy of these districts.

4.1 Socio-economic Status of Washim district

4.1.1 Location

Washim is one of the eleven districts of Vidarbha region and was formed after splitting Akola district on 1 July, 1998.Washim district lies between19.61 to 21.16 north latitude and 76.07 to 77.14 east longitudes and 600M MSL altitude. The geographical area of Washim district is 5,150 Sq. Km. Washim district is located in the eastern region of Vidharbha. Akola lies to its north, Amravati lies to its North-east, Hingoli lies to its south, Buldana lies to its west, Yavatmal lies to its east.

4.1.2 Administrative set up

This district is divided into 3 sub-divisions, namely, Washim , Mangrulpir and Karanja. District has 6 Tehsils, namely- Washim, Risod, Malegaon, Mangrulpir, Manora and Karanja. District Collector's office is located in Washim town. There are four Nagar Parishad, six Panchayat Samitis and seven hundred and eighty nine total villages and four towns.

4.1.3 Topography

The district forms part of Deccan Plateau with slope towards southeast from Sahayadri hills and has a varied topography consisting of hills, plains and undulating topography near riverbanks. The district forms a part of Godavari and Tapi basins. The Balaghat Plateau comprises of Low-lying hills forming water divide. Many of the tributaries to Godavari and Tapi rivers originate from the Balaghat Plateau. Penganga River is the main river of the district. It flows through the Tehsil of Risod. Later it flows through the boundary of Washim and Hingoli districts. River Kaas is the main tributary of Penganga. River Kaas meets Penganga about 1 km from

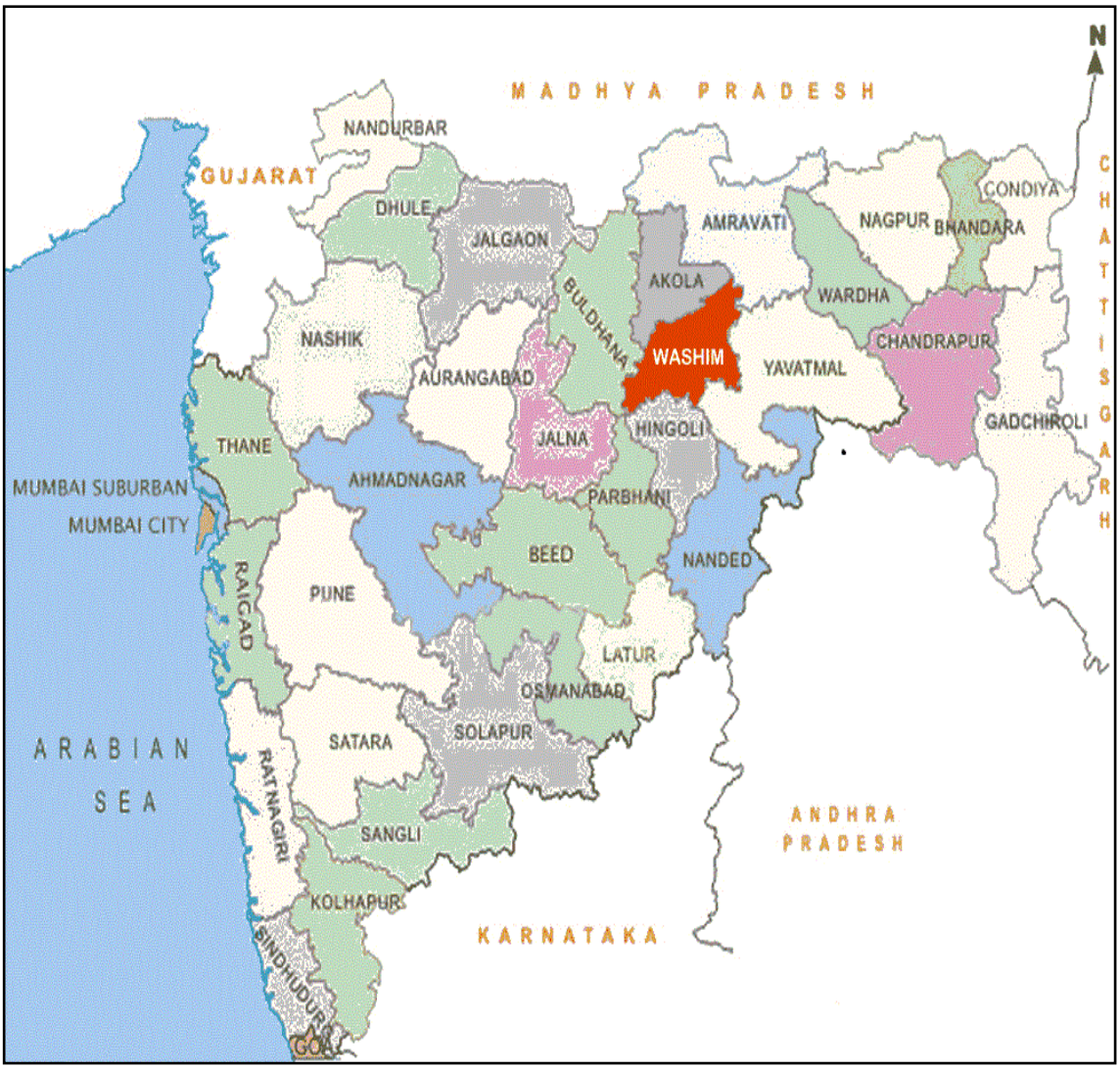

Fig.1. Map showing districts of Maharashtra

Fig. 2. Map showing Tahasils of Washim district of Maharashtra.

the village of Shelgaon Rajgure. River Arunavati and its tributaries originate in the Tehsil of Washim and then flow through the tehsils of Mangrulpeer and Manora into the district of Yavatmal. River Katepurna originates in the hilly areas of the 8 district and flows northwards through the tehsil of Malegaon and enters the Akola district. There are hilly ranges extending from through the tehsils of Malegaon, Washim, Mangrul Pir and Manora. There is plain region in the basins of River Penganga in the Risod Tehsil. Other important rivers include Chandrabhaga, Adan, Pus and Bembala.

4.1.4 Soil

The soil of the district is basically derived from Deccan Trap Basalt and major part of the district is occupied by medium black soil of 25-50 cm depth occurring in the plains in entire south western, north eastern and northern parts of the district, whereas the shallow black soil of 7.5 to 25 cm depth occur in restricted hilly parts of the district in central elongated part and the northern peripheral part. The soil profile data is not available in figures given in the Performa.

4.1.5 Climate and rainfall

The climate is tropical in Washim. The average annual temperature in Washim is 26.2 °C, The driest month is February. With an average of 33.7 °C In summer (April- May) , minimum temperature is about 22 degree Celsius and maximum temperature is about 45 degree Celsius with mean temperature of about 33.5 degree Celsius whereas in winter (October-March), minimum temperature is 10 degree Celsius and maximum temperature is about 28 degree Celsius with mean temperature of about 19 degree Celsius and that in rainy season (June – September), minimum temperature is about 18 degree Celsius and maximum temperature is about 26 degree Celsius with mean temperature of about 17 degree Celsius. . During the year, the average temperatures vary by 12.9 °C. , May is the warmest month. December has the lowest average temperature of the year. It is 20.8 °C. Washim District falls in two agro ecological zone type viz Assured rainfall zone (ACZ-7) and Moderate Rainfall Zone (ACZ-8). Risod and Karanja falls under Assured rainfall zone (ACZ-7) covering 170583 ha area and Washim, Malegaon, Manora and

Mangrulpir falls under Moderate Rainfall Zone (ACZ-8) covering 342541 ha area. Washim district has average annual rainfall of 798.7 mm. On an average, there are above 42 rainy days. In winter, there is much less rainfall in Washim than in summer. There is 5 mm of precipitation in February. With an average of 294 mm, the most precipitation falls in July. The precipitation varies 289 mm between the driest month and the wettest month.

4.1.6 Population

Table 4.1.6 Demographic particulars of Washim district

Description	2011
Actual Population	1,197,160
Male	620,302
Female	576,858
Population Growth	17.34%
Density per square kilometres	244.00
Proportion to Maharashtra Population	1.07%
Sex Ratio (Per 1000)	930.00
Child Sex Ratio (0-6 Age)	863.00
Average Literacy	83.25
Male Literacy	90.55
Female Literacy	75.48
Total Child Population (0-6 Age)	1,52,190
Male Population (0-6 Age)	81,686,00
Female Population (0-6 Age)	70,504
Literates	869,917
Male Literates	487,703
Female Literates	382,214
Child Proportion (0-6 Age)	12.71%
Boys Proportion (0-6 Age)	13.17%
Girls Proportion (0-6 Age)	12.22%

Source: Directorate of census operations in Maharashtra, 2011

As per the Census 2011, the total population of the Washim district was 1,197,160 of which male and female were 620,302 and 576,858 respectively. Washim District population constitutes 1.07 percent

of total Maharashtra population. Population density is 244 per square kilometer. There was change of 17.34 percent in the population compared to population as per 2011.The ratio of female population per thousand of male is 930. Child sex ratio (0-6) years of age is 863. The district is with literacy level of 83.25 percent.

4.2 Land Utilization Pattern

Total geographical area of Washim district is 513124 ha. Out of which 429173ha area under gross cropped area and 420361 ha area is net sown area. The area sown more than once is 21680 ha. Area under forest is 37068 ha, under wasteland is 8003 ha and under miscellaneous use is about 7831 ha. The land Use Pattern is given in Table 4.2.

Table 4.2. Land utilization pattern of Washim district

Name of the state: Maharshtra								
Name of District : Washim								
Sr. No.	Name of Tehsil	Number of the Villages Covered	Total Geographical Area	Area under Agriculture			Area under Forest	Area under Other uses
				Gross Cropped Area	Net Sown Area	Area sown more than once		
1	Washim	128	94150	86649	79317	7332	2118	2145
2	Risod	169	87390	71471	77905	6434	1919	895
3	Malegaon	135	91598	72263	69703	2560	12852	1385
4	Mangrulpir	100	78569	64507	63253	1254	3813	552
5	Manora	121	78224	58471	57390	1081	13033	1289
6	Karanja	136	83193	75812	72793	3019	3333	1565
7	Total	789	513124	429173	420361	21680	37068	7831

4.2.1 Cropping Seasons

The year can be broadly divided into three seasons as *Kharif* which starts from June and ends September. While *Rabi* ranges from October to January and Summer season fall within period of February to May. In summer season, land generally remains fallow. Preparatory tillage operations are undertaken in summer season. Washim District is land of Soybean. Soybean and Cotton are two important crops grown in *Kharif* season. Pigeon pea, Sorghum, Green gram and black gram are also grown in Kharif season on large scale. Wheat and gram are important Rabi crops grown in area. Safflower and rabi sorghum are also grown in Rabi season.

Table 4.2.1 Cropping Seasons in Washim district

Sr. No.	Major Field Crops cultivated	Area (hectare)	Percentage to total Gross Cropped Area
Kharif			
1	Soybean	185.1	38.59466
2	Cotton	67.8	14.13678
3	Other pulses	88.4	18.43203
4	Tur	47.4	9.883236
5	Sorghum	29.9	6.234362
Rabi			
1	Gram	55.7	11.61384
2	Wheat	3	0.625521
3	Safflower	2.3	0.479566
	Total	479.6	

4.2.2 Cropping pattern

Data of cropping pattern of Washim district is presented in table 4.2.2. Study of cropping pattern shows that Soybean is most important crops in the district. Followed by Soybean and Cotton, the other major crops of the district are cereals (Jowar, Bajra, Wheat), Pulses (Tur, Green gram, Gram) and Oilseed (Sunflower, Ground nut). A variety of fruits like Lemon, Orange, Mango, Pomegranate, Custard apple, Guava, Banana, Papaya and Vegetables like Onion, Chilly, Brinjal, Pumpkin, Cucumber, Water melons, all types of Gourds.Thus, cropping pattern of district is diversified in nature. Monsoon pattern of the district is erratic. That usually affects the production potential of the area.

Table 4.2.2 Cropping pattern of Washim district

Tehsil	Cereals	Coarse Cereals	Pulses	Oilseeds	Cotton	Vegetables	Fruit crop	Total
Washim	5183	12215	13106	62832	522	1613	3	2827
Risod	3660	20450	13275	60743	213	745	0	386
Malegaon	1385	6788	2902	56392	111	1036	6	624
Mangrulpir	2936	7111	9716	46599	3030	747	2	460
Manora	4073	10642	10012	30975	16976	449	2	5
Karanja	3043	6719	10504	42582	14552	896	1	407
Total	20280	63925	59515	300123	35404	5548	14	4709

4.2.3 Cropping Intensity

Cropping intensity shows the intensity of land use. It gives an idea about the pace of agricultural developments in the different regions of Washim district. As evident from table 4.2.3 there are different cropping intensities in differen tahasils of Washim district.Cropping intensity is highest in Washim tahasil and and lowest in Risod tahasil of Washim district. Total cropping intensity of washim district turns out to be 101.5 %.

Table 4.2.3 Cropping intensity in Washim district

Sr No.	Name of Taluka	Cropping Intensity (%)
1	Washim	109
2	Risod	91
3	Malegaon	103
4	Mangrulpir	101
5	Manora	101
6	Karanja	104
	Total	101.5

4.2.4 Fertilizer consumption

Fertilizer is an important component of new production technology. Level of consumption of fertilizer shows the agricultural development of the region. As revealed from the table 4.2.4 consumption of fertilizer is highest in Manora tahasil followed by Manglurpir thasil and lowest in Malegaon Tahasil.

Table 4.2.4 Fertilizer consumption in Washim district

Sr. No.	Tehsil	Fertiliser Consumption (kg/ha)			Total
		N	P	K	
1	Washim	275	187	46.3	508.3
2	Malegoan	279.5	183	42	504.5
3	Risod	276	186	43	505
4	Mangrulpir	286.3	183	49.9	519.2
5	Manora	284	184.5	52.5	521
6	Karanja	283	178.3	49	510.3
	Total	1683.8	1101.8	282.7	3068.3

4.2.5 Marketing and Transportation

For marketing of agricultural produce agriculture marketing committees are functioning in the district. Out of 6, 5 Tahasil have facility of regulated market. Markets are connected with roads and have facilities of banking, electricity, telephone communication, internet facility, etc. Bullock carts and tractors are means of transportation of agriculture produce.

CHAPTER V

RESULTS AND DISCUSSION

This Chapter deals with general information of the selected beneficiary and non- beneficiary farmers includes family size educational status, land use pattern and cropping pattern etc. Per hectare input utilization and cost of cultivation of major crops and impact of farm ponds on the productivity of input in Malegaon Tahasil are included in this chapter and finding of this study are presented below.

5.1 Socio-Economic characteristics of selected beneficiary and non-beneficiary farmers of farm ponds

The socioeconomic parameters of the farmers influenced the production, income and marketing activities of the agro-produce on their farm. The family size, educational status, land use pattern, cropping pattern and fixed capital investment are the major socio-economic actors needed to be studied for comparative economics of farm ponds beneficiary and non-beneficiary farmers.

5.1.1 Distribution of beneficiary and non-beneficiary farmers according to size of holding

The distribution of farmers in the three categories i.e. small, medium and large according to their size of holding is presented in table 5.1. Out of the total 50 beneficiary selected cultivators 20 per cent beneficiary cultivators belonged to small holding groups, 30 per cent medium land holding group and 50 per cent were large farmers and similarly the table 5.1 also show that out of 50 non-beneficiary selected farmers 20 per cent cultivators belonged to small holding group 30 per cent medium land holding group and 50 per cent were large holding groups.

In case of beneficiary contributed 1.51 hectares, 2.45 hectares and 4.91 hectares in small, medium and large size group respectively. While average size of holding was 3.49 hectares for overall beneficiary farmers.

In case of non-beneficiary farmers contributed 1.61 hectare under small size group, 3.10 hectare medium size group 4.38 hectare in large size group respectively. The average size of holding was 3.44 hectare.

Table: 5.1 Distribution of beneficiary and non-beneficiary farmers according to size of holding

Sr. No.	Group of farmers	Sample (No's)		Average size of holding (Ha.)	
		B	NB	B	NB
1	Small (0.01 to 2.00 Ha.)	10 (20.00)	10 (20.00)	1.51	1.61
2	Medium (2.01 to 4.00 Ha.)	15 (30.00)	15 (30.00)	2.45	3.10
3	Large (4.01 Ha. and above)	25 (50.00)	25 (50.00)	4.91	4.38
4	Overall	50 (100.00)	50 (100.00)	3.49	3.44

(Figure in parenthesis indicate the percentages to total)

5.1.2 Average size of family of selected farmers

The average size of family of selected farm pond beneficiary and non-beneficiary farmers in Malegaon Tahasil is given in table 5.2. The share of male in family size was highest in small size group of non-beneficiary farmers i.e. 45.01 percent followed by medium size group of non- beneficiary farmers i.e. 37.05 percent and small size group of beneficiary farmers is i.e. 30.09 percent. Whereas, share of female in family was highest in small group of non- beneficiary farmers i.e. 45.16 percent followed by small size group of beneficiary farmers i.e. 35.81 percent. And lowest in large size group non beneficiary farmers i.e. 29.16 percent. The share of children in family size was observed highest in medium size group of beneficiary farmers. i.e. 38.45 percent.

Table: 5.2 Average family size of beneficiary and non-beneficiary farmers of farm pond

(figures in number)

Sr. No	Particular	Size of group							
		Small		Medium		Large		Overall	
		B	NB	B	NB	B	NB	B	NB
1	Male	1.03 (30.95)	2.54 (45.16)	1.46 (31.52)	1.08 (37.05)	3.23 (35.29)	1.68 (35.00)	5.99 (33.30)	6.02 (39.54)
2	Female	1.05 (35.71)	2.54 (45.16)	1.04 (30.09)	1.04 (29.16)	2.84 (31.09)	1.56 (32.5)	5.74 (31.91)	5.50 (36.13)
3	Children	1.04 (33.33)	0.54 (9.67)	1.78 (38.38)	1.6 (33.33)	3.07 (33.61)	1.56 (32.5)	6.26 (34.78)	3.70 (24.31)
4	Total	4.02 (100)	5.63 (100)	4.65 (100)	4.8 (100)	9.15 (100)	4.8 (100)	18.00 (100)	15.23 (100)

Note : Figures in (parentheses indicates the percentage in total) and B=beneficiary and NB=non beneficiary.

5.1.3 Educational status of selected farmers

It was observed from the table 5.3 that the overall illiterate percentage of beneficiary farmers was 36.00 percent and a non beneficiary farmer was 28.05 percent. Among the different size group percent of illiteracy was observed higher in small size group i.e.38.88 percent in non beneficiary farmers and 30.23 percent in beneficiary farmers. In medium size group illiteracy among beneficiary farmers was 25.67 per cent and among non-beneficiary farmers it was 27.27 per cent. In large group of farmers illiteracy among beneficiary farmers was 1.69 per cent and among non-beneficiary farmers it was 1.02 per cent. Thus, least illiteracy was found among beneficiary farmers in large size group of farmers. Percentage of primary school was observed highest in small size group of non- beneficiary farmers (55.56 percent). Percentage of secondary education was observed highest in large size group of beneficiary farmers (52.15 per cent). The percentage of higher education was observed highest in beneficiary farmers of large size group i.e. 39.11 per cent. Percentage of farmers having graduate level education was highest in large size group of farmers i.e. 9.77 percent in beneficiary farmers.

Table 5.3 Educational status of beneficiary and non- beneficiary farmers of selected farm ponds

Sr. No.	Particulars	Size of group							
		Small		Medium		Large		Overall	
		B	NB	B	NB	B	NB	B	NB
1	**Primary School**	1.4 (32.55)	1.81 (55.56)	1.53 (31.08)	1.46 (30.55)	2.61 (55.41)	1.56 (32.5)	1.42 (30.21)	1.42 (33.80)
2	**Secondary high school**	1.04 (32.55)	1.27 (38.88)	1.33 (27.02)	1.33 (27.77)	2.46 (52.15)	1.02 (25.00)	1.32 (28.08)	1.14 (27.14)
3	**College**	0.2 (4.65)	0.18 (5.56)	0.8 (16.21)	0.66 (13.88)	1.84 (39.11)	0.64 (13.33)	0.76 (16.17)	0.54 (12.85)
4	**Graduate (college education)**	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.46 (9.77)	0.08 (1.66)	0.12 (2.55)	0.04 (0.95)
5	**Illiterate**	1.03 (30.23)	1.27 (38.88)	1.26 (25.67)	1.33 (27.77)	1.69 (35.08)	1.32 (27.05)	1.69 (36.00)	1.02 (28.57)
	Total	4.3 (100)	3.27 (100)	4.93 (100)	4.08 (100)	4.72 (100)	4.08 (100)	4.07 (100)	4.02 (100)

(Figure in parenthesis indicate the percentages to total)

5.1.4 Land use pattern of selected farmers

Land utilization indicates the area of land actually utilizes for different purpose like crop production, fallow land and net cultivated land, etc. the result revealed that in table 5.4. Indicates the land use pattern and cropping intensity of selected farm pond beneficiary and non-beneficiary farmers in Malegaon Tahasil.

Table 5.4 Land use pattern and cropping intensity of selected farm pond beneficiary and non-beneficiary farmers

(Area in hectare)

Sr. No.	Particulars	Size of group							
		Small		Medium		Large		Overall	
		B	NB	B	NB	B	NB	B	NB
1	Total land holding	1.51 (100)	1.61 (100)	2.45 (100)	3.10 (100)	4.91 (100)	4.38 (100)	3.49 (100)	3.44 (100)
2	Permanent fallow	0.00 (0.00)	0.00 (0.00)	0.01 (0.25)	0.04 (1.29)	0.03 (0.53)	0.08 (1.82)	0.01 (0.42	0.05 (1.51)
3	Operational Holding	1.51 (100)	1.61 (100)	2.43 (99.16)	2.94 (94.84)	4.83 (98.31)	4.13 (94.16)	3.44 (98.63)	3.27 (94.89
a)	Irrigated	1.02 (67.44)	0.00 (0.00)	1.95 (79.81)	0.15 (4.73)	1.86 (37.89)	0.26 (5.87)	1.72 (49.26)	0.17 (5.02)
b)	Unirrigated	0.49 (32.56)	1.61 (100)	0.47 (19.34)	2.79 (90.11)	2.97 (60.42)	3.87 (88.29)	1.72 (49.37)	3.10 (89.87)
4	Current Fallow land	0.00 (0.00)	0.00 (0.00)	0.01 (0.60)	0.12 (3.87)	0.06 (1.17)	0.18 (4.01)	0.03 (0.95)	0.12 (3.60)
5	Net cultivated area	1.51 (100)	1.61 (100)	2.43 (99.40)	2.82 (90.97)	4.85 (98.83)	3.95 (90.15)	3.46 (99.05)	3.14 (91.29)
6	Gross Cropped Area	2.47	2.25	3.99	3.95	8.74	6.97	6.06	5.12
7	**Cropping intensity**	**164.12**	**139.70**	**164.15**	**140.22**	**180.23**	**176.38**	**175.43**	**162.90**

Average area under irrigation per farm was higher for beneficiary group (1.72hectare) than the non-beneficiary group (0.17 hectare). Gross cropped area at overall level for beneficiary and non-beneficiary farms was 6.06 hectares and 5.12 hectares respectively. Cropping intensity which shows the intensity of land use was about 175.43 per cent for beneficiary farm and 162.90 per cent for non-beneficiary farms. Thus, cropping intensity of beneficiary farms was higher than non-beneficiary farms. Availability of farm pond which leads to water conservation might have increased water availability for irrigation which further resulted in growing of more than one crop in a year and thus, in higher cropping intensity on beneficiary farms.

5.1.5 Impact of Cropping pattern of selected farmers

Cropping pattern refers to allocation of area under different crops. On the basis of experience, irrigation facilities available, the pattern of distribution of rainfall and type of soil available with farmers, they decide the cropping pattern. The cropping pattern of *kharif* and *rabi* season are presented in table 5.5.

As revealed from this table at overall level soybean was main crop on beneficiary farms occupying 51.00 per cent of total cropped and 40.17 per cent of total cropped area on non-beneficiary farms. Next important crop was tur and it accounted for 32.00 per cent of the total cropped area on farm pond beneficiary farms and 40.74 per cent of the total cropped area on farm pond non-beneficiary farms. Gram and other important crops grown by the farmers in *rabi* season. Gram was fourth most important crop in area; occupying 58.52 per cent of total cropped area on farm pond beneficiary farms and 64.33 per cent of total cropped area on farm pond non-beneficiary farms. Group wise study of cropping pattern revealed that soybean, tur, and gram were the important crops in terms of area on both beneficiary and non-beneficiary farms.

Table: 5.5 Impact of cropping pattern of beneficiary and non beneficiary farmers of selected farm ponds

(area in hectare)

Sr. No	Particulars	Size of holding							
		Small		Medium		Large		Overall	
A	Kharif	B	NB	B	NB	B	NB	B	NB
1	Soybean	0.82 (56.18)	0.84 (57.25)	1.00 (49.02)	0.98 (33.67)	2.13 (52.98)	1.92 (54.85)	1.53 (51.00)	1.41 (40.17)
2	Tur	0.56 (38.36)	0.53 (36.30)	0.92 (42.09)	1.37 (47.06)	1.18 (29.35)	1.43 (40.85)	0.98 (32.00	1.43 (40.74)
3	Cereal	0 (0.00)	0 (0.00)	0.09 (4.16)	0.15 (5.15)	0.29 (7.21)	0.15 (4.28)	0.17 (5.68)	0.26 (7.38)
4	Pulses	0.06 (4.10)	0.02 (1.52)	0.12 (5.55)	0.21 (7.21)	0.26 (6.46)	0.00 (0.00)	0.18 (6.02)	0.22 (6.26)
5	Vegetable.	0.01 (0.68)	0 (0.00)	0.03 (1.38)	0.00 (0.00)	0.16 (3.98)	0.00 (0.00)	0.09 (3.01)	0.06 (2.01)
6	Other	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.14 (4.81)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.13 (1.70)
	Total of Area	1.46 (99.32)	1.39 (95.07)	2.16 (100)	2.91 (95.25)	4.02 (99.98)	3.5 (99.98)	2.95 (100)	3.51 (100)
B	Rabi								
1	Gram	0.67 (78.48)	0.58 (71.60)	0.80 (62.08)	1.01 (82.11)	0.92 (31.94)	1.18 (55.92)	0.46 (58.22)	1.01 (64.33)
2	Cereal	0.13 (16.45)	0.21 (25.92)	0.27 (20.93)	0.05 (4.06)	1.06 (36.80)	0.36 (17.06)	0.64 (81.11)	0.22 (14.01)
3	Vegetable	.0.04 (5.06)	0.02 (2.46)	0.06 (4.65)	0.06 (4.87)	0.35 (12.15)	0.25 (11.84)	0.20 (26.07)	0.14 (8.91)
4	Oilseed	0.00 (0.00)	0.00 (0.00)	0.05 (3.87)	0.05 (4.06)	0.40 (13.78)	0.24 (11.37)	0.21 (27.59)	0.16 (10.19)
5	Others	0.00 (0.00)	0.00 (0.00)	0.06 (4.65)	0.06 (4.87)	0.15 (5.20)	0.08 (3.79)	0.07 (9.97)	0.04 (2.54)
	Total of Area	0.79 (100)	0.81 (100)	1.29 (100)	1.23 (100)	2.88 (100)	2.11 (100)	2.12 (100)	1.57 (100)
	Gross Area	2.25	2.20	4.40	3.14	7.10	5.60	5.07	3.82
C	Perennial	0.00 (0.00)	0.00 (0..00)	0.06 (0.16)	0.00 (0.00)	0.03 (0.45_)	0.00 (0.00)	0.02 (0.35)	0.00 (0.00)
D	Annual	00.0 (0.00)	0.00 (0.00)	0.01 (2.41)	0.00 (0.00)	0.09 (1.17)	0.00 (0.00)	0.07 (1.35)	0.00 (0.000
	Gross Area	2.26	2.23	4.03	4.42	7.85	7.28	5.59	5.42

(Figure in parenthesis indicate the percentages to total)

5.1.6 Availability of capital assets of beneficiary and non-beneficiary farmers of selected farm ponds

It was observed from table 5.6 that at overall level almost all the farmers in the beneficiary group possessed important implements like plough, harrow and tiffan. Percentage of farmers possessing tractor was also quite high i.e. 25.32 per cent of beneficiary farmers and 18.16 per cent of non-beneficiary farmers. Electric pump sets were possessed by almost

cent per cent of the beneficiary farmers and only 15.69 per cent of the non-beneficiary farmers. Almost 55.45 per cent of the beneficiary farmers and 36.52 per cent of the non-beneficiary farmers at overall level possessed bullock pairs.

Table 5.6 Availability of capital assets of farm pond beneficiary and non-beneficiary farmers of selected farm ponds

(Figure in numbers)

Sr. No.	Particular	Size of groups							
		Small		Medium		Large		Overall	
		B	NB	B	NB	B	NB	B	NB
1	Implement								
A	Plough	0.60 (55.52)	0.36 (35.25)	0.87 (86.23)	0.54 (56.26	0.91 (90.60)	0.83 (82.25)	0.79 (77.45)	0.58 (59.56)
B	Harrow	0.78 (77.52)	0.57 (56.23)	0.89 (87.65)	0.84 (85.21)	0.9 (91.21)	0.86 (85.63)	0.86 (85.45)	0.76 (76.74)
C	Tiffan	0.66 (65.32)	0.61 (60.23)	0.75 (74.12)	0.69 (70.43)	0.82 (83.24)	0.71 (68.56)	0.74 (72.63)	0.67 (64.50)
D	Bullock Cart	0.75 (72.30)	0.63 (64.20)	0.79 (79.83)	0.73 (72.36)	0.8 (79.23)	0.75 (72.37)	0.78 (78.96)	0.70 (69.27)
2	Machinery								
A	Electric pump	0.98 (99.12)	0.13 (16.11)	1.12 (100.00)	0.17 (23.11)	1.23 (100.00)	0.19 (18.65)	1.11 (100.00)	0.16 (15.69)
B	Tractor	0.06 (6.00)	0.04 (4.12)	0.24 (20.23)	0.17 (17.13)	0.49 (45.18)	0.35 (32.25)	0.26 (25.32)	0.18 (18.16)
C	Thresher	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.12 (10.26)	0.08 (7.63)	0.04 (4.85)	0.02 (3.65)
D	Sprayer	0.40 (35.38)	0.33 (32.21)	0.40 (42.71)	0.37 (35.32)	0.72 (69.23)	0.68 (62.39)	0.51 (50.12)	0.46 (43.46)
3	Livestock								
A	Bullock Pair	0.33 (32.58)	0.21 (20.23)	0.42 (41.24)	0.26 (25.16)	0.84 (76.89	0.67 (65.63)	0.53 (55.45)	0.38 (36.52)
B	Cow	0.16 (15.66)	0.14 (13.48)	0.21 (20.27)	0.19 (18.15)	0.36 (35.95)	0.28 (27.68)	0.24 (23.85)	0.20 (19.88)
C	Buffalow	0.00 (0.00)	0.00 (0.00)	0.16 (15.64)	0.11 (12.11)	0.29 (28.16)	0.19 (18.39)	0.15 (15.23)	0.10 (10.69)

(Figure in parenthesis indicate the percentages to total)

In case of non-beneficiary percentage of farmers possessing important implements like plough, harrow, tiffan and bullock cart was less than beneficiary farmers groups. The proportions of farmers possessing animals in non-beneficiary group were less than beneficiary group. Table

5.5 also shows that per farm availability of implement, machinery and livestock at overall level on beneficiary farm was higher than the non-beneficiary farmers.

5.1.7 Investment in fixed capital assets.

The success of farming largely depends upon carrying out various operations in time. This is possible only if required farm implements, tools and machinery are available with the farmers. In view of this it is important to study per farm fixed capital investment of selected farmers.

Information on per farm investment in fixed capital assets in presented in table 5.7 It was observed form the table that at the overall levels per farm investment in beneficiary group was Rs.3141000. as against 309600. in non-beneficiary group land was major item of investment accounting for 97.45 per cent and 98.02 per cent of the total investment on beneficiary and non-beneficiary farm respectively. Machinery was the next item of investment, it share in total investment in beneficiary and non-beneficiary groups being 1.46 per cent and 1.11 per cent respectively, implement and livestock where the other important item of capital investment on both the group of farm. Thus per farm capital investment on beneficiary farm was higher than non-beneficiary farm. Inter group comparison of investment in capital assets did not revealed any specific trend.

Table 5.7. Investment in fixed capital assets of selected farm pond beneficiary and non-beneficiary farmers

(figure in Rs)

Sr. No	Particulars	Size of groups							
		Small		Medium		Large		Overall	
		B	NB	B	NB	B	NB	B	NB
1	Land	1259000 (97.87)	1149000 (98.59)	2205000 (95.79)	2190000 (97.48)	4419000 (97.36)	3942000 (97.65)	3141000 (97.45)	3096000 (98.02)
2	Implements	11329.40 (0.89)	8549.90 (0.65)	13366.50 (0.62)	12227.10 (0.43)	15787.80 (0.33)	12708.90 (0.34)	13821.23 (0.43)	11826.64 (0.37)
3	Machinery	6599.60 (0.48)	3381.00 (0.24)	63193.60 (2.79)	4542.98 (1.63)	70495.72 (1.55)	54928.28 (1.36)	46129.64 (1.46)	34977.42 (1.11)
4	Livestock	10600.00 (0.76)	7700.00 (0.52)	18450.00 (0.80)	13250.00 (0.46)	34500.00 (0.76)	26033.33 (0.64)	21183.33 (0.66)	15661.11 (0.50)
5	Total	1388629.00 (100.00)	1469740.90 (100.00)	2302010.10 (100.00)	2862020.08 (100.00)	4538793.52 (100.00)	4036670.51 (100.00)	3223144.21 (100.00)	3158477.16 (100.00)

(Figure in parenthesis indicate the percentages to total)

5.2.1 Per hectare input utilization of major crops of selected farm pond beneficiary and non-beneficiary farmers

One of the objective of the present study was to understand per hectare level of input used for important crops grown on beneficiary and non-beneficiary farms. Results on this behalf are presented and discussed crop wise in the following tables.

5.2.1 Per hectare input utilization for Soybean

Results revealed that in table 5.8 indicate that at overall level the use of various inputs for soybean on beneficiary farms was slightly higher than non-beneficiary farms. Beneficiary farmers used 20.04 hired human male labour days per hectare against 19.66 hired human male labour days by the non-beneficiary farmers. Use of hired human female labour days was 16.96 days on beneficiary farms and 18.22 days on non-beneficiary farms. Use of seed and farm yard manure per hectare did not vary much among the beneficiary and non-beneficiary farms. Use of chemical fertilizers on beneficiary farms was slightly higher than the non-beneficiary farms. Intergroup comparison of beneficiary and non-beneficiary farms also revealed the same trend.

5.2.2. Per hectare input utilization for tur

Tur is an important pulse crop grown by the farmers in study area. As revealed from Table 5.9 use of manure on beneficiary farm was clearly more than non-beneficiary farms. Beneficiary farmers applied slightly more quantity of fertilizers than the non-beneficiary farms Use of hired human male labour days on beneficiary farms (10.87 days) and non-beneficiary farmers (11.01 days), same was the case with hired human female labour days (13.44) days on beneficiary farms and (12.75) days on non-beneficiary farms).

Table: 5.8 Impact on input utilization pattern of beneficiary and non-beneficiary farmers of selected farm ponds in soybean crop

(Numbers /ha)

Sr.No	Particulars	Unit	Land holding size							
			Small		Medium		Large		Overall	
			B	NB	B	NB	B	NB	B	NB
1	Hired human labour									
A	Male	Days	22.80	22.7	15.07	14.62	19.66	16.11	20.04	19.66
B	Female		25.00	24.00	22.26	16.25	25.26	18.24	16.96	18.22
2	Bullock labour	Days	7.80	6.10	8.60	5.12	7.00	6.00	4.73	5.78
3	Machinery	Hrs.	5.00	4.50	5.26	5.00	5.00	4.93	3.92	5.62
4	Seed	Kg	73.60	58.90	73.73	70.90	118.24	71.6	82.74	76.5
5	Manure	Qtl.	3.10	3.36	2.26	2.40	6.36	3.93	4.92	4.63
6	Fertilizer									
A	N	Kg.	55.90	54.90	58.26	61.9	100.40	59.26	68.84	101.15
B	P	Kg.	119.80	118.20	117.60	116.2	205.04	114.1	140.26	138.69
7	Family labour									
A	Male	Days	8.90	7.70	9.88	8.12	7.14	6.75	9.68	8.50
B	Female		10.79	9.00	15.42	11.25	15.55	14.68	10.25	9.97

Table: 5.9 Impact on input utilization pattern of beneficiary and non-beneficiary farmers of selected farm ponds in tur crop (Numbers/ha)

Sr. No.	Particulars	Unit	Land holding size							
			Small		Medium		Large		Overall	
			B	NB	B	NB	B	NB	B	NB
1	Hired human labour									
a	Male	Days	20.53	18.29	19.21	18.21	20.15	19.54	19.94	20.79
b	Female		23.12	21.5	24.6	25.11	24.05	23.45	24.03	24.56
2	Bullock labour	Days	4.14	4.55	5.16	5.133	5.41	5.31	5.089	5.10
3	Machinery	Hrs.	3.69	3.54	3.90	3.80	4.91	4.88	4.31	4.52
4	Seed	Kg.	12.66	12.12	12.64	12.45	12.36	11.35	12.49	12.34
5	Manure	Qtl.	4.12	3.82	4.75	4.61	5.36	5.15	4.90	4.93
6	Fertilizer									
a	N	Kg.	23.37	23.33	23.95	22.70	23.21	22.48	22.86	22.72
B	P	Kg.	45.50	40.87	45.51	45.59	46.29	45.69	45.90	44.70
C	K	Kg.	21.83	20.20	21.46	19.72	23.17	22.64	22.39	22.58
7	Family labour									
A	Male	Days	11.00	10.29	11.06	11.21	10.71	11.17	10.87	11.01
B	Female		11.87	11.75	13.60	13.08	13.97	12.95	13.44	12.75

5.2.3. Per hectare input utilization for gram.

Gram is an important *rabi* crop of the study area. Levels of input utilization for gram crop are presented in table 5.10 it could be revealed from the table that the per hectare use of hired human male labour days (18.26 days on beneficiary farms and 13.68 days on non-beneficiary farms), seed (73.04 kg on beneficiary farms and 72.40 kg on non-beneficiary farms) and manure (23.49) on beneficiary farms and (21.99) on non-beneficiary farms) on beneficiary farms and non-beneficiary farms differed slightly. Use of chemical fertilizers on beneficiary farms was also higher than the non-beneficiary farms. The beneficiary farmers are in contact with the extension agencies who provide them the technical guidance and also explain them the need of application of crucial inputs to the crop for getting higher production.

Table: 5.10 Impact on input utilization pattern of beneficiary and non-beneficiary farmers of selected farm ponds in Gram crop

(Numbers /ha)

Sr. No.	Input	Unit	Size of holding							
			Small		Medium		Large		Overall	
			B	NB	B	NB	B	NB	B	NB
1	Hired human labour	Days								
A	Male		22.32	15.83	15.10	12.39	17.98	13.59	18.26	13.68
B	Female		15.12	14.00	14.68	11.55	17.00	10.90	16.77	11.80
2	Bullock labour	Days	1.10	2.19	2.36	1.35	1.15	1.46	1.51	1.37
3	Machinery	Hrs.	6.89	3.22	6.94	1.88	7.42	3.32	7.25	2.887
4	Seed	Kg.	73.87	76.50	69.80	70.80	76.02	73.41	73.84	72.40
5	Manures	Qtl.	22.50	21.50	23.57	22.00	23.91	22.64	23.49	21.99
6	Fertilizers	Kg.								
A	N		24.08	23.10	22.88	22.61	24.02	23.87	23.67	25.24
B	P		61.41	50.58	53.60	37.68	61.25	49.27	59.14	46.06
7	Family labour	Days								
A	Male		24.50	16.5	23.68	17.78	19.22	16.20	21.87	16.73
B	Female		8.625	9.51	12.9	9.47	5.94	6.67	8.45	8.08

5.2.4 Per hectare cost of cultivation for Soybean

One of the objectives of present investigation was to study economics of major crops, grown by the beneficiary and non- beneficiary

farmers. For the purpose the total variable cost, total production, gross return and net return were worked out separately for each crop. Result in this behalf presented and discussed crop wise in the following table.

The share of each item to the total cost i.e. cost ‘C’ total economic costs for soybean cultivation. The cost has determined on the basis of standard cost concept i.e. cost ‘A’, cost 'B', cost 'C', the different cost concepts have different utilities in research. Here and attempt has been made to estimate the figures of cost of soybean crop of beneficiary and non-beneficiary farmer in the study area and presented in below tables. Per hectare cost of cultivation of soybean grown by the beneficiary and non-beneficiary farmers is presented in table 5.11

Table 5.11 revealed that, the beneficiary and non-beneficiary farmers per hectare cost of cultivation of soybean crop for the sample as an overall was i.e. cost ‘C' ranges from Rs.89555.54 in large size group it was Rs.246691.6 in medium size group it was Rs.58106.79 and in case of small size group of farmer it was Rs. 55217.24 respectively. The per ha. cost of cultivation for Large farmers was Rs.89555.54 Higher total cost on large size farmer was obviously due to higher use of input.

The per ha. overall cost of beneficiary farmers cost ‘A’ was Rs.37334.00 and non- beneficiary farmer It was 33504.77.00. and cost B it was Rs.58850.00 in beneficiary farmer and non beneficiary it was 48011.18. The per ha overall. cost of cultivation in large size group beneficiary and non beneficiary farmers it was 69350.16 (28.11) and 32282.04 (32.60) per cent. The per ha cost of cultivation in medium size group of beneficiary and non-beneficiary farmers it was 37134.00(63.90) and 31443.68 (55.72)

The per ha. Cost of cultivation in small size group of beneficiary and non beneficiary farmers cost B it was Rs.54850.00 (61.24). percent. And 48011.18(63.40). In non-beneficiary group costs were lower as compared to beneficiary farmers as there was low level of input used.

Table: 5.11 Impact of per hectare cost of cultivation of soybean of beneficiary and non-beneficiary farmers of selected farm pond

(Rs./ha)

Sr. No.	Input	Size of holding							
		Small		Medium		Large		Overall	
		B	NB	B	NB	B	NB	B	NB
1	Hired human labour								
a	Male	4560.00 (8.25)	4120.00 (8.89)	2653.00 (4.56)	2640.00 (4.67)	6816.66 (2.76)	3144.00 (3.17)	3412.00 (3.80)	3188.00 (4.21)
b	Female	6030.00 (10.92)	5634.00 (12.16)	4008.00 (6.89)	3350.00 (5.93)	12645.00 (5.58)	5406.00 (5.45)	5572.80 (6.22)	4834.80 (6.38)
2	Bullock labour	4680.00 (8.47)	5340.00 (11.53)	5200.00 (8.94)	3880.00 (6.86)	8075.00 (3.27)	4320.00 (4.36)	4512.00 (5.03)	4392.00 (5.80)
3	Machinery	1400.00 (2.53)	1400.00 (3.02)	2733.33 (7.70)	1250.00 (2.21)	3500.00 (1.41)	1340.00 (1.35)	1970.00 (2.19)	1940.00 (2.56)
4	Seed	7360.00 (13.32)	7330.00 (15.82)	7220.00 (12.42)	7213.33 (12.77)	7336.83 (5.94)	7268.00 (7.33)	7306.00 (8.15)	7264.00 (9.59)
5	Manures	2500.00 (4.42)	2500.00 (5.39)	2500.00 (4.30)	2500.00 (4.42)	2500.00 (4.422)	2500.00 (4.30)	25000 (3.27)	2500.00 (3.30)
6	Fertilizer								
a	N	350.00 (0.63)	365.00 (0.78)	350.00 (0.60)	352.00 (0.62)	717.91 (0.29)	358.80 (0.36)	354.40 (0.39)	365.00 (0.47)
b	P	2357.76 (4.26)	2700.00 (5.83)	3286.66 (5.65)	2613.33 (4.62)	5329.16 (2.16)	2832.00 (2.85)	2891.04 (3.22)	2740.00 (3.61)
7	Irrigation	447.70 (0.81)	563.00 (1.21)	256.00 (0.44)	124.73 (0.22)	568.75 (0.23)	97.16 (0.09)	308.14 (0.34)	198.00 (0.26)
8	Plant protection	3280.00 (5.94)	2590.00 (5.59)	2293.33 (3.94)	2286.00 (4.04)	4791.66 (1.94)	1772.40 (1.78)	2536.00 (2.83)	2090.00 (2.76)
9	Depreciation	2170.00 (3.92)	1466.00 (3.16)	1640.00 (2.82)	1237.33 (2.19)	3672.08 (1.48)	1450.40 (1.46)	1843.8 (2.05)	1389.00 (1.83)
10	Threshing	2730.00	2410.00	2760.00	1922.06	5445.83	2236.16	2732.00	2176.00

		(4.94)	(5.20)	(4.74)	(3.40)	(2.20)	(2.25)	(3.05)	(2.87)
11	Transportation	257.00 (0.50)	234.00 (0.50)	274.00 (0.47)	166.26 (0.29)	482.91 (0.19)	396.00 (0.39)	258.00 (0.28)	294.00 (0.38)
12	Land Revenue	176.00 (0.31)	134.00 (0.28)	190.00 (0.320	145.33 (0.25)	805.00 (0.32)	275.92 (0.27)	281.00 (0.31)	142.00 (0.18)
13	Interest. on working capital@ 6 % annum	1710.00 (3.09)	143.00 (3.09)	1455.33 (2.50)	1422.667 (2.51)	2863.75 (1.16)	1257.60 (1.27)	1494.20 (1.66)	1341.00 (1.77)
14	COST A	44471.45 (80.53)	39608.25 (85.53)	37134 (63.90)	31473.68 (55.72)	69350.16 (28.11)	32282.04 (32.60)	37374.00 (41.73)	33504.77 (44.25)
15	interest on fixed capital @ 10 % annum	2165.00 (3.92)	1433.5 (3.09)	2132.667 (3.67)	2153.333 (3.81)	4284.583 (1.73)	2141.60 (2.16)	2143.60 (2.39)	2003.50 (2.64)
16	Rental value of land	13097.08 (23.71)	9946.66 (21.47)	15256.39 (26.25)	12815.00 (22.68)	68815.97 (27.89)	24396.33 (24.63)	24211.75 (27.03)	18032.00 (23.81)
16	COST B	63108.95 (114.29)	53833.46 (116.25)	54624 (94.00)	46791 (82.84)	103355 (41.89)	46414.08 (46.87)	54850 (61.24)	48011.18 (63.40)
17	Family Labour								
a	Male	3350.00 (4.26)	2400.00 (5.18)	1950.00 (3.35)	6297.22 (11.14)	6433.00 (2.60)	3708.66 (3.74)	2675.83 (2.98)	4223.00 (5.57)
b	Female	1944.00 (3.52)	1980.00 (4.87)	2137.00 (3.68)	6127.50 (10.84)	6255.93 (2.53)	3257.20 (3.28)	2612.77 (2.91)	3862.85 (5.10)
18	COST C	55217.24 (100)	46306.77 (99.99)	58106.79 (100)	56483 (100)	246691.6 (99.99)	99021.15 (100)	89555.54 (100)	75716.89 (100)

(Figure in parentheses indicates the percentages to total cost C)

In beneficiary group the important items of expenditure and their share in total cost were in case of small, medium, large and at overall level hired human labour (male + female) accounted 19.17 per cent, 11.45 per cent, 8.34 per cent and 10.02 per cent respectively. This human labour used in various farm operations like ploughing, harrowing, sowing, hoeing, weeding, harvesting etc. Bullock labour accounted in case of small, medium, large and at overall level 8.47 per cent, 8.94 per cent, 3.27 per cent and 5.03 per cent respectively. Bullock labour used in the farm operation like ploughing, harrowing, hoeing and transport the farm produce from field to farmhouse. Machine used in farm Operation like ploughing, harrowing, threshing etc. It included the cost in small, medium, large and at overall level were Rs.1400, Rs.2733.33, Rs.3500 and Rs.1940 respectively. Seed was used in case of small, medium, large and overall level Rs.7360, Rs.7220, Rs.7336 and Rs.7336.83 respectively. Manure and fertilizers used in case of small, medium, large and at overall level was13.31 per cent, 10.55 per cent, 4.27 per cent and 7.88 per cent respectively. An irrigation charge includes electricity bill only and labour charges of irrigation included in hired human charges and family labour charges. In case of small, medium, large and at overall level higher than the non-beneficiary farmers.

In non-beneficiary group costs were lower as compared to beneficiary farmers as there was low level of input used.

5.2.5. Per hectare cost of cultivation of Tur.

The share of each items to the total cost i.e. cost ‘C’ for tur cultivation. The cost has determined on the basis of standard cost concept i.e. cost ‘A”, cost ‘B', cost 'C‘, the different cost concepts have different utilities in research. Here and attempt has been made to estimate the figures of cost of Tur crop of beneficiary and non-beneficiary farmers in the study area and presented in tables 5.12.

The per hectare cost of cultivation of tur grown by the beneficiary farmers is presented in Table 5.12 that, in case of beneficiary farmer per hectare cost of cultivation of tur crop for the sample as a overall level was Rs.46453.60. The per ha. total cost of cultivation i.e. cost ‘C’

ranges from Rs.46492.80 in large size group, Rs.46497.28 in medium size group and Rs.44989.67 for small size group respectively.

In case of beneficiary the per ha. cost of cultivation at overall level i.e. cost 'A' and cost 'B' was Rs.29738.50 and Rs.42136.20 respectively which was 64.19 per cent and 90.95 per cent of total cost i.e. cost 'C'. The per ha. cost of cultivation i.e. cost 'A' and cost 'B' was in large size group Rs.30641.37 and Rs.42253.60 respectively which was 65.91 per cent and 90.88 per cent of total cost i.e cost 'C' The per ha cost of cultivation in medium size group i.e. cost 'A' and cost 'B' was Rs.29363.58 and Rs.42692.56 which was 62.54per cent and 90.93 per cent of total cost I.e. cost 'C'. The per ha. cost of cultivation in small size group is. cost 'A' and cost 'B' was Rs.28043.98 and Rs.41008.42which was 62.33 per cent and 91.15 per cent of total cost i.e. cost 'C' respectively. In case of small, medium, large and at overall level share of hired human labour (male + female) to total cost i.e cost 'C' accounted 16.86 per cent, 16.03 per cent, 16.43 per cent and 16.40 per cent respectively. This human labour used in various farm operations like ploughing, harrowing, sowing, hoeing, weeding, harvesting etc. Bullock labour accounted in case of small, medium, large and at overall level 5.00 per cent, 5.70 per cent, 5.83 per cent and 5.59 per cent respectively. Bullock labour used in the farm operation like ploughing, harrowing, hoeing and transport the farm produce from field to farmhouse. Machines used in farm operation like ploughing, harrowing, threshing etc. It included the share in total cost i.e cost 'C' in case of small, medium, large and at overall level were 2.49 per cent, 2.49 per cent, 3.11 per cent and 2.80 per cent respectively. At overall level the machinery cost was slightly less as compared to non-beneficiary farmers.

The per hectare cost of cultivation of tur grown by the non-beneficiary farmers is presented in Table 5.12 that, in case of non-beneficiary farmer per hectare cost of cultivation of tur crop for the sample as a overall level was Rs.43928.37. The per ha. total cost of cultivation i.e. cost 'C' ranges from Rs.43078.68 in large size group, Rs.43212.02 in medium size group and Rs.47127.15 for small size group respectively. The

per ha. cost in case of small size group of farmer was higher as input use level was higher.

In case of non-beneficiary the per ha. cost of cultivation at overall level i.e. cost 'A' and cost 'B' was Rs.28490.96 and Rs.39812.68 respectively which was 64.86 per cent and 90.63 per cent of total cost i.e. cost 'C'. The per ha. cost of cultivation i.e. cost 'A' and cost 'B' was in large size group Rs.27631.09 and Rs.38899.70 respectively which was 64.14 per cent and 90.30 per cent of total cost i.e cost 'C' The per ha cost of cultivation in medium size group i.e. cost 'A' and cost 'B' was Rs.27608.73 and Rs.39005.21 which was 63.89 per cent and 90.26 per cent of total cost I.e. cost 'C'. The per ha. Cost of cultivation in small size group is. cost 'A' and cost 'B' was Rs.31963.96 and Rs.43306.32 which was 67.58 per cent and 91.89 per cent of total cost i.e. cost 'C' respectively.

In case of beneficiary in farmers small, medium, large and at overall level share of hired human labour (male + female) to total cost i.e cost 'C' accounted 16.84 per cent, 16.03 per cent, 16.43 per cent and 16.39 per cent respectively. This human labour used in various farm operations like ploughing, harrowing, sowing, hoeing, weeding, harvesting etc. Bullock labour accounted in case of small, medium, large and at overall level 4.61 per cent, 5.20 per cent, 5.83 per cent and 5.49 per cent respectively. Bullock labour used in the farm operation like ploughing, harrowing, hoeing and transport the farm produce from field to farmhouse. Machines used in farm operation like ploughing, harrowing, threshing etc. It included the share in total cost i.e cost 'C' in case of small, medium, large and at overall level were 2.46per cent, 2.49 per cent, 3.11 per cent and 2.79 per cent respectively. At overall level the machinery cost was slightly more as compared to non-beneficiary farmers.

Table: 5.12 Impact of per hectare cost of cultivation of Tur of beneficiary and non-beneficiary farmers of selected farm pond

(Rs./ha)

Sr. No.	Input	Size of holding								
		Unit	Small		Medium		Large		Overall	
			B	NB	B	NB	B	NB	B	NB
1	Hired human labour	Days								
a	Male		4083.00 (9.13)	3658.33 (7.78)	3842.222 (8.18)	4242.22 (9.82)	4030.61 (8.67)	4309.37 (10.00)	3989.303 (8.61)	4159.01 (9.47)
b	Female		3468.75 (7.71)	3225.00 (6.86)	3690.00 (7.85)	3766.67 (8.72)	3608.82 (7.76)	3818.96 (8.87)	3605.15 (7.78)	3684.48 (8.39)
2	Bullock pair	Days.	2072.92 (4.61)	2229.17 (4.74)	2583.333 (5.50)	2566.67 (5.94)	2709.24 (5.83)	2656.62 (6.17)	2544.02 (5.49)	2544.14 (5.79)
3	Machinery	Hrs.	1107.50 (2.46)	1062.50 (2.26)	1171.667 (2.49)	1441.67 (3.34)	1444.59 (3.11)	1465.5 (3.40	1295.29 (2.79)	1377.76 (3.13)
4	Seed	Kg.	1266.67 (2.82)	1212.50 (2.58)	1264.722 (2.69)	1245.83 (2.88)	1234.42 (2.66)	1235.76 (2.87)	1249.96 (2.69)	1234.12 (2.81)
5	Manures	Qtl.	2800.00 (6.22)	2700.00 (5.75)	3325.00 (7.08)	3546.67 (8.21)	3754.12 (8.07)	3608.12 (8.38)	3440.56 (7.41)	3451.39 (7.86)
6	Fertilizers	Kg								
a	N		593.32 (1.32)	533.01 (1.13)	593.4649 (1.26)	594.59 (1.38)	603.67 (1.30)	595.86 (1.38)	598.53 (1.29)	582.90 (1.32)
b	P		1010.71 (2.25)	826.25 (1.76)	1665.3 (3.54)	2418.53 (5.60)	2085.98 (4.49)	2565.59 (5.96)	1744.72 (3.76)	2173.60 (4.95)
c	K		232.20 (0.52)	216.00 (2.46)	352.80 (0.75)	562.80 (1.30)	489.60 (1.05)	595.44 (1.38)	397.08 (0.85)	509.76 (1.60)
7	irrigation		1600.00 (3.56)	1183.33 (2.52)	1870 (3.98)	2071.11 (4.79)	2021.94 (4.35)	2027.84 (4.71)	1891.97 (4.08)	1871.92 (4.26)

8	Plant protection		1750.00 (3.89)	1510.42 (3.21)	1880.556 (4.00)	1793.75 (4.15)	1858.07 (4.00)	1793.54 (4.16)	1843.20 (3.97)	1736.98 (3.95)
10	Threshing		2666.67 (5.93)	1800.00 (3.83)	2622.778 (5.58)	2268.61 (5.25)	2295.02 (4.94)	2243.85 (5.21)	2467.67 (5.32)	2162.50 (4.92)
11	Transportation		512.50 (1.14)	529.17 (1.13)	605.8333 (1.29)	672.56 (1.56)	680.25 (1.46)	691.54 (1.61)	624.372 (1.34)	653.370 (1.48)
12	Land Revenue		196.04 (0.44)	220.00 (0.47)	200.4167 (0.42)	221.83 (0.51)	224.13 (0.48)	214.46 (0.50)	211.359 (0.45)	217.779 (0.49)
13	int.on working apital @ 6%annum		1587.40 (3.53)	1801.78 (3.83)	1662.089 (3.54)	1562.76 (3.62)	1734.42 (3.73)	1564.02 (3.63)	1683.31 (3.63)	1611.19 (3.66)
14	cost A		28043.98 (62.33)	31831.46 (67.73)	29363.58 (62.54)	27608.73 (63.89)	30641.37 (65.91)	27631.09 (64.14)	29738.5 (64.19)	28464.46 (64.83)
15	int on fixed capital@ 10 % annum		2192.08 (4.87)	2563.75 (5.46)	1351.806 (2.87)	1072.64 (2.48)	1055.75 (2.27)	1057.67 (2.46)	1371.83 (2.96)	1363.37 (3.10)
16	Rental value of land		10772.36 (23.94)	8778.61 (18.68)	11977.18 (25.51)	10323.84 (23.89)	10556.48 (22.71)	10210.94 (23.70)	11025.8 (25.51)	9958.34 (22.68)
16	Cost B		41008.42 (91.15)	43173.82 (91.87)	42692.56 (90.93)	39005.21 (90.26)	42253.60 (90.88)	38899.70 (90.30)	42136.2 (90.95)	39786.18 (90.62)
17	Family Labour									
a	Male		2200.00 (4.89)	2058.33 (4.38)	2040.833 (4.34)	2243.89 (5.29)	2142.70 (4.61)	2235.39 (5.19)	2175.53 (4.69)	2202.53 (5.01)
b	Female		1781.25 (3.96)	1762.50 (3.75)	2040.833 (4.34)	1962.92 (4.54)	2096.4 (4.51)	1943.58 (4.51)	2016.73 (4.35)	1913.16 (4.35)
18	Cost C		44989.67 (100)	46994.65 (100)	46947.28 (100)	43212.02 (100)	46492.80 (100)	43078.68 (100)	46453.6	43901.87 (100)

(Figure in parentheses indicates the percentages to total cost C)

5.2.6 Per hectare cost of cultivation for Gram.

The share of each items to the total cost of cultivation for gram crop i.e. cost ‘C'. The cost has determined on the basis of standard cost concept i.e. cost ‘A”, cost 'B', cost 'C', the different cost concepts have different utilities in research. Here and attempt has been made to estimate the figures of cost of gram crop of non-beneficiary farmer in the study area and presented in tables 5.13

The per hectare cost of cultivation of gram grown by the beneficiary farmers is presented in Table 5.13 It is revealed from that, in case of beneficiary farmers per hectare cost of cultivation of gram crop for the sample as a overall was Rs.49229.88. The per ha. total cost of cultivation i.e. cost ‘C’ ranges from Rs.48376.02 in large size group and Rs.49974.86 in medium size group. The per ha. cost of cultivation ranges Rs 50247.07 in small size group. Total cost i.e. cost ‘C’ was higher in small size group.

In case of beneficiary the per ha. cost of cultivation at overall level i.e. cost 'A’ and cost ‘B‘ was Rs.31557.09 and Rs.43587.13 respectively which was 64.10 per cent and 88.53 per cent of total cost i.e. cost ‘C’. The per ha. cost of cultivation i.e. cost ‘A' and cost 'B' was in large size group Rs 31753.871 and Rs.43639.85 respectively which was 65.64 per cent and 90.21 per cent of total cost i.e cost 'C' The per ha cost of cultivation in medium size group i.e. cost 'A' and cost 'B' was Rs.30746.69 and Rs.43188.47 which was 61.52 per cent and 86.42 per cent of total cost I.e. cost 'C'. The per ha. cost of cultivation in small size group is. cost 'A' and cost 'B' was Rs.32280.73 and Rs.44053.32 which was 64.24 per cent and 87.67 per cent of total cost i.e. cost 'C' respectively.

In case of small, medium, large and at overall level share of hired human labour (male + female) to total cost i.e cost ‘C’ accounted 16.21 per cent, 13.61 per cent, 12.59 per cent and 11.62 per cent respectively. This human labour used in various farm operations like ploughing, harrowing, sowing, hoeing, weeding, harvesting etc. Bullock labour accounted in case of small, medium, large and at overall level 1.20 per cent, 2.32 per cent, 1.19 per cent and 1.53 per cent respectively.

Bullock labour used in the farm operation like ploughing, harrowing, hoeing and transport the farm produce from field to farmhouse. Machines used in farm operation like ploughing, harrowing, threshing etc. It included the share in total cost i.e cost ‘C’ in case of small, medium, large and at overall level were 9.30 per cent, 7.92 per cent, 9.89 per cent and 8.83 per cent respectively. At overall level the machinery cost was higher as compared to non-beneficiary farmers.

The per hectare cost of cultivation of gram grown by the non-beneficiary farmers is presented in Table 5.13 that, in case of non-beneficiary farmer per hectare cost of cultivation of gram crop for the sample as a overall level was Rs.43348.81. The per ha. total cost of cultivation i.e. cost ‘C’ ranges from Rs.43098.33 in large size group, Rs.41819.24 in medium size group and Rs.46269.37 for small size group respectively. The per ha. Cost in case of small size group of farmer was higher as input use level was higher.

In case of non-beneficiary the per ha. cost of cultivation at overall level i.e. cost 'A’ and cost ‘B‘ was Rs.28296.12 and Rs.38783.07 respectively which was 66.66 per cent and 89.47 per cent of total cost i.e. cost ‘C’. The per ha. cost of cultivation i.e. cost ‘A' and cost 'B' was in large size group Rs.28952.91 and Rs.38856.53 respectively which was 67.18 per cent and 90.16 per cent of total cost i.e cost 'C' The per ha cost of cultivation in medium size group i.e. cost 'A' and cost 'B' was Rs.27101.45 and Rs.36840.59 which was 64.81 per cent and 88.09 per cent of total cost I.e. cost 'C'. The per ha. cost of cultivation in small size group is. cost 'A' and cost 'B' was Rs.31446.15 and Rs.41513.12 which was 67.96 per cent and 89.72 per cent of total cost i.e. cost 'C' respectively.

In case of non beneficiary farmers small, medium, large and at overall level share of hired human labour (male + female) to total cost i.e cost ‘C’ accounted 11.37 per cent, 10.03 per cent, 11.33 per cent and 11.01 per cent respectively. This human labour used in various farm operations like ploughing, harrowing, sowing, hoeing, weeding, harvesting etc. Bullock labour accounted in case of small, medium, large and at overall level 1.89 per cent, 1.62 per cent, 1.70 per cent and 1.71 per cent

Table: 5.13 Impact of per hectare cost of cultivation of Gram of beneficiary and non-beneficiary farmers of selected farm pond

(Rs./ha)

Sr. No.	Input	Size of holding							
		Small		Medium		Large		Overall	
		B	NB	B	NB	B	NB	B	NB
1	Hired human labour								
A	Male	4558.33 (9.07)	3166.67 (6.64)	3335.55 (6.47)	2479.52 (5.93)	3596.95 (7.44)	3468.25 (6.71)	3710.81 (7.53)	2736.556 (6.31)
b	Female	23687.50 (7.14)	2187.50 (4.73)	23687.50 (7.14)	1716.31 (4.10)	2489.79 (5.15)	1636.81 (4.62)	2412.643 (4.9)	1770.798 (4.70)
2	Bullock pair	604.17 (1.20)	875.00 (1.89)	1163.88 (2.32)	678.37 (1.62)	575.95 (1.19)	734.01 (1.70)	757.9762 (1.53)	745.51 (1.71)
3	Machinery	4675.00 (9.30)	1975.00 (4.27)	3960 (7.92)	1130.95 (2.70)	4783.05 (9.89)	1996.19 (4.63)	4350.286 (8.83)	1732.381 (3.99)
4	Seed	7387.50 (14.70)	7679.17 (16.60)	7020 (14.04)	8188.89 (19.58)	7602.29 (15.71)	8096.27 18.79)	7384.64 (15)	8040.635 (18.54)
5	Manures	4508.33 (8.97)	7900.00 (17.07)	4686.66 (9.37)	6833.33 (16.34)	4783.05 (9.89)	6576.48 (15.26)	4699.19 (9.54)	6918.238 (15.95)
6	Fertilizers								
A	N	314.05 (0.63)	494.43 (1.07)	297.74 (0.59)	294.94 (0.71)	313.28 (0.65)	350.50 (0.81)	308.77 (0.62)	362.61 (0.83)
B	P	2360.24 (4.70)	1943.92 (4.20)	2079.91 (4.16)	1201.62 (2.87)	2353.89 (4.87)	1838.54 (4.27)	2272.97 (4.61)	1668.539 (3.84)
7	irrigation	1333.33 (2.65)	1562.50 (3.38)	1108.33 (2.21)	698.02 (1.67)	1084.29 (2.24)	856.43 (1.99)	1141.31 (2.31)	950.119 (2.19)
8	Plant protection	750.00 (1.49)	1256.25 (2.72)	2050 (4.10)	1646.07 (3.94)	2090.14 (4.32)	1993.89 (4.63)	1990.071 (4.04)	1742.018 (4.01)

9	Depreciation	199.32 (0.40)	124.13 (0.27)	593.89 (1.18))	373.07 (0.89)	169.45 (0.35)	139.98 (0.32)	302.75 (0.61)	206.73 (0.47)
10	Incidental	441.25 (0.88)	457.08 (0.99)	353.33 (0.70)	246.93 (0.59)	373.8048 (0.77)	259.62 (0.60)	381.15 (0.77)	295.30 (0.68)
11	Land Revenue	140.00 (0.28)	140.00 (0.30)	140.00 (0.28)	140.00 (0.33)	140.00 (0.29)	140.00 (0.32)	140.00 (0.28)	140.00 (0.32)
13	cost A	32280.73 (64.24)	31446.15 (67.96)	30746.69 (61.52)	27101.45 (64.81)	31753.87 (65.64)	28952.91 (67.18)	31557.09 (64.10)	28896.12 (66.65)
14	int on fixed capital @ 10% annum	199.32 (0.40)	124.13 (0.27)	593.90 (1.18)	373.07 (0.89)	169.4465 (0.35)	139.98 (0.32)	302.7564 (0.61)	206.7363 (0.47)
15	Rental value of land	11573.26 (23.03)	9942.85 (21.49)	11847.87 (23.70)	9366.06 (22.40)	11716.53 (24.22)	9763.65 (22.65)	11727.28 (3.82)	9680.21 (22.33)
16	CostB	44053.32 (87.67)	41513.12 (89.72)	43188.47 (86.42)	36840.59 (88.09)	43639.85 (90.21)	38856.53 (90.16)	43587.13 (88.53)	38783.07 (89.46)
17	Family Labour								
A	Male	4900.00 (9.75)	3300.00 (7.13)	4905.56 (9.81)	3557.22 (8.51)	3844.66 (7.95)	3240.40 (7.52)	4374 (8.88)	3347.36 (7.72)
B	Female	114750.0 (228.37)	112500.00 (2.43)	189000.00 (378.19)	190500.00 (455.53)	106200 (219.53)	172800.0 (400.94)	132750 (269.65)	166050 (383.05)
18	Cost C	50247.07 (100)	46269.37 (100)	49974.86 (99.99)	41819.24 (100)	48376.02 (100)	43098.33 (100)	49229.88 (100)	43348.81 (100)

(Figure in parentheses indicates the percentages to total cost C)

respectively. Bullock labour used in the farm operation like ploughing, harrowing, hoeing and transport the farm produce from field to farmhouse. Machines used in farm operation like ploughing, harrowing, threshing etc. It included the share in total cost i.e cost ‘C’ in case of small, medium, large and at overall level were 4.27 per cent, 2.70 per cent, 4.63 per cent and 3.99 per cent respectively. At overall level the machinery cost was more as compared to non-beneficiary farmers.

5.3 Economics of production of selected major crops of beneficiary and non-beneficiary farmers

5.3.1 Per hectare cost and returns from Soybean

The per hectare cost and return structure of agricultural production, helps the farmer in mapping adjustment in the organization and thereby secure the optimum level of production and income. The per hectare cost and returns from soybean is presented in table 5.14

It is revealed from the table 5.14 that at in case of beneficiary overall level average gross return worked out to Rs 94869.67 The net return obtain at various costs were Rs.31557. at cost 'A', Rs.43587.13 at cost 'B', and Rs. 89555.54 at cost 'C'. The highest input-output ratio at cost 'C' was recorded in large size group i.e. 1.65 and lowest input-output ratio at cost 'C' was recorded in small size group i.e.1.42 At overall level the input-output ratio at cost 'C' was 1.65 and medium size group input-output ratio was 1.38 respectively.

In case of beneficiary farmers at small, medium, large and overall level per hectare yield of main produce obtained from soybean 19.24 qt., 22.12 qt., 24.43 qt. and 21.98 qt. respectively it was more as compared to non beneficiary farmers which has seen in table 5.14 Yield increases 4-5 qt. more than the non-beneficiary farmers here impact of farm pond shown by providing irrigation to crop in dry spell.

Table: 5.14 Impact on per hectare cost and returns on soybean beneficiary and non beneficiary farmers of selected farm ponds.

Sr. No	Particulars	Size of holding							
		Small		Medium		Large		Overall	
1	Yield	B	NB	B	NB	B	NB	B	NB
A	Main Produce	19.03	14.43	22.12	18.53	24.43	35.65	21.98	26.02
B	By produce	9.85	7.84	12.33	11.02	23.14	16.83	17.21	13.56
2	Gross return (Rs)	78582.50	59680.00	91538.33	76890.00	96501.42	77002.38	94869.67	76853.27
	Value of main produce (Rs)	76120.00	57780.00	88480.00	74134.00	198400.00	142609.50	140968.00	104800.00
	Value of By produce	2462.50	1960.00	3058.33	2756.00	5785.00	4209.50	4302.50	3392.00
3	Costs (Rs)								
	Cost A	32280.70	31446.10	30746.99	27101.40	31753.00	28952.90	31557.09	28896.10
	Cost B	44053.32	41513.12	43188.47	36840.59	43639.85	38856.53	43587.13	38783.07
	Cost C	55217.24	4636.77	58106.79	56483.00	246691.60	99021.15	89555.54	75716.89
4	Net Return Over (Rs.)								
	Cost 'A'	46302.33	28233.9	60791.34	49788.60	61363.09	44720.34	57791.32	43099.37
	Cost 'B'	34529.18	18166.88	48349.86	40049.41	44091.93	30588.30	40181.17	28592.96
	Cost 'C'	23365.26	55043.27	33431.54	20407.00	37954.98	24165.29	35168.72	21150.42
5	Input-Output Ratio at								
	Cost 'A'	2.43	1.89	2.91	2.83	2.75	2.39	2.56	2.28
	Cost 'B'	1.78	1.43	2.11	2.08	1.84	1.66	1.73	1.59
	Cost 'C'	1.42	1.02	1.57	1.36	1.65	1.46	1.59	1.38

5.3.2 Per hectare cost and returns from Tur.

The per hectare cost and returns from tur is presented in Table 5.15.

It is revealed from the table 5.15 that at in case of beneficiary overall level average gross return worked out to Rs 66360.00 The net return obtain at various costs were Rs.29738.50 at cost 'A', Rs.42136.20 at cost 'B', and Rs. 46453.60 at cost 'C'. The highest input-output ratio at cost 'C' was recorded in medium size group i.e. 1.55 and lowest input-output ratio at cost 'C' was recorded in large size group i.e.1.37. At overall level the input-output ratio at cost 'C' was 1.42 and medium size group input-output ratio was 1.39 respectively.

In case of beneficiary farmers at small, medium, large and overall level per hectare yield of main produce obtained from tur 11.82 qt., 13.11 qt., 12.50 qt. and 11.90 qt. respectively it was more as compared to non beneficiary farmers

5.3.4 Per hectare cost and returns from Gram.

The per hectare cost and returns from tur is presented in table 5.16.

It is revealed from the Table 5.16 that at in case of beneficiary overall level average gross return worked out to Rs 73490.59 The net return obtain at various costs were Rs.31557.09 at cost 'A', Rs.43587.13 at cost 'B', and Rs. 49229.88 at cost 'C'. The highest input-output ratio at cost 'C' was recorded in large size group i.e. 1.52 and lowest input-output ratio at cost 'C' was recorded in small size group i.e.1.48. At overall level the input-output ratio at cost 'C' was 1.49 and 1.40 respectively.

In case of beneficiary farmers at small, medium, large and overall level per hectare yield of main produce obtained from soybean 14.41 qt., 14.63 qt., 14.50 qt. and 8.08 qt. respectively it was more as compared to non beneficiary farmers..

Table: 5.15 Impact on per hectare cost and returns on Tur beneficiary and non beneficiary farmers of selected farm ponds

Sr. No.	Particulars	Size of holding							
		Small		Medium		Large		Overall	
1	Yield	B	NB	B	NB	B	NB	B	NB
	Main Produce	11.82	9.67	13.11	11.34	12.50	11.22	11.90	10.95
	By produce	4.67	4.13	4.70	4.44	5.25	4.23	4.55	4.27
2	Gross return (Rs)	65947.9	53991.7	73065.5	63274.02	64683.7	62552.01	66360.00	61056.73
	Value of main produce (Rs)	65014.58	53166.67	72126.39	62386.81	68750.00	61705.83	65450.00	60202.29
	Value of By produce	933.33	825.00	939.17	887.22	1050.00	846.55	910.00	854.44
3	Costs (Rs)								
	Cost A	28043.98	31831.46	29363.58	27608.73	30641.37	27631.09	29738.50	28464.46
	Cost B	41008.42	43173.82	42692.56	39005.21	42253.60	38899.70	42136.20	39786.80
	Cost C	44989.67	46994.65	46947.28	43212.03	46492.80	43078.68	46453.60	43901.87
4	Net Return Over (Rs.)								
	Cost 'A'	37903.92	22027.71	29407.75	43657.81	34042.33	34921.30	36621.49	32565.78
	Cost 'B'	24939.48	10685.35	42736.73	30328.83	22430.1	23652.69	24233.80	21244.06
	Cost 'C'	20958.23	6864.51	46991.45	26074.11	18190.90	19473.71	19806.4	17128.36
5	Input-Output Ratio at								
	Cost 'A'	2.35	1.69	2.48	2.29	2.11	2.26	2.23	2.14
	Cost 'B'	1.60	1.25	1.71	1.62	1.53	1.61	1.57	1.53
	Cost 'C'	1.46	1.15	1.55	1.46	1.37	1.45	1.42	1.39

Table: 5.16 Impact on per hectare cost and returns on Gram beneficiary and non beneficiary farmers of selected farm ponds.

Sr.No.	Particulars	Size of holding							
		Small		Medium		Large		Overall	
1	Yield	B	NB	B	NB	B	NB	B	NB
A	Main Produce	14.41	12.45	14.63	11.56	14.50	12.09	8.08	12.00
B	By produce	3.37	3.79	3.52	2.80	3.44	2.03	1.91	2.62
2	Gross return (Rs)	72927.08	63239.58	74047.22	58517.96	73382.02	60979.59	73490.59	60693.10
A	Value of main produce (Rs)	72083.33	62291.67	73166.67	57815.48	72521.43	60469.84	72627.38	60037.90
B	Value of By produce	843.75	947.91	880.55	702.48	860.59	509.75	479.52	655.20
3	Costs (Rs)								
	Cost A	32280.70	31446.10	30746.69	27101.40	31753.00	28952.90	31557.09	28896.10
	Cost B	44053.30	41513.10	43188.47	36840.59	43639.85	38856.53	43587.13	38783.07
	Cost C	50247.07	46269.37	49974.86	41819.24	48376.02	43098.33	49229.88	43348.81
4	Net Return Over (Rs.)								
	Cost 'A'	40646.38	31793.44	43300.53	31416.51	41628.15	32026.68	41933.5	31796.98
	Cost 'B'	28847.08	21726.46	30858.75	21677.37	29742.17	22123.06	29903.46	21910.03
	Cost 'C'	22680.01	16970.21	24072.36	16698.72	25006.00	17881.26	24260.71	17344.29
5	Input-Output Ratio at								
	Cost 'A'	2.25	2.01	2.40	2.16	2.31	2.11	2.32	2.10
	Cost 'B'	1.65	1.52	1.71	1.59	1.68	1.57	1.68	1.56
	Cost 'C'	1.45	1.37	1.48	1.40	1.52	1.41	1.49	1.40

5.3.4 Overall impacts on per hectare cost and returns for selected crops

Table 5.17 revealed that overall impact of farm pond on beneficiary farmers for selected major crops i.e. soybean, tur and gram. Net returns over total cost i.e. cost 'C' for soybean, tur and gram were Rs.35168.72, Rs.26118.22 and Rs.24240.71 respectively. Input-output ratios at total cost i.e. cost 'C' for soybean, tur and gram 1.59, 1.55 and 1.49, respectively.

Table 5.17 revealed that, overall impact of farm pond on non-beneficiary farmers for selected major crops i.e. soybean, tur and gram. Net returns over total cost i.e. cost 'C' for soybean, tur and gram were Rs.21150.42, Rs.26074.11 and Rs.17344.29, respectively. Input-output ratios at total cost i.e. cost 'C' for soybean, tur and gram 1.38, 1.46 and 1.40, respectively.

The soybean crop yields more net return as compare to tur and gram. Input-output ratio of beneficiary farmer for soybean crop was highest i.e. 1.59. and lowest in gram i.e. 1.43.

It could be seen from table that the R^2 value at overall level for beneficiary and non-beneficiary group was 0.80 and 0.56 respectively. At overall level regression coefficient of land in beneficiary category was 0.62 against 0.48 for non-beneficiary category. Regression coefficient of manures and fertilizers for beneficiary and non-beneficiary farm was 0.25 and 0.22 respectively. For working capital the regression coefficient for beneficiary group at overall level was 0.58 as against 0.44 for the non-beneficiary group. Thus the regression coefficients which indicate the productivity of inputs factors were in general, higher for the beneficiary farms than the non-beneficiary category.

Table: 5.17 Overall impacts on per hectare cost and returns of beneficiary and non beneficiary farmers of selected farm ponds

Sr. No.	Particulars	Selected crops					
		Soybean		Tur		Gram	
		B	NB	B	NB	B	NB
1	Yield						
	Main produce (Qtl.)	21.98	26.02	13.11	11.34	8.08	12.00
	By produce	17.21	13.56	4.70	4.44	1.91	2.62
2	Gross Return (Rs.)	94869.67	76853.27	73065.5	63274.02	73490.59	60693.10
	Value of main produce (rs)produce	140968.00	104800.00	72126.39	62386.81	72627.38	60037.90
	Value of by produce (Rs.)	4302.50	3392.00	939.17	887.22	479.52	655.20
3	Cost (Rs.)						
	Cost ' A'	31557.09	28896.10	29363.58	27608.73	31557.09	28896.10
	Cost 'B'	43587.13	38783.07	42692.56	39005.21	43587.13	38783.07
	Cost 'C'	89555.54	75716.89	46947.28	43212.03	49229.88	43348.81
4	Net Return Over (Rs.)						
	Cost 'A'	57791.32	43099.37	29407.75	43657.81	41933.5	31796.98
	Cost 'B'	40181.17	28592.96	42736.73	30328.83	29903.46	21910.03
	Cost 'C'	35168.72	21150.42	26118.22	26074.11	24260.71	17344.29
5	Input-Output Ratio at						
	Cost 'A'	2.56	2.28	2.48	2.29	2.32	2.10
	Cost 'B'	1.73	1.59	1.71	1.62	1.68	1.56
	Cost 'C'	1.59	1.38	1.55	1.46	1.49	1.40

5.4 Impact of farm pond on productivity of various inputs

Table 5.18 Production function estimates for beneficiary and non-beneficiary farms

Sr. No.	Input	Regression coefficient							
		Small		Medium		Large		Overall	
		B	NB	B	NB	B	NB	B	NB
1	Intercept	2.95 (0.47)	2.63 (0.42)	0.93 -(0.02)	2.50 (0.40)	3.21 (0.55)	4.44 (0.64)	2.45 (0.33)	3.15 (0.49)
2	Land (X_1)	0.77** (0.22)	0.49** (0.23)	0.70 (0.40)	0.63** (0.40)	0.44** (0.08)	0.38 (0.55)	0.62** (0.23)	0.48** (0.39)
3	Human labour (X_2)	0.24 (0.26)	0.35** (0.22)	0.44 (0.54)	0.20 (0.27)	0.12 (0.70)	0.08 (0.60)	0.24 (0.50)	0.20 (0.36)
4	Bullock labour (X_3)	0.12 (0.21)	0.08 (0.23)	0.11 (0.36)	-0.02 (0.24)	-0.063 (0.35)	0.02 (0.92)	0.059 (0.30)	0.02 (0.46)
5	Manures and fertilizers (X_4)	0.23** (0.05)	0.21 (0.11)	0.29 (0.33)	0.27 (0.62)	0.25** (1.08)	0.19 (0.09)	0.25** (0.48)	0.22 (0.27)
6	Working capital (X_5)	0.56** (0.12)	0.44** (0.07)	0.60** (0.16)	0.50 (0.11)	0.60** (0.16)	0.44 (0.11)	0.58* (0.14)	0.44 (0.09)
	R^2	0.77	0.56	0.82	0.61	0.80	0.59	0.80	0.56

Note: *, ** indicates significance at 1 per cent and 5 per cent level of significance respectively.

Higher regression coefficient and consequently the higher factor productivity for beneficiary farms were obviously due to farm pond availability on these farms. Farm pond availability ultimately made more water available for irrigation on beneficiary farms which resulted in increasing the productivity of land, manures and fertilizers which directly affect the crop yield.

Intergroup comparison revealed that the regression coefficients of land, manures and fertilizers and working capital for small category of farm in beneficiary groups were higher than the non-beneficiary groups. Same trend was seen in case of medium group of farmers. For large group of beneficiary category the regression coefficient of land, manures and fertilizers and working capital were higher than the large farms of non-beneficiary category. The study thus reveals that the

productivity of the input factors on farms of the beneficiary group was higher than the non-beneficiary group. Thus, farm pond availability has resulted in increasing factor productivity on beneficiary farms. This finding has been proved in table 5.19.

Table 5.19. Marginal value products of input

Sr. No.	Factor	Beneficiary	Non-beneficiary
1	Land	11620.88	6459.59
2	Human labour	0.66	0.40
3	Bullock labour	0.79	0.30
4	Fertilizers and manures	4.15	3.50
5	Working capital	1.07	0.27

It could be seen from this table that the marginal value product (MVP) of land, bullock labours, manures and fertilizers and working capital at overall level of beneficiary farms was higher than non-beneficiary farms. This higher (MVP) of input factors on beneficiary farms indicate higher input productivity on these farms.

CHAPTER VI

SUMMARY AND CONCLUSION

The availability of irrigation not only increases agricultural production but also result in over all socio-economic development of rural masses. The present study deals with the “Comparative Economics of Farm Ponds Beneficiary and Non- Beneficiary Farmers in Malegaon Tahasil of Washim District.” The present study was undertaken to analyze costs and return of major crop production and to analyzed resource use efficiency of major crops of beneficiary and non-beneficiary farmers. Although there are some defects in production like scarcity of water, lack of financial facility, high cost of fertilizer and less availability of human labour. It is an attempt to identify the problems faced by beneficiary and non-beneficiary farmers.

The study entitled “Comparative Economics of Farm Ponds Beneficiary and Non-Beneficiary Farmers in Malegaon Tahasil of washim District” was under taken with following objectives.

1) To study the socio-economic characteristics of the selected beneficiary and non-beneficiary farmers.
2) To study the per hectare input utilization in major crops by the selected farmers.
3) To examine the economics of production of major crops of selected farmers.
4) To examine the impact of farm ponds on the productivity of various inputs.

The study has been undertaken in Washim district of Vidarbha region. Primary data was collected from alegaonr tahasil and 10 villages are selected purposely, from these villages each of 5 beneficiary having farm pond in their field and 5 non beneficiary farmers without farm pond in their field were selected and overall 50 each beneficiary and non-beneficiary farmers were selected for present study. The data pertain for the year 2017-18

The socio-economic characteristic of farmers i.e. size of family, educational status, land utilization pattern and cropping pattern were studied. The standard cost concept i.e. Cost 'A', Cost 'B' and Cost 'C' were used for working out per hectare cost and return. The Cobb-Douglas production function was use to study the resource use efficiency in major crops production. The necessary information from selected beneficiary and non-beneficiary farmers was collected by survey method in the prescribed schedules for the year 2017-18. The collected data was tabulated analyzed and results are discussed. The results of the study are summarized as follows. On the basis of average size of holding of each 50 beneficiary and non-beneficiary farmers are categorized in to small, medium and large size of holding in case of beneficiary contributed 1.51 hectare, 2.45 hectare and 4.91 hectare area, respectively. Average size of holding was 3.49 hectare for overall 50 beneficiary farmers. In case of non-beneficiary contributed 1.61 hectare, 3.10 hectare and 4.38 hectare, respectively. Average size of holding was 3.44 hectare for overall 50 non-beneficiary farmers.

In case of beneficiary the average family size of selected farmers was share of male in family size was highest in small size group of non- beneficiary farmers i.e. 45.01 percent followed by medium size group of non- beneficiary farmers i.e. 37.05 percent and small size group of beneficiary farmers is i.e. 30.09 percent. Whereas, share of female in family was highest in small group of non- beneficiary farmers i.e. 45.16 percent followed by small size group of beneficiary farmers i.e. 35.81 percent. And lowest in large size group non beneficiary farmers i.e. 29.16 percent. The share of children in family size was observed highest in medium size group of beneficiary farmers. i.e. 38.45 percent.

In case of beneficiary educational status at overall level illiterate percentage of beneficiary farmers was 36.00 percent and a non beneficiary farmer was 28.05 percent. Among the different size group percent of illiteracy was observed higher in small size group i.e.38.88 percent in non beneficiary farmers and 30.23 percent in beneficiary farmers. In medium size group illiteracy among beneficiary farmers was

25.67 per cent and among non-beneficiary farmers it was 27.27 per cent. In large group of farmers illiteracy among beneficiary farmers was 1.69 per cent and among non-beneficiary farmers it was 1.02 per cent. Thus, least illiteracy was found among beneficiary farmers in large size group of farmers. Percentage of primary school was observed highest in small size group of non- beneficiary farmers(55.56 percent). Percentage of secondary education was observed highest in Large size group of beneficiary farmers (52.15 per cent). The percentage of higher education was observed highest in beneficiary farmers of large size group i.e. 39.11 per cent. Percentage of farmers having graduate level education was highest in large size group of farmers i.e. 9.77 percent in beneficiary farmers.

Average area under irrigation per farm was higher for beneficiary group (1.72hectare) than the non-beneficiary group (0.17 hectare). gross cropped area at overall level for beneficiary and non-beneficiary farms was 6.06 hectares and 5.12 hectares respectively. Cropping intensity which shows the intensity of land use was about 175.43 per cent for beneficiary farm and 162.90 per cent for non-beneficiary farms. Thus, cropping intensity of beneficiary farms was higher than non-beneficiary farms. Availability of farm pond which leads to water conservation might have increased water availability for irrigation which further resulted in growing of more than one crop in a year and thus, in higher cropping intensity on beneficiary farms

In non-beneficiary percentage of farmers possessing important implements like plough, harrow, tiffan and bullock cart was less than beneficiary groups. The proportions of farmers possessing animals in non-beneficiary group were less than beneficiary group. Per farm availability of implement, machinery and livestock at overall level on beneficiary farm was higher than the non-beneficiary farm.

Per hectare input utilization for soybean crop at overall level, The beneficiary farmer per hectare cost of cultivation of soybean for overall level the use of various inputs for soybean on beneficiary farms was slightly higher than non-beneficiary farms. Beneficiary farmers used 20.04 male labour days per hectare against 19.66 male labour days by the non-

beneficiary farmers. Use of female labour days was16.96 days on beneficiary farms and 18.22 days on non-beneficiary farms. Use of seed and farm yard manure per hectare did not vary much among the beneficiary and non-beneficiary farms. Use of chemical fertilizers on beneficiary farms was slightly higher than the non-beneficiary farms. Intergroup comparison of beneficiary and non-beneficiary farms also revealed the same trend.

Per hectare input utilization for Tur crop at overall level, Use of manure on beneficiary farm was clearly more of non-beneficiary farms. Beneficiary farmers applied slightly more quantity of fertilizers than the non-beneficiary farms Use of male labour days on beneficiary farms (10.87 days) and non-beneficiary farms (11.01 days), same was the case with female labour days (13.44) days on beneficiary farms and (12.75) days on non-beneficiary farms).

Per hectare input utilization for Tur crop at overall level input utilization for gram crop use of male labour days (18.26 days on beneficiary farms and 13.68 days on non-beneficiary farms), seed (73.04 kg on beneficiary farms and 72.40 kg on non-beneficiary farms) and manure (23.49) on beneficiary farms and (21.99) on non-beneficiary farms) on beneficiary farms and non-beneficiary farms differed slightly. Use of chemical fertilizers on beneficiary farms was also higher than the non-beneficiary farms. The beneficiary farmers are in contact with the extension agencies who provide them the technical guidance and also explain them the need of application of crucial inputs to the crop for getting higher production.

The beneficiary and non-beneficiary farmers per hectare cost of cultivation of soybean crop for the sample as an overall was per ha. total cost of cultivation i.e. cost ‘C' ranges from Rs.89555.54 in large size group it was Rs.246691.6 in medium size group it was Rs.58106.79 and in case of small size group of farmer it was Rs. 55217.24 respectively. The per ha. cost of cultivation for Large farmers was Rs.89555.54 Higher total cost on large size farmer was obviously due to higher use of input.

The per ha. overall cost of beneficiary farmers cost ‘A’ was Rs.37334.00 and non- beneficiary farmer It was 33504.77.00. and cost B it was Rs.58850.00 in beneficiary farmer and non beneficiary it was 48011.18. The per ha overall. cost of cultivation in large size group beneficiary and non beneficiary farer it was 69350.16 (28.11) and 32282.04 (32.60) per cent. The per ha cost of cultivation in medium size group of beneficiary and non-beneficiary farmers it was 37134.00(63.90) and 31443.68 (55.72)

The per ha. Cost of cultivation in small size group of beneficiary and non beneficiary farmers cost B it was Rs.54850.00 (61.24). percent. And 48011.18(63.40). In non-beneficiary group costs were lower as compared to beneficiary farmers as there was low level of input used.

The per hectare cost of cultivation of tur in case of non-beneficiary farmer per hectare cost of cultivation of tur crop for the sample as a overall level was Rs.43928.37. The per ha. total cost of cultivation i.e. cost ‘C’ ranges from Rs.43078.68 in large size group, Rs.43212.02 in medium size group and Rs.47127.15 for small size group respectively. The per ha. cost in case of small size group of farmer was higher as input use level was higher.

In case of non-beneficiary the per ha. cost of cultivation at overall level i.e. cost 'A’ and cost ‘B‘ was Rs.28490.96 and Rs.39812.68 respectively which was 64.86 per cent and 90.63 per cent of total cost i.e. cost ‘C’. The per ha. cost of cultivation i.e. cost ‘A' and cost 'B' was in large size group Rs.27631.09 and Rs.38899.70 respectively which was 64.14 per cent and 90.30 per cent of total cost i.e cost 'C' The per ha cost of cultivation in medium size group i.e. cost 'A' and cost 'B' was Rs.27608.73 and Rs.39005.21 which was 63.89 per cent and 90.26 per cent of total cost I.e. cost 'C'. The per ha. Cost of cultivation in small size group is. cost 'A' and cost 'B' was Rs.31963.96 and Rs.43306.32 which was 67.58 per cent and 91.89 per cent of total cost i.e. cost 'C' respectively.

The per hectare cost of cultivation of gram in case of beneficiary farmers per hectare cost of cultivation of gram crop for the sample as a overall was Rs.49229.88. The per ha. total cost of cultivation

i.e. cost ‘C’ ranges from Rs.48376.02 in large size group and Rs.49974.86 in medium size group. The per ha. cost of cultivation ranges Rs 50247.07 in small size group. . Total cost i.e. cost ‘C’ was higher in small size group.

In case of beneficiary the per ha. cost of cultivation at overall level i.e. cost 'A’ and cost ‘B‘ was Rs.31557.09 and Rs.43587.13 respectively which was 64.10 per cent and 88.53 per cent of total cost i.e. cost ‘C’. The per ha. cost of cultivation i.e. cost ‘A' and cost 'B' was in large size group Rs 31753.871 and Rs.43639.85respectively which was 65.64 per cent and 90.21 per cent of total cost i.e cost 'C' The per ha cost of cultivation in medium size group i.e. cost 'A' and cost 'B' was Rs.30746.69 and Rs.43188.47 which was 61.52 per cent and 86.42 per cent of total cost I.e. cost 'C'. The per ha. cost of cultivation in small size group is. cost 'A' and cost 'B' was Rs.32280.73 and Rs.44053.32 which was 64.24 per cent and 87.67 per cent of total cost i.e. cost 'C' respectively.

Higher regression coefficient and consequently the higher factor productivity for beneficiary farms were obviously due to farm pond availability on these farms. Farm pond availability ultimately made more water available for irrigation on beneficiary farms which resulted in increasing the productivity of land, manures and fertilizers which directly affect the crop yield.

The marginal value product (MVP) of land, bullock labours, manures and fertilizers and working capital at overall level of beneficiary farms was higher than non-beneficiary farms. This higher (MVP) of input factors on beneficiary farms indicate higher input productivity on these farms.

CHAPTER VII

IMPLICATION

The present study entitled “Comparative economics of farm ponds beneficiary and non-beneficiary farmers in Malegaon Tahasil of Washim district” was to examine the impact of farm ponds on major crops in Washim district and study the economics of major crops. Implication emerging from this study are reported in this section are as follows.

Impact of farm pond’s on farmer’s economy was implicated here it increase the irrigated area of farmer held and giving additional support to crop in dry spell.

It also increase the number of crop growing throughout the year to beneficiary farmers. Also increased the area of *rabi* crop and summer crop.

Abuse or sediment of farm pond, farmer had remove from it and spread in their field that resulting increasing soil fertility and also crop production and minimize the loss of soil and water erosion from their field they constructed water conservation structure like farm pond.

To cope up with such problems our government, since long is trying their best, but nothing concrete could done. Farmers should come forward through their own organization to help themselves.

CHAPTER VIII

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Date : / / 2018

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SCHEDULE

1) General Information:

a) Name of the cultivator :

b) Village :

2) Information on land:

A) Total land holding (ha) :

B) Irrigated land :

C) Unirrigated land :

a) Permanent fallow :

b) Current fallow :

D) Area under crop :

E) Source of irrigation :

F) Land value :

3) Information about family member:

Sr. No.	Name of member	Sex	Age	Relation with head family	Education	Occupation main/ subsidiary	Monthly income

4) Details of land holding:

Sr. No.	Particulars	Land holding in hectare
1	Total land holding	
2	Fallow land	
3	Net cultivated area	
4	Area under irrigation	
5	Double cropped area	
6	Total cropped area	
7	Cropping Intensity	

5) Inventory of implements and machinery for the year 2017-2018

Sr. No.	Name of Implement/ Machinery	Number	Present value (Rs.)	Remaining life in year
1	A) IMPLEMENTS a) Plough			
	b) Harrow			
	c) Tiffan			
	d) Hoe			
	e) Bullock cart			
2	MACHINERY a) Tractor			
	b) Electric pump			
	c) Sprayer			
	d) Duster			
	e) Harvester			

6) Information on Livestock

Sr. No.	Type	No.	Breed	Age	If home breed present price	Year in which cattle is purchased	Purchasing price of cattle	Remaining life in year
1.	Bullock							
2	Milch Animal a) Buffalow b) Cow							
3	Other animal a) Goat b) Poultry Birds c) Hen d) Duck							

7) Cropping Pattern 2017-18

Sr. No	Season	Crop	Variety	Area under crop (ha.)		Total area
1	Kharif					
2	Rabi					
3	Summer					

8) Per hectare input used for crop (2017-18)

Name of the crop :

Sr. No.	Particulars	Quantity	Rate	Total cost
1	Human labour (Days) a) Male			
	b) Female			
2	Bullock labour (Days)			
3	Seed (kg.)			
4	F.Y.M (C.L.)			
5	Fertilizer (Kg.) N (Kg.)			
	P (Kg.)			
	K (Kg.)			
6	Plant protection (Rs.) a) Insecticide			
	b) Pesticide			
7	Tractor (Hrs.)			

9) Cost of Cultivation (2017-18)

Name of the crop :

Sr. No.	Item	F r equenc y	Human labour days				Bullock labour		Tractor		Material used	Total value
			Hired		Wages/hr		No. of pair	Wage Rate	Hr	Wage per hrs		
			M	F	M	F						
1	Ploughing											
2	Harrowing											
3	Carting and spreading manures											
4	Sowing											
5	Hoeing											
6	Weeding											
7	Seeds											
8	Fertilizer Application N P K											
9	Plant Protection a)Spraying b) Dusting c) Other											
10	Harvesting											
11	Threshing											

12	Land Revenue (Rs.0											
13	Depreciation cost (Rs.)											
14	Incidental charges											
	Total											
15	Interest on working capital @6 % per annum											
	Cost A											
16	Rental value of land											
17	Interest on fixed capital @ 10 % per annum											
	Cost B											
18	Family labour charges Male Female											
	Total cost i.e. Cost C											

Output:

1. Main product :

   a) Rate :

   b) Value :

2. By product:

   a) Rate :

   b) Value :