AERC STUDY No. 45

STATUS AND UTILIZATION PATTERN OF INPUT SUBSIDIES IN PUNJAB AGRICULTURE

D K GROVER
J M SINGH
SANJAY KUMAR
JASDEV SINGH

Study sponsored by Ministry of Agriculture and Farmers Welfare

AGRO-ECONOMIC RESEARCH CENTRE
Department of Economics and Sociology
Punjab Agricultural University
Ludhiana

February, 2018

DATA COLLECTION/COMPILATION TEAM

SATWINDER SINGH

PARMINDER SINGH

TEJINDER KAUR DHALIWAL

TABLE OF CONTENT

LIST OF TABLES

PREFACE

Input subsidies are given in the farming sector to encourage the farmers to use the resources judiciously to get the desired yield level of various crops. The direct subsidy benefit is realized by the farmers in monetary terms by reduction in price of inputs/ farm machinery etc. while indirect subsidies, which are mostly given especially for fertilizer, electric power use/ fuel etc. in farming sector. The major concern of the policy planners is to rationalize the agricultural subsidies which occasionally result in the over-use/ exploitation of highly subsidized inputs. Farmer lobbies/ unions often strongly advocate the need for continuation of farm subsidies for helping the already distressed farming sector. It is pertinent to mention here that the quantum of subsidy benefit realized by various farm categories be investigated in order to frame future policies for the benefit of deprived sections/ class within the farming sector.

In view of the above cited reasons the present study has been undertaken to study the trends and utilization pattern of input subsidies in Punjab agriculture. This attempt can be helpful to the policy makers to frame blueprint for the benefit of farming community in general and lower strata of peasants in particular for forming future strategies/ policies.

We express our gratitude to Directorate of Economics and Statistics, Ministry of Agriculture and Farmers Welfare, Government of India, New Delhi for financial support to take up this study.

Authors

STATUS AND UTILIZATION PATTERN OF INPUT SUBSIDIES IN PUNJAB AGRICULTURE

Abstract

Subsidy is usually given to remove some type of burden and is often considered to be in the interest of the public. Subsidies in Indian agriculture can be classified into two broad categories viz., direct and indirect subsidies. Direct subsidies are implemented through various schemes in agricultural sector by the Government and indirect subsidies confine itself to three major inputs viz., fertilizer, irrigation and power. Keeping the importance of subsidies in Indian agriculture, the present study was designed to study the trends and utilization pattern of input subsidies in Punjab agriculture along with quantum of subsidy intensity benefit realized by various farmersô categories. The data were collected from 180 farm households representing all the farm categories from three districts representing different agro-climatic zones while the reference year of the study was 2014-15. The economic analysis of the data collected from farm households regarding crops grown namely; paddy, paddy-basmati, cotton, maize, sugarcane wheat and potato, revealed that the total variable cost on per hectare basis was found to vary between Rs. 82780 for sugarcane to Rs. 25651 for wheat crop. Also, the returns over variable cost fetched from sugarcane (Rs. 103734) were the highest on per hectare basis and the lowest for maize (Rs. 16294). The direct subsidy scenario based upon secondary data collected revealed that the input subsidy provided by Department of Agriculture was on wheat seed was to the tune of Rs. 500 per quintal for the years 2012-13 and 2013-14, which increased to Rs. 700 per quintal during 2014-15. The amount of subsidy provided for agricultural machinery increased from Rs. 0.74 crore during 2002-03 to Rs. 62.74 crore during 2014-15. The amount of subsidy disbursed by the Department of Horticulture in Punjab under NHMS amounted to Rs. 5.39 crores during 1990-91, peaked at Rs. 76.88 crores during 2012-13 and then declined to Rs. 44.24 crores during 2014-15. The subsidies under RKVY peaked at Rs. 12.95 crores during 2013-14 and then declined to Rs. 8 crores during 2014-15. As far as indirect subsidies are concerned, the fertilizer subsidy in Punjab has followed a decreasing trend from 2010-11 to 2014-15; it decreased from Rs. 4581 crore to Rs. 3492 crore. The total cost of supply of electricity to agriculture increased from Rs. 900 crore in 2002-03 to Rs. 4454 crore during 2014-15.The electricity supply to agriculture sector is free. The per unit cost/subsidy in agriculture has also been continuously increasing from Rs. 1.55 in 2002-03 to Rs. 4.19 in 2014-15. The level of direct subsidies availed by large and medium farms were the highest for farm machinery, while the marginal, small and semi-medium farms availed highest subsidy on the wheat seed. Crop-wise input subsidy analysis based upon primary data collected from selected farm households revealed that without subsidy there was increase in cost of growing paddy by 24.18 per cent followed by wheat (22.78%), basmati-paddy (18.60%), potato (14.56%), maize (14.06%) sugarcane (12.04%) and cotton (10.36%). On the contrary, the net returns in potato growing declined by 52.44 per cent followed by maize (27.70%), cotton (14.37%), paddy (13.06%), wheat (11.13%) sugarcane (9.60%) and paddy (13.06%). In overall crop production (including fodder), it was found that without subsidies there was an overall increase in the cost of crops by 19.24 per cent while net returns declined by 12.66 per cent. On large farms there was highest increase in total cost per hectare without availing the benefit of subsidy followed by other farm categories The per cent increase in cost without subsidy for growing all the crops was highest on large farms (24.38%) followed by medium, semi-medium, small and marginal farms. This shows the higher subsidy benefit accrued by the large, medium and semi-medium category farmers in crop cultivation as compared to small and marginal farmers. As far as fertilizer subsidy is concerned, larger share in fertilizer subsidy benefit was enjoyed by large farmers as compared to farmers from other farm categories. Per hectare crop-wise fertilizer subsidy revealed that biggest chunk of fertilizer subsidy worked out in case of potato (Rs.8990) followed by sugarcane, wheat, paddy, cotton, maize and basmati crop. The crop-wise difference in fertilizer use attributed to higher fertilizer subsidy in case of potato and sugarcane crops. Farm category- wise analysis showed higher benefit realized by medium and large farmers in majority of the crops. The crop-wise fertilizer subsidies on per farm basis revealed that the quantum of fertilizer subsidy was highest in case of wheat crop followed by other crops. Thus, nearly 70 per cent of the total subsidy on fertilizers attributed to cultivation of wheat and paddy crops due to higher area under these crops. The crop-wise per hectare power subsidy revealed that power subsidy in case of paddy crop, worked out at Rs.4289 per hectare followed by sugarcane, basmati, potato, maize, wheat and cotton. Thus, the crops requiring higher number of irrigations accrued higher proportion of power subsidy realized by the agricultural sector. On per hectare basis, the maximum benefit of power subsidy was realized by large and medium category farmers as compared to other farmer categories. As far as diesel subsidy is concerned, it was Rs. 391 per hectare in sugarcane crop followed by paddy, basmati, maize and cotton. Farm category wise analysis revealed that diesel subsidy benefit was highest on semi-medium, medium and large farms as compared to marginal and small farms. The extent of diesel subsidy was higher for sugarcane and paddy crops due to higher generator/ diesel engine use for irrigating these crops particularly in hot summer months. Thus, higher benefit of diesel subsidy was enjoyed by large and medium farmers as compared to farmers from other farm categories due to higher area under crop cultivation. The quantum of total direct subsidy received per hectare in aggregate was highest on medium category farms followed by marginal, small, semi-medium and large farms. On per farm basis also it was highest on medium farms followed by large, semi-medium, small and marginal farms. This shows the disparity in disbursement of direct subsidies. The benefit of indirect subsidies availed by the farmers revealed that per hectare indirect subsidy realized by the large farmers was highest being Rs.8531 per hectare followed by medium, semi-medium, small and marginal farmers. Therefore, indirect subsidies benefits were largely accrued by large and medium category farmers as compared to small and marginal farmers. In order to see the quantum of subsidy intensity availed farm households were categorized into three groups i.e. low, medium and high by using cube-root cumulative frequency method. The distribution of sample households on the basis of total agricultural subsidy availed per hectare revealed that 36.67 per cent of the households fell in the low subsidy group of up to Rs. 5818 followed by 33.33 per cent in Rs. 5819-7572 group and remaining 30 per cent in > Rs.7572 group . It was seen that higher number of households fell in low subsidy group as compared to medium and high subsidy groups. Majority of the marginal and small farmers fell in low subsidy farm group while semi-medium farmers fell in both low and medium subsidy groups and large and medium category farmers in medium and high subsidy groups. The crop-wise analysis revealed that there was higher subsidy benefit realized by high subsidy intensity farms comprising large and medium farm categories. Also, quantum of fertilizer, power and diesel subsidy benefit was higher on high subsidy intensity farms as compared to medium and low

subsidy intensity farms. Major policy recommendations included that the direct subsidy benefit should be target group based especially for small and marginal farmers since major chunk of direct subsidies are taken by medium and large category farmers and hence should be totally discontinued for this group. The resultant savings by way of withdrawal of direct subsidies, this benefit should be given to marginal and small farmers to improve their economic lot. In case of indirect subsidies, especially fertilizer and power subsidies, these should be continued for marginal and small farmers in the present form and it should be given to the medium and large farmers with a rider. Nominal charges for power usage by medium and large category farmers in agricultural sector can be one of the options. These policy issues can be helpful in rational use of agricultural subsidies and bridge the farm category gap and disparity in agricultural sector.

CHAPTER-I

INTRODUCTION

1.1 Background

Subsidy is a benefit given by the Government to groups or individuals usually in the form of a cash payment or reduction in price of a service/commodity. It is usually given to remove some type of burden and is often considered to be in the interest of the public. There are often considerable opportunities for both raising productivity and reducing costs (Crawford *et al.*, 2006; Morris *et al.*, 2007; Jayne *et al.*, 2009; Bumb *et al.*, 2011). In developing countries, agricultural production is characterized by low level of input use, conventional production techniques and uncertain conditions resulting into lower yields and hence low per capita availability of food. One of the institutional supports to agriculture development in India has been that of fiscal incentives in the form of input subsidies (Mundle and Rao 1991, AERC Karnataka). Agricultural input subsidies are just one of four ways of improving the profitability of input use, the others being (a) raising physical productivity of inputs (through adaptation of technologies and farmersô learning how to manage them, and when and when not to use them); (b) reducing the costs of input purchases by increasing efficiencies (for example, in fertilizer or seed production and/or delivery systems); and (c) increasing output prices (with either high consumer prices or with subsidies funded by tax payers).

The reduced cost of subsidized inputs increase their profitability and reduce the risks perceived by farmers with a limited knowledge of input benefits and of correct usage. With credit and extension services, input subsidies were supposed to help farmers implement, benefit from, and with later subsidy withdrawal buy and use inputs on their own; rapid learning about input use and benefits would mean that subsidies should be needed for only a short time and could be rapidly phased out. However, subsidies were often subsequently implemented more widely with pan territorial pricing to support agricultural development in more remote areas, and to counteract taxes on agriculture through export tariffs, managed exchange rates, and controls on domestic prices (Chirwa and Dorward, 2013).

The substantial success of the Green Revolution in Asian countries in driving growth and poverty and reduction is widely recognized but, implicitly or explicitly, this is often considered to have been achieved despite, rather than assisted by, input subsidies (Economist Intelligence Unit, 2008). The importance of subsidies in promoting agricultural growth in situations recognised through having the greatest effect on food staples in large countries with high physical returns from input use. Djurfeldt *et al* (2005) argue that input subsidies

were a critical element in Green Revolution policies across a range of Asian countries. Fan *et al.* (2007) estimate a significant contribution of input subsidies to growth and poverty reduction in India in the early stages of the Green Revolution but not later (although estimated returns to some other investments such as agricultural research were higher). Dorward *et al* (2004) argue that sustained (but not indefinite) input subsidies were a major part of successful Green Revolution packages, making a critical contribution to thickening and thus ókick startingô markets, first within staple food supply chains and then in the wider rural economy.

Agricultural sector in India is subsidized to emphasize upon increasing the use of inputs and thus enhancing the productivity of crops and thereby production. Empirical studies show that subsidies cause considerable increase in production of crops. During the last decade or so, farm subsidies have emerged as an important issue in various policy debates especially emphasizing their use in the green revolution belt of the country. It is very clear that increasing or maintaining the trend-rate of growth of agricultural output in future would require large agricultural investments, particularly public investment for developing infrastructure and sustaining our land and water resources.

Subsidies in Indian agriculture can be classified into two broad categories viz., direct and indirect subsidies. Direct subsidies are implemented through various schemes in agricultural sector by the government and indirect subsidies confine itself to three major inputs viz., fertilizer, irrigation and power. Presently, the input subsidies are the far most expensive instrument of Indiaôs food and agricultural policy regime, requiring a steadily larger budget share. The government pays fertilizer producers directly in exchange of selling fertilizer at lower than market prices. Irrigation and electricity, on the other hand, are supplied directly to the farmers at prices that are below the production cost. The cost of agricultural input subsidies as a share of agricultural output almost doubled from 6.0 per cent in 2003-04 to 11.6 per cent in 2009-10, driven by large increase in the subsidies to fertilizer and electricity (Arora, 2013). However, farm subsidies are reported to be crowding out the public investment and are not sustainable beyond a limit and time-period. Other serious problems due to continued subsidies are the degradation of land and water resources and their impact on sustainability of agricultural growth. As per reports, the subsidies prompt the end-users to overuse the services/ inputs resulting in soil degradation, soil nutrient imbalances, environmental pollution and ground water depletion, all of which result into decreased effectiveness of inputs and cause loss to the society as a whole.

Though subsidies as incentives are effective in pushing agricultural growth to a certain extent, but it is important to make their rational use and also it should be ensured that they do not become a permanent feature of the economy. It is high time to take a fresh look at the issue of farm input subsidies. Thus, this study will serve as a baseline for evolving pragmatic policies in this direction.

1.2 Objectives of the study

The study will be taken up with the following specific objectives:

i) To study the trends and distribution pattern of various input subsidies provided by the Union and State Governments to farm sector in Punjab.

ii) To examine the utilization pattern of subsidies by different categories of farmers.

iii) To analyze the overall effect of differences in the levels of input subsidy used by various categories of farmers on crop pattern, cropping intensity, adoption of improved technology, input use, crop productivity and returns.

iv) To suggest policy measures for rational use of such subsidies in farm sector to further improve the farming lot in Punjab.

1.3 Review of literature

Sharma, (1982) examined the impact of agricultural subsidies on national income and agricultural production. For this purpose the author used the time period from 1970-71 to 1981-82 and a general equilibrium model. The study revealed that during this period, agricultural subsidies affected the national income and agriculture production positively.

Gupta, (1984) tried to analyse the agricultural subsidies in India from 1970-71 to 1982-83. The author used linear regression model. The study showed that during this period, the use of agricultural subsidies increased at faster rate but there was a large inter-state disparity.

Gulati (1989) found out somewhat regressive pattern in the distribution of input subsidies across the states. It is perhaps also indicative of declining efficiency in the use of input subsidies as agricultural incomes go up. This is because states with high agricultural incomes are the ones that exhibit higher subsidies.

Ratna and Sharma (1992) concluded that input subsidies are better than output subsidies when wages are not protected. Strong income effect, which is generated by wage indexation results in the reversal of this conclusion, i.e. output subsidy becomes preferable to input subsidy. In comparison to price subsidies, investment on irrigation certainly promotes income distribution and perhaps also growth.

Ratnareddy and Deshpande (1992) argued that the withdrawal of subsidies is not warranted, as this would reduce the input use in low productive areas, depressing the further process of growth. It may also hurt the small and marginal farmers, as they do not have significant marketable surplus.

Paroda (2000) observed that there is a growing criticism against the continuance of agricultural input subsidies particularly on fertilizer, irrigation, power and credit for some reasons. First, these subsidies are fiscally not sustainable. Second, they also encourage misuse of resources leading to land-degradation, water logging, depletion of ground water resources, soil salinity, etc. Third, they crowed out public investment resources adversely affecting the overall agricultural growth. Further, most of the subsidies given as incentives and support in the name of the poor, rarely reach the poor or small farmers and are usually concerned by the rich farmers.

Vaidyanathan (2000) reported that increase in input prices will of course induce farmers to reduce the quantum of inputs used. Both the water and fertilizers are used far less efficiently than is feasible with currently available knowledge and techniques. A reduction in the quantum of these inputs, therefore, does not necessarily mean a reduction in the volumes of production or income. Higher input prices will in fact create a strong inducement for more careful management of inputs.

Badi and Badi (2002) reported that the consumption of fertilizers observed to be varied from state to state. The consumption pattern of fertilizers has direct relevance to output pattern of crops i.e. states consuming more nutrients is producing more grains. States like Punjab, Haryana, Tamil Nadu, Andhra Pradesh and Uttar Pradesh have higher consumption, while states like Assam, Madhya Pradesh and Rajasthan have very low consumption. Even though such states are consuming very low volume of fertilizers, India is not self-sufficient in fertilizer production and about 30 per cent of the need is met by imports. Even after subsiding fertilizers to a very great extent, the consumption of certain states are very low, if there was no subsidy at all, the consumption pattern of fertilizer would have been still very low.

Gulati and Sudha Narayanan (2003) stated that all of these subsidies, by reducing the prices of the inputs, served in the initial stages of green revolution, as incentives to the farmers for adopting the newly introduced seed-cum-fertilizer technology. These helped in raising the agricultural output, after some time, the amount paid on these subsidies began to rise. The input subsidies have often been accused of causing most harmful effect in terms of reduced public investment in agriculture on account of the erosion of investible resources, and wasteful use of scarce resources like water and power. Further, apart from causing

unsustainable fiscal deficits, these subsidies by encouraging the intensive use of inputs in limited pockets have led to lowering the productivity of inputs, reducing employment elasticity of output through the substitution of capital for labour and environmental degradation such as lowering of water tables.

Acharya and Jogi (2004) reported that the genesis of input subsidies in Indian agriculture can be traced to the philosophy and objectives of agricultural development strategy launched during the mid-1960s. Input subsidies helped in balancing the conflicting interests of farmers and consumers and in achieving macro and micro food-security. Subsidies on fertilizers, electricity and canal water, which account for bulk of subsidies, have been analyzed. In 1999ï 00, the electricity subsidy accounted for 53 per cent; fertilizer subsidy, 28 per cent; and canal irrigation subsidy, 19 per cent. During the last twenty years, 81 per cent of the incremental subsidy has been contributed by increase in the rate of per unit subsidy. Contrary to general perception, Punjab has accounted for only 7.4 per cent of the total subsidies in Indian agriculture. Across farm size groupsô distribution of subsidies has been found to follow the pattern of share of operated areas. Crop-wise analysis has revealed that the input subsidies are mainly going to the food crops. The paper has suggested a caution in handling the issue of subsidies in Indian agriculture because the economic conditions of farmers have not improved to a desirable level. Subsidies on farm inputs cannot be seen in isolation of the subsidies in other sectors of the economy, which are many a times more, and consequences of their withdrawal are less painful.

Gulati, (2007) reviewed the trends in Government subsidies and investments in and for Indian agriculture. The author suggested that to sustain long-term growth in agricultural production and therefore provide a long-term solution to poverty reduction, the Government should cut subsidies of fertilizer, irrigation, power and credit and increase investments in agricultural research and development, rural infrastructure and education. Promoting non-farm opportunities are also important.

Fan (2008) revealed that the subsidies have occupied agricultural economists for a long time because they are pervasive in agriculture, even though they are often applied in ways that benefit mostly richer farmers, cause inefficiencies, lead to a heavy fiscal burden, distort trade and have negative environmental effects. Agricultural subsidies can play an important role in early phases of agricultural development by addressing market failures and promoting new technologies.

Steve (2010) stated in his working paper on őThe Use of Input Subsidies in Developing Countriesô published in Global Forum on agriculture Policies for Agricultural

Development, Poverty Reduction and Food Security OECD, Headquarters, Paris that input subsidies need to be contemplated with caution, with a clear consideration of the costs and benefits compared with conventional best practice of addressing market failures directly and using social policies to address social objectives with respect to poverty and food insecurity. In order to achieve these benefits, there will be a need for complementary spending on public goods. For agriculture, these usually consist of rural roads, agricultural research and extension, education, primary health care, and clean water.

Kaur and Sharma (2012) established relation between subsidies (including fertilizers, electricity and irrigation) distributed in different zones in India. During pre as well as post liberalization periods, at country level as well as zone level, the total subsidies have increased in absolute terms, whereas at India level as well as in South, West, North, North-East zones, productivity has also increased except in 1996-97 and in East zone productivity has declined during 1996-97 to 2000-01. As compared to post-liberalization period (2006-07) with pre-liberalization period (1990-91), it is observed that in India, subsidies have increased 8.32 times, whereas productivity increased by only 1.1 times. While comparing the same time period, as zone level analysis shows that in West zone, subsidies have increased the maximum number of times i.e. 11.95 times, followed by South zone (8.93 times), East zone (7.67 times), North zone (7.49 times) and North-East zone (6.28 times), On the other hand productivity has increased maximum i.e. 1.90 times in South zone, followed by West zone (1.12 times), North zone (1.11 times), East zone (1.1 times) and North-East zone (1.05 times). In 1990-91, South zone has got near about three times of total subsidies and has near about two times of productivity; whereas in 2006-07, it has received 3.37 times of subsidies and has near about two times of productivity as compared to East zone.

Salunkhe and Deshmush (2013) revealed that agriculture subsidies are integral part of farming in India. Every year Government of India spends lot of money on various agriculture subsidies for growth of agriculture sector. This paper basically focuses on overview of agriculture subsidies in India with help of provisions of funds for agriculture in five years plans and annual budget and study types of agriculture subsidies and distribution criteria in India. There are two major types of subsidies which are fertilizer subsidies and food subsidy. Agriculture retained its high priority in the budget with a planned allocation for agriculture and allied sectors. The budget provides additional funds to several ongoing programs for enhancing agricultural production, irrigation management, higher farm credit and improving post-harvest storage and processing infrastructure. These two account for almost 90 per cent of agricultural subsidy. In addition to this one more form which is intangible and uncountable

is that, agricultural income is not taxed in India. These days the issue revolves around fertilizer subsidies more.

Kumar and Joshi (2014) observed that the input subsidy and technology are the two significant factors for the development of agriculture in India. Concerns are often expressed about a decrease or increase in input subsidy and inadequate investment in farm technology development. Policy planners often face the questions like what would happen to output supply, factor demand, agricultural prices and farmer income under alternative input subsidy and farm technology scenarios and what would be the impact of input subsidy and technological innovation on the welfare of producer and consumer ? To find answer to such questions, empirical unified models for two major cereals ð wheat and rice ð have been developed and analyzed for input subsidy and farm technology. The study has revealed that technology is the most powerful instrument for neutralizing factor price inflation and safeguarding the interest of producers as well as consumers, while input subsidy has a weak effect on output supply. The study has observed that investments in irrigation, rural literacy, capacity building, research and extension and information flow are crucial to increase supply at a higher growth rate.

CHAPTER-II

METHODOLOGY

The study covers both the direct and indirect agricultural input subsidies and is based on primary as well as secondary data. The primary data were aimed at eliciting information from farmers whereas, the macro level data pertains to the secondary data on subsidies for supplying the selected inputs i.e. seeds/ saplings, fertilizers, canal water and electricity to agricultural sector. The secondary data pertaining to the overtime subsidy on these agricultural inputs in India were collected from various published sources including Agricultural Statistics at A Glance, Economic Survey, etc. Information on subsidy on these items in Punjab state was collected from Statistical Abstracts of Punjab, Department of Agriculture, Department of Animal Husbandry, Department of Horticulture, Department of Irrigation, Punjab State Power Corporation Ltd., NBARD, etc.

To work out the extent and distribution of agricultural input subsidies among different major crops and farm categories in Punjab, the farm level primary data was collected from a sample of 180 farmers representing different farm size categories and agro-climatic regions of state. The Punjab state comprises three broad agro-climatic regions. To meet the specific objectives of the study, at first stage of sampling three districts of Punjab viz. Hoshiarpur, Ludhiana and Bathinda representing each regions of the state were selected randomly. While Hoshirpur district represents the sub-mountain undulating zone, Ludhiana and Bathinda districts represent the central plain zone and south-western plain zone of the state, respectively (Figure 1). At second stage, two blocks from each of the selected district were selected. Thus overall six blocks from the sample districts were selected. At next stage of sampling a cluster comprising 2-3 villages from each of the selected blocks were selected randomly for the farm household survey. Finally from each of the selected village cluster, 30 representative farm households, in proportion to their respective proportionate share in different categories as per standard national level definition of operational holdings viz., marginal (< 1 ha), small (1-2 ha), semi-medium (2-4 ha), medium (4-10 ha) and large (> 10 ha) were selected randomly. Thus, overall from state total sample of 180 farmer households comprising 29 marginal, 33 small, 55 semi-medium, 48 medium and 15 large farmers forms the basis for the present enquiry (Table 2.1).

Table 2.1: List of selected districts, blocks and villages in Punjab, 2014-15.

Agro-climatic Zone	District	Name of Blocks	Selected farmers	Number of sample farmers					Total
				Marginal	small	semi-medium	medium	large	
				Up to 1 ha	1-2 ha	2-4 ha	4-10 ha	> 10 ha	
Sub-mountain Undulating	Hoshairpur	Hoshairpur-II	30	4	5	10	9	2	30
		Mahilpur	30	4	8	10	6	2	30
		Sub-total	*60*	*8*	*13*	*20*	*15*	*4*	*60*
Central Plain	Ludhiana	Jagraon	30	6	5	6	10	3	30
		Samrala	30	6	6	10	6	2	30
		Sub-total	*60*	*12*	*11*	*16*	*16*	*5*	*60*
South-Western Plain	Bathinda	Bathinda	30	4	5	10	7	4	30
		Talwandi sabon	30	5	4	9	10	2	30
		Sub-total	*60*	*9*	*9*	*19*	*17*	*6*	*60*
Total sample size			**180**	**29**	**33**	**55**	**48**	**15**	**180**

Information on production of crops and use of inputs in physical as well as monetary terms along with other socio-economic aspects of farm households was collected from the sample farmers through the interview method using the specially designed schedules for the purpose. The information pertains to the crop year 2014-15 (Reference year). The data was analysed to work out the extent and distribution of agricultural input subsidies. While the information on direct subsidies was available in collected farm level data as such, the indirect subsidies on account of fertilizers, electricity/water was estimated from physical use of these inputs. Subsidy on urea, Di-amoniam Phosphate (DAP) and Muirate of Potash (MOP) was worked out by dividing the total subsidy on respective fertilizer by the quantity of it released for consumption in country during year 2014-15. Subsidy on electricity was worked out by multiplying the use of electricity units (kwh) with per unit (kwh) subsidy provided to agricultural sector of state during 2014-15. Subsidy on diesel used during kharif 2014-15 (November, 2014 onwards diesel prices are the market prices and hence do not involve the subsidy) was estimated by taking the difference in average cost of procurement and average issue price of diesel for the same period (May, 2014 to October 2014). Tabular analysis and simple statistical tools such as averages and percentages were used for the interpretation of the results.

In order to document the effect of subsidies on agriculture, all sampled farmers were categorized into three groups. All sampled households, with respect to quantum of subsidies availed during the reference year and were sorted out in ascending order. Further, farm households were categorized into three groups i.e. low, medium and high by using cube-root cumulative frequency method, Crop-wise subsidy intensity and input use pattern of these three groups were worked out to explore the effect of subsidy on agriculture.

CHAPTER-III

SOICIO-ECONOMIC PROFILE OF THE SELECTED FARMERS

This chapter tends to highlight various socio-economic features of the sampled farm households. A brief sketching of the basic features will help in properly analyzing the trends in distribution of agricultural subsidies across various farm-size groups. The family size, size of operational holdings, educational status, cropping pattern, credit, asset position and yield of major crops have been discussed in details.

3.1 Family size

The family size along with the population of males, females and children of respondent farmers has been presented in Table 3.1. The overall family size for sample households was 6.17 and the family size showed an increase with the increase in farm size. The family size varied between 7.8 on large farms to 5.41 on marginal farm size category. Of the total population, 36.72 per cent were adult males, 34.47 per cent were adult females and 28.80 per cent were minor on the sample holdings.

Table 3.1: Household composition of respondent farmers, Punjab, 2014-15

(Number/farm)

Family composition	Marginal	Small	Semi-medium	Medium	Large	Overall
Adult male	2.17 (40.13)	2.27 (40.11)	2.09 (35.17)	2.35 (34.98)	2.80 (35.90)	2.27 (36.72)
Adult female	1.83 (33.76)	2.03 (35.83)	1.98 (33.33)	2.38 (35.29)	2.67 (34.19)	2.13 (34.47)
Minor	1.41 (26.11)	1.36 (24.06)	1.87 (31.50)	2.00 (29.72)	2.33 (29.91)	1.78 (28.80)
Total	5.41 (100.00)	5.67 (100.00)	5.95 (100.00)	6.73 (100.00)	7.80 (100.00)	6.17 (100.00)

Figures in parentheses are percentages of the total

3.2 Age of the family head

It can be seen from the Table 3.2 that most of the household heads were in the age group of 36 to 50 years (about 47%). It is the age when the risk taking ability of an individual is the highest as compared to other age groups. Around 39 per cent household heads belonged to the age group of above 50 years.

Table 3.2: Age of the family head on sample farms, Punjab, 2014-15

(Number)

Age groups (years)	Marginal	Small	Semi-medium	Medium	Large	Overall
Up to 35	7 (24.14)	4 (12.12)	11 (20.00)	12 (25.00)	3 (20.00)	37 (20.56)
36-50	11 (37.93)	13 (39.40)	17 (30.91)	27 (56.25)	5 (33.33)	73 (46.56)
>50	11 (37.93)	16 (48.48)	27 (49.09)	9 (18.75)	7 (46.67)	70 (38.88)
Total	29 (100.00)	33 (100.00)	55 (100.00)	48 (100.00)	15 (100.00)	180 (100.00)

Figures in parentheses are percentages of the total

3.3 Educational status of household heads

Education status of the head of the family on sample farm can be seen from the Table 3.3. Overall, 16.67 per cent household heads were illiterate, another 8.89 per cent were basic literates (Primary). About 22 per cent of the household heads had studied up to 8th standard (Middle). Most of the heads of the household (about 37%) were matriculate and only 6 per cent were qualified up to graduation/post graduation. There was no clear relationship between the level of education of household head and farm size.

Table 3.3: Educational status of head of the family on sample farms, Punjab, 2014-15

(Numbers)

Particulars	Marginal	Small	Semi-medium	Medium	Large	Overall
Illiterate	9 (31.03)	7 (21.21)	9 (16.36)	2 (4.17)	3 (20.00)	30 (16.67)
Primary	2 (6.90)	2 (6.06)	6 (10.91)	4 (8.33)	2 (13.33)	16 (8.89)
Middle	4 (13.79)	9 (27.27)	14 (25.45)	10 (20.83)	2 (13.33)	39 (21.66)
Matriculate	9 (31.03)	12 (36.37)	16 (29.09)	27 (56.25)	3 (20.00)	67 (37.22)
Secondary	3 (10.35)	3 (9.09)	7 (12.74)	3 (6.25)	2 (13.33)	18 (10.00)
Graduate	2 (6.90)	0 (0.00)	3 (5.45)	2 (4.17)	2 (13.33)	9 (5.00)
Post Graduate	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	1 (6.68)	1 (0.56)
Total	29 (100.00)	33 (100.00)	55 (100.00)	48 (100.00)	15 (100.00)	180 (100.00)

Figures in parentheses are percentages of the total

3.4 Land details

The average operational holding size of sample households was 4.71 hectare (Table 3.4). The level of leased in land (2.14 hectare) was much higher than the leased out land (0.01 hectare) among the sample respondents. It was strange to observe that the practice of leasing-in land increased with the increasing farm size. The marginal farm was found to lease-in 0.15 hectare, while the average large farms were leasing in 8.88 hectare of land. The leasing-out of land was only prevalent amongst the marginal and small farms. The average operational land was observed to vary from 0.75 for marginal farms to 14.83 hectares for large farm categories. Almost all the area had the irrigation facilities highlighting well developed irrigation infrastructure in the study region. Overall, average rental value of leased-in land was Rs. 85915 per hectare which increased with the increasing farm size. Further, overall average rental value of leased out land was Rs. 87500 per hectare.

Table 3.4: Land holding details of the sample farms, Punjab, 2014-15

(Ha/farm)

Particulars	Marginal	Small	Semi-medium	Medium	Large	Overall
Land owned (a)	0.61 (81.33)	1.35 (76.27)	2.10 (59.62)	4.12 (56.30)	5.95 (40.11)	2.58 (54.83)
Land leased-in (b)	0.15 (20.00)	0.47 (26.55)	1.42 (40.38)	3.20 (43.70)	8.88 (59.89)	2.14 (45.38)
Land leased-out (c)	0.01 (1.33)	0.05 (2.82)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.01 (0.21)
Total operational holding (a+b-c)	0.75 (100.00)	1.77 (100.00)	3.53 (100.00)	7.32 (100.00)	14.83 (100.00)	4.71 (100.00)
Irrigation intensity (%)	99.27	100.00	100.00	100.00	100.00	99.98
Average rental value of land leased-in (Rs/ Ha)	78610	80668	84730	88505	91785	85915
Average rental value of land leased-out (Rs/ Ha)	75000	100000	0.00	0.00	0.00	87500

Figures in parentheses are percentages of the total operational area

3.5 Agricultural credit

The extent of debt among different farm size categories is presented in Table 3.5. The overall access to credit was Rs. 3.53 lakh/farm and access to credit improved with an increase in farm size. The proportion of institutional credit was about 90 per cent with the rest coming from non-institutional sources. On per hectare basis, the overall access to credit was Rs. 69558 and access to credit decreased with an increase in farm size. The per hectare credit from commercial banks declined with increase in farm size varying from Rs 81656 on

marginal farms to Rs 27150 on large farms with an average Rs 45093 on the sample farm households.

Table 3.5: Access of sample farm households to various sources of agricultural credit in Punjab, 2014-15

Size Group	Cooperative societies	Commercial banks	Commission agents/money lenders	Total
(Rupees/farm)				
Marginal	12241 (15.67)	61552 (78.81)	4310 (5.52)	78103 (100.00)
Small	49121 (26.90)	116970 (64.06)	16515 (9.04)	182606 (100.00)
Semi-medium	82964 (23.81)	222364 (63.82)	43091 (12.37)	348418 (100.00)
Medium	136771 (26.56)	331146 (64.30)	47083 (9.14)	515000 (100.00)
Large	214000 (28.13)	496667 (65.29)	50000 (6.57)	760667 (100.00)
Overall	90633 (25.66)	229000 (64.83)	33611 (9.51)	353244 (100.00)
(Rupees/ha)				
Marginal	16240	81656	5718	103614
Small	27709	65983	9316	103009
Semi-medium	23533	63074	12223	98829
Medium	17964	43494	6184	67643
Large	11698	27150	2733	41582
Overall	17847	45093	6618	69558

Figures in the parentheses indicate the per cent to total

3.6 Cropping pattern

The cropping pattern and cropping intensity on the sample farms has been given in Table 3.6. Paddy and wheat were the major kharif and rabi crops in the study area grown on about 29 and 40 per cent of total cropped area during the season, respectively. The area under paddy was found to vary from about 16 to 37 per cent of the net cropped area, which increased with the increase in farm size. Maize was the other major kharif crop grown by the sample households as it occupied about six per cent of the total cropped area. Cotton, basmati-paddy and sugarcane occupied about six, three and one per cent of the total cropped area, respectively. Fodder was grown in the kharif, rabi and summer seasons in the state and the net cropped area under these crops was about three, three and one per cent during the different seasons, respectively. Wheat was the major rabi season crop in the study area. Potato was another important crop of the season which occupied about 3 per cent of the total cropped area. Maize and summer moong were the important summer crops. On an average the cropping intensity for different farm size categories was 210.83 per cent, which increased

with an increase in farm size. The cropping intensity ranged between 200 per cent on marginal farms and 213.89 per cent on the large farms.

Table 3.6: Cropping pattern and cropping intensity on the sample farms, Punjab, 2014-15

(% to total cropped area)

Crop	Marginal	Small	Semi- medium	Medium	Large	Overall
Kharif season						
Paddy	16.00	18.63	22.39	29.82	36.60	28.80
Basmati-paddy	2.00	0.27	2.31	2.59	1.92	2.22
Cotton	12.67	9.59	8.41	5.56	3.50	6.14
Maize	8.67	13.15	9.23	5.24	1.77	5.84
Sugarcane	0.00	0.00	0.00	0.52	1.42	0.60
Others (Fodder, etc.)	10.66	6.58	5.42	3.55	1.54	3.83
Sub-total	50.00	48.22	47.76	47.28	46.75	47.43
Rabi season						
Wheat	42.00	40.82	40.98	39.33	37.99	39.58
Potato	0.00	1.37	1.36	2.65	5.67	3.02
Others (Fodder, etc.)	8.00	6.58	5.29	5.37	3.09	4.83
Sub-total	50.00	48.77	47.63	47.35	46.75	47.43
Zaid Season crops	0.00	3.01	4.61	5.89	7.91	5.74
Total cropped area (ha)	1.50	3.65	7.36	15.44	31.72	9.93
Cropping intensity (%)	200.00	205.06	209.69	211.80	213.89	210.83

3.7 Farm assets

The average sample household was found to possess assets worth about Rs. 5 lakh and the asset value was found to increase with the increasing farm size. Machines and implements, livestock and farm buildings constituted about 60, 30 and 10 per cent of the total value of assets. On an average, sample farms were found to possess tractors of Rs. 1.84 lakhs per farm, submersible pumps/electric motors of Rs. 8222 and generator and diesel engine of Rs. 11731 per farm. The marginal farms were found to possess the least number of tractors (0.14), while the medium and large farms possess more than one tractor. The average sample household was found to possess 0.81 tractors (Table 3.7). The proportion was found to increase with the increasing farm size.

Table 3.7: Ownership of farm assets on the sample farms, Punjab, 2014-15 **(Rs/farm)**

Size group/component	Marginal		Small		Semi-medium		Medium		Large		Overall	
	No/farm	Present value	No/farm	Present value	No/farm	Present value	No/farm	Present value	No/farm	Present value	No/farm	Present value
(i) Machines and implements												
Tractor	0.14	10862	0.55	79697	0.93	175445	1.04	291354	1.47	435667	0.81	183969
Implements	0.34	2605	1.55	18288	3.44	61725	5.23	118969	5.93	150244	3.28	66878
Submersible/EM	0.45	3879	0.67	6348	0.85	5744	1.4	11542	1.73	19200	0.97	8222
Generator/Diesel engine	0.21	6431	0.27	2091	0.58	10273	0.77	16042	0.73	34733	0.53	11731
Power Chaff cutter	0.21	741	0.73	3276	0.91	3536	0.92	4635	0.93	5160	0.77	3467
Chaff cutter Manual	0.48	976	0.15	488	0.07	300	0.06	94	0.07	100	0.15	372
Sprayer (battery power)	0.1	103	0.36	179	0.51	691	0.54	1033	0.53	1080	0.43	626
Power sprayer	0	138	0.09	364	0.02	1191	0.1	4152	0.27	17200	0.07	2993
Manual Sprayer	0.48	276	0.67	232	0.69	335	0.69	441	0.67	640	0.65	360
Combine harvester	0	0	0	0	0	0	0	0	0.2	146667	0.02	12222
Laser leveller	0	0	0	0	0.02	5455	0.02	7292	0	0	0.01	3611
Under-ground pipes	0.03	414	0.03	303	0.07	2727	0.21	13094	0.07	1333	0.09	4558
Small hand tools	-	486	-	952	-	1042	-	2160	-	2520	-	1357
Total	**2.45**	**26912 (29.60)**	**5.06**	**112217 (51.48)**	**8.09**	**268464 (59.56)**	**10.98**	**470807 (71.17)**	**12.6**	**814544 (76.66)**	**7.77**	**300367 (65.68)**
(ii) Farm Buildings												
Cattle shed	0.31	4655	0.55	6894	0.75	21764	0.73	27417	0.87	23133	0.64	17903
storage/Implement shed	0.07	2414	0.27	12424	0.55	32564	0.56	27542	0.6	42200	0.43	23478
Storage bin	0.93	831	1.48	1573	1.8	1438	2.46	2635	3.53	2640	1.92	1784
Vermi-compost	0	0	0	0	0	0	0	0	0.07	400	0.01	33
Bio gas plants	0.07	1552	0	0	0.04	636	0.02	417	0.07	333	0.03	583
Total	**1.38**	**9452 (10.39)**	**2.3**	**20891 (9.58)**	**3.13**	**56402 (12.51)**	**3.77**	**58010 (8.77)**	**5.13**	**68707 (6.47)**	**3.03**	**43782 (9.57)**
(iii) Livstock (No.)												
Draft animals	0.1	586	0.36	1197	0.45	1345	0.48	2375	0.6	2433	0.4	1561
Buffaloes	1.03	34655	1.73	53152	2.58	86055	2.85	84083	4	117067	2.37	73800
Cows	0.72	17586	1.21	28758	1.22	36055	1.58	43938	1.73	57133	1.28	35600
Young stock	0.59	1741	0.7	1788	1.53	2404	1.08	2315	1.33	2693	1.09	2184
Total	**2.45**	**54569 (60.01)**	**4**	**84894 (38.94)**	**5.78**	**125858 (27.92)**	**6**	**132710 (20.06)**	**7.67**	**179327 (16.88)**	**5.13**	**113146 (24.75)**
Grand Total	**6.28**	**90933 (100.00)**	**11.36**	**218002 (100.00)**	**17.00**	**450724 (100.00)**	**20.75**	**661527 (100.00)**	**25.40**	**1062578 (100.00)**	**15.93**	**457295 (100.00)**
Average farm size (ha)	**0.75**		**1.78**		**3.51**		**7.29**		**14.83**		**4.71**	

Figures in the brackets are the percentage to the total

The average sample households were found to possess 0.97 electric motors and 0.53 generator/diesel engine and the proportion was found to increase with the increasing farm size. Further, the average sample farms were found to possess 0.77 power chaff cutter, 0.15 chaff cutter manual, 0.43 sprayer, 0.65 manual sprayer and approx. 0.12 combine harvester, laser leveller and underground pipes.

The average sample household was found to own 0.64 sheds for fodder and the proportion was found to increase with the increasing farm size. Buffaloes were found to be the most preferred livestock of the sample households as consumers of the Punjab state prefer buffalo milk due to its high fat content. The average sample household was found to rear 2.37 buffaloes on the farm. The proportion was found to increase with the increasing farm size. The cows were the next preferred livestock category. The average sample household was found to rear 1.28 cattle on the farm and the proportion was found to increase with the increasing farm size. Marginal sample farm households were found to possess power chaff cutter of Rs.741 per farm while large sample farm households were found to possess power chaff cutter of Rs. 5160 per farm. On an average the investment on underground pipes was Rs. 4558 and on small hand tools was Rs. 1357 per farm. The total investment in cattle shed was Rs. 4655 per farms by marginal farms and Rs. 23133 per farm by large farm households. On an average, the total investment on storage shed was of Rs. 23478 per farm. As we all know buffaloes were found to be the most preferred livestock of the sample farms households. Overall, Rs. 73800 has been invested on buffaloes by sample farm households per farm.

3.8 Summary

The overall family size for sample households was 6.17 and the family size showed an increase with the increase in farm size. The family size varied between 7.8 on large farms to 5.41 for the marginal farm size category. Most of the heads of the household were in the age group of 36 to 50 years (about 47%). Overall, 16.67 per cent household heads were illiterate, another 8.89 per cent were basic literates (Primary). About 22 per cent of the household heads had studied up to 8^{th} standard (Middle). Most of the heads of the household (about 37%) were matriculate and only six per cent were qualified up to graduation/post graduation. The average operational holding size of sample households was 4.71 hectare. The level of leased in land (2.14 hectare) was much higher than the leased out land (0.01 hectare) among the sample respondents. Almost all the area had the irrigation facilities highlighting well developed irrigation infrastructure in the study region. The overall access to credit was Rs. 3.53 lakh/farm and access to credit improved with an increase in farm size. The

proportion of institutional credit was about 90 per cent with the rest coming from non-institutional sources. On per hectare basis, the overall access to credit was Rs. 69558 and access to credit decreased with an increase in farm size. The per hectare credit from commercial banks declined with increase in farm size varying from Rs 81656 on marginal farms to Rs 27150 on large farms with an average Rs 45093 on the sample farm households. Paddy and wheat were the major kharif and rabi crops in the study area grown on about 29 and 40 per cent of total cropped area during the season, respectively. The area under paddy was found to vary from about 16 to 37 per cent of the net cropped area, which increased with the increase in farm size. Cotton, basmati-paddy and sugarcane occupied about six, three and one per cent of the total cropped area, respectively. Fodder was grown in the kharif, rabi and summer seasons in the state and the net cropped area under these crops was about three, three and one per cent during the different seasons, respectively. Wheat was the major rabi season crop in the study area. Potato was the other important crops of the season which occupied about 3 per cent area of the total cropped area. Maize and summer moong were the important summer crops. On an average the cropping intensity for different farm size categories was 210.83 per cent, which increased with an increase in farm size. The cropping intensity ranged between 200 per cent on marginal farms and 213.89 per cent on the large farms. The average sample household was found to possess assets worth about Rs. 5 lakh and the asset value was found to increase with the increasing farm size. Machines and implements, livestock and farm buildings constituted about 60, 30 and 10 per cent of the total value of assets. On an average, sample farms were found to possess tractors of Rs. 1.84 lakh per farm, submersible pumps/electric motors of Rs. 8222 and generator and diesel engine of Rs. 11731 per farm.

CHAPTER-IV

ECONOMICS OF PRODUCTION OF IMPORTANT CROPS IN PUNJAB

The remarkable progress of Punjab agriculture is credited to the use of inputs like fertilizers, improved seeds, irrigation, plant protection chemicals, machinery, credit and technology back up. Punjab is a leading state in ensuring the timely availability and efficient delivery system of these vital inputs required for agriculture. Besides, the utilisation of direct and indirect subsidy by different category of farmers is dependent upon the quantum of input use by the farmers. The most important cultivating crops of the state viz. paddy, wheat, Basmati-paddy, maize, cotton, sugarcane and potato were selected for in-depth analysis. The present chapter deals with the recent trends in use/requirement of important farm inputs and their prices in Punjab.

4.1. Input use pattern of major crops

4.1.1. Paddy

The input use pattern for the cultivation of paddy crop has been depicted in Table 4.1.1. On per hectare basis, about 352 man hours were required for carrying out the various operations like sowing, transplanting, fertiliser/insecticide application, irrigation, harvesting etc. Transplanting is the labour intensive operation in paddy crop. The paddy crop also required about 15 tractor hours particularly for field preparation. Harvesting of crop through combine harvester required about 2 hours per hectare. For irrigation, on per hectare basis, paddy required submersible pumps for 161 hours, electric motor for 26 hours along with canal irrigation for about 2 hours. Besides, for carrying out various operations, on an average on per hectare basis, the generator use was for about 9 hours along with diesel consumption of 149.85 litres. It was found that sample households used about 17 Kg of paddy seed per hectare. Amongst different categories, on per hectare basis, the highest use of urea was by medium farms (326.9 kg), DAP by large farms (58.33 kg) and MOP by medium farms (3.53 kg), respectively. Being highly water intensive crop, about 29 irrigations are required at different stages of paddy production. In overall scenario, paddy yield was 71.49 quintals per hectare which was the highest (72.59 qtls/ha) on medium farms and lowest (68.75 qtls/ha) on small farms showing better agricultural technology use on medium and large farms.

Table 4.1.1: Physical input use in Paddy crop cultivation on sample farms, Punjab, 2014-15

(Per ha)

Particulars	Marginal	Small	Semi medium	Medium	Large	Overall
Human Labour (Hours)	378.23	363.40	366.21	341.11	354.04	351.90
Tractor use (Hours)	14.11	14.30	15.23	15.04	14.92	15.01
Combine harvester (Hours)	2.14	2.15	2.14	1.98	2.00	2.03
Canal (Hours)	1.25	0.23	1.61	1.41	2.50	1.76
Electric motor (Hours)	75.00	58.13	60.79	21.30	8.33	26.24
Submersible Pump (Hours)	93.96	145.94	138.49	158.91	181.00	161.58
Diesel Engine (Hours)	34.58	5.00	6.18	6.52	0.00	4.58
Generator (Hours)	1.88	5.00	8.39	12.85	5.83	9.22
Total irrigation hours	206.67	214.30	215.46	201.01	197.67	203.38
Diesel used (litres)	174.58	116.05	172.17	158.70	129.67	149.85
Seed	15.83	16.45	16.35	17.07	16.67	16.79
FYM (Qtls)	56.25	9.38	43.42	47.28	30.00	39.30
Urea (Kg)	301.04	307.81	323.68	326.90	325.00	325.00
DAP(Kg)	52.08	54.69	53.62	48.64	58.33	53.18
MOP(Kg)	0.00	3.13	2.96	3.53	0.00	2.18
Others (Kg)	10.00	24.06	25.67	25.39	27.17	25.81
Weedicides (No.)	1.04	1.06	1.00	0.98	0.93	0.97
Insecticides (No.)	2.58	2.56	2.84	3.07	3.00	2.98
Irrigation (No)	28.33	29.06	30.05	29.00	30.00	29.56
Yield (Qtl/ha)	68.96	68.75	69.38	72.59	71.33	71.49

4.1.2. Basmati-paddy

The input use pattern for the cultivation of basmati-paddy (Table 4.1.2) shows that about 386 hours per hectare were required for carrying out the various operations like sowing, transplanting, fertiliser/insecticide application, irrigation, harvesting etc. The labour requirement was more for fine varieties of paddy because manual harvesting of crop was more popular in basmati-paddy. The basmati-paddy crop also required about 13 machine labour hours of tractor particularly for field preparation and 1.06 hours of combine harvester. For irrigation, on per hectare basis, basmati-paddy required irrigation through submersible pumps for 116 hours, electric motor for 17 hours and canal irrigation for less than one hour. Besides, for carrying out various operations, on an average on per hectare basis, the generator use was for about 5hours along with diesel consumption of 107.78 litres. The basmati-paddy growers were found to use about 16 Kg of seed per hectare, which is lower as compared to

the recommended level of 20 Kg/hectare. Amongst different categories, on per hectare basis, the highest use of urea was by large farms (187.5 kg), DAP by marginal farms (75 kg) and MOP by semi-medium farms (15.63 kg), respectively. Basmati-paddy required about 20 irrigations at different stages of its production which is lower as compared to other varieties of paddy. Basmati-paddy yield was the highest i.e. 47.19 qtls per hectare on large farms and lowest (40 qtls/ha) on marginal farms.

Table 4.1.2: Physical input use in basmati-paddy crop on sample farms, Punjab, 2014-15

(Per ha)

Particulars	Marginal	Small	Semi medium	Medium	Large	Overall
Human Labour (Hours)	455.00	492.50	373.36	412.50	363.28	386.19
Tractor use (Hours)	14.38	17.50	14.84	13.30	12.81	13.38
Combine harvester (Hours)	0.00	0.00	2.03	0.45	1.56	1.06
Canal (Hours)	0.00	0.00	0.47	0.71	0.00	0.46
Electric motor (Hours)	112.50	140.00	21.88	13.39	9.38	17.46
Submersible Pump (Hours)	0.00	0.00	105.00	122.68	137.50	116.04
Diesel Engine (Hours)	0.00	0.00	11.88	3.93	0.00	4.71
Generator (Hours)	22.50	0.00	7.50	1.07	7.81	4.59
Total irrigation hours	135.00	140.00	146.72	141.79	154.69	143.26
Diesel used (litres)	133.75	87.50	146.72	87.14	117.81	107.78
Seed	15.00	15.00	15.63	16.96	15.31	15.91
FYM (Qtls)	0.00	0.00	0.00	32.14	0.00	15.58
Urea (Kg)	125.00	150.00	171.88	174.11	187.50	172.32
DAP (Kg)	75.00	62.50	65.63	71.43	71.88	68.91
MOP (Kg)	0.00	0.00	15.63	8.93	0.00	8.02
Others (Kg)	12.50	20.00	14.06	18.75	12.50	15.74
Weedicides (No.)	1.00	1.00	1.00	1.00	1.00	1.00
Insecticides (No.)	2.00	2.00	3.13	2.43	2.75	2.61
Irrigation (No)	18.00	20.00	20.50	19.07	20.00	19.27
Yield (Qtls/ha)						
Main product	40.00	42.50	42.97	46.25	47.19	44.71
By-product	45.00	30.00	12.19	40.00	12.50	26.40

Figures in the brackets indicate the percent to total

4.1.3 Cotton

The input use pattern for the cultivation of cotton is given in Table 4.1.3 and the data show that about 535 man hours per hectare were required for carrying out various farm operations like sowing, fertiliser/insecticide application, irrigation, harvesting etc. This shows that cotton is highly labour intensive crop. Since the cotton crop is picked manually, therefore

the requirement of labour was more as compared to other competing crops grown during kharif season. On per hectare basis, it required about 14 machine labour hours, 8.35 electric motor hours, 22.86 submersible pump hours and 81.58 hours of diesel engine+generator particularly for field preparation. The total diesel use in overall was about 75 litres per hectare. The cotton growers were found to use 4.62 Kg of seed per hectare. Amongst different size farms, on per hectare basis, use of urea was the highest (250 kg) for large farms, 118.06 kg of DAP for marginal farms, while the use of MOP was the highest (12.50 kg) at large and medium farms. Overall, the cotton crop required 4.92 irrigations during its production which is sufficiently lower as compared to irrigation requirement for paddy. Cotton yield showed high variability with 18.75 quintals per hectare on large farms and 12.62 quintals per hectare on marginal farms being the lowest. Difference in adoption of new farm technology in cotton cultivation on various farm categories can be attributed to variability in yield.

Table 4.1.3: Physical input use in cotton crop cultivation on sample farms, Punjab, 2014-15

(Per ha)

Particulars	Marginal	Small	Semi medium	Medium	Large	Overall
Human Labour (Hours)	475.83	490.70	533.55	537.90	594.25	535.01
Tractor use (Hours)	10.69	11.88	14.34	14.64	15.50	14.13
Canal (Hours)	3.61	3.59	4.14	3.35	4.00	3.72
Electric motor (Hours)	0.00	17.81	12.19	5.00	5.00	8.35
Submersible Pump (Hours)	25.56	10.31	14.06	26.07	41.50	22.86
Diesel Engine (Hours)	77.61	85.78	83.87	81.57	77.08	81.58
Total irrigation hours	106.78	117.49	114.26	115.99	127.58	116.51
Diesel used (litres)	56.53	74.38	78.28	77.41	70.50	74.99
Seed	4.00	3.94	4.72	4.51	5.50	4.62
FYM (Qtls)	0.00	0.00	14.06	16.07	0.00	10.41
Urea (Kg)	229.17	242.19	238.28	245.54	250.00	241.93
DAP(Kg)	118.06	106.25	105.47	107.14	100.00	105.62
MOP(Kg)	4.17	0.00	5.47	12.50	12.50	8.50
Others (Kg)	0.00	7.81	0.00	0.00	0.00	0.85
Weedicides (No.)	0.56	0.88	0.94	0.93	1.00	0.91
Insecticides (No.)	4.67	5.75	5.19	4.79	5.80	5.15
Irrigation (No)	4.33	5.38	5.00	4.57	5.60	4.92
Yield (Qtls/ha)						
Main product	12.92	14.45	16.17	16.29	18.75	16.20
By-product	40.69	36.88	47.97	54.02	54.50	49.50

Figures in the brackets indicate the per cent to total

4.1.4. Maize

The input use pattern for cultivation of maize crop has been depicted in Table 4.1.4. On per hectare basis, about 362 man hours were required for carrying out various farm operations like sowing, fertiliser/insecticide application, irrigation, harvesting etc.

Table 4.1.4: Physical input use in maize cultivation on sample farms, Punjab, 2014-15

(Per ha)

Particulars	Marginal	Small	Semi medium	Medium	Large	Overall
Human Labour (Hours)	368.33	315.83	379.05	359.00	362.19	361.50
Tractor use (Hours)	14.27	16.46	20.16	17.63	19.38	18.44
Combine harvester (Hours)	0.00	0.73	0.33	0.33	0.00	0.35
Canal (Hours)	0.00	0.00	0.00	0.00	0.00	0.00
Electric motor (Hours)	0.00	0.00	0.00	1.33	0.00	0.50
Submersible Pump (Hours)	48.33	40.63	37.63	39.67	40.00	39.56
Diesel Engine (Hours)	0.00	0.00	2.63	0.00	0.00	0.94
Generator (Hours)	0.00	0.00	2.63	0.00	0.00	0.94
Total irrigation hours	48.33	40.63	42.89	41.00	40.00	41.95
Diesel used (litres)	62.81	79.48	99.38	82.79	101.88	89.34
Seed	20.00	20.42	20.13	21.00	20.00	20.56
FYM (Qtls)	0.00	0.00	0.00	0.00	0.00	0.00
Urea (Kg)	156.25	166.67	190.79	165.00	187.50	176.57
DAP (Kg)	125.00	125.00	118.42	125.00	125.00	123.09
MOP (Kg)	0.00	0.00	0.00	9.17	18.75	4.96
Others (Kg)	0.00	0.00	1.98	0.00	0.00	0.71
Weedicides (No.)	1.00	0.92	1.00	1.00	1.00	0.99
Insecticides (No.)	1.33	1.67	1.89	1.80	2.00	1.82
Irrigation (No)	4.00	3.33	4.32	4.00	4.00	4.03
Yield (Qtls/ha)						
Main product	43.75	40.21	43.49	43.75	47.50	43.58
By-product	32.92	27.50	30.92	28.50	35.00	30.00

On per hectare basis, the maize crop required about 18 hours of machine labour of tractor, harvester combine (0.35 hours), and electric motor (0.5 hours), submersible pump (About 40 hours) particularly for field preparation and for carrying out different inter-culture operations. Total diesel consumption was found to be about 89 litres per hectare. The maize growers used 20.56 Kg of seed per hectare, which is almost comparable to the recommended level of 20 Kg/hectare. Amongst different categories, on per hectare basis, the highest amount of urea was used by semi medium farms (190.79kg) in comparison to 156.25 kg used by marginal farms. DAP was used in lesser amounts by semi-medium farms (118.42 kg) as compared to 125 kg by other farm categories. MOP and Zinc were also used by the growers for the production of maize. The maize crop generally required about 4 irrigations at different stages of its production. Maize yield was 43.58 quintals per hectare in overall scenario, while it was 47.50 quintals per hectare on large farms which was the highest and 40.21 quintals per hectare on small farms which was the lowest. Thus, input use was better on large farms as compared to other farm categories.

4.1.5. Sugarcane

The Table 4.1.5 depicts the input use pattern for the cultivation of sugarcane which shows that on per hectare basis about 1110 man hours were required for carrying out the various operations like sowing, fertiliser/insecticide application, irrigation, harvesting etc. It reveals that the labour requirement of this crop was more than other crops. It is due to the fact that more manual labour was required for harvesting of crop. The crop also required about 29.46 machine labour hours of tractor, 15.46 hours of electric motor and 126 hours of submersible pump particularly for field preparation and sowing. Total diesel consumption was found to be 150 litres. The sugarcane growers used about 38 quintals of seed per hectare. On per hectare basis, Medium farms use 437.5 kg of urea was which very close to 416.67 kg used by large farms. The quantity of DAP (200 kg) used by either medium or large farms was also similar to that used on overall basis. However, large farms used 125kg of MOP which was almost double than an overall value of 78.13 kg. The plant protection measures taken by medium farms for weedicides and insecticides were 1 and 3.67, respectively. The sugarcane crop required about 20 irrigations at different stages of its production, which were also lower as compared to paddy. The yield was about 800 quintals and 787.50 quintals on medium farms.

Table 4.1.5: Physical input use in sugarcane crop cultivation on sample farms, Punjab, 2014-15

(Per ha)

Particulars	Marginal	Small	Semi medium	Medium	Large	Overall
Human Labour (Hours)	-	-	-	1268.33	1326.04	1110.63
Tractor use (Hours)	-	-	-	21.25	39.58	29.46
Canal (Hours)	-	-	-	0.00	0.00	0.00
Electric motor (Hours)	-	-	-	13.33	20.00	15.46
Submersible Pump (Hours)	-	-	-	135.83	153.33	126.02
Diesel Engine (Hours)	-	-	-	0.00	0.00	0.00
Generator (Hours)	-	-	-	0.00	0.00	0.00
Total irrigation hours	-	-	-	149.17	173.33	141.48
Diesel used (litres)	-	-	-	123.33	196.67	150.32
Seed	-	-	-	45.83	44.17	37.79
FYM (Qtls)	-	-	-	104.17	104.17	88.25
Urea (Kg)	-	-	-	437.50	416.67	357.64
DAP (Kg)	-	-	-	200.00	200.00	169.44
MOP (Kg)	-	-	-	0.00	125.00	78.13
Others (Kg)	-	-	-	16.67	45.83	32.35
Weedicides (No.)	-	-	-	1.00	1.00	0.85
Insecticides (No.)	-	-	-	3.67	3.33	2.90
Irrigation (No)	-	-	-	19.00	21.33	17.56
Yield (Qtls/ha)						
Main product	-	-	-	787.50	808.33	680.21
By-product	-	-	-	100.00	115.00	94.10

4.1.6. Wheat

The input use pattern for the cultivation of wheat given in Table 4.1.6 shows that about 116 man hours per hectare were required for carrying out the various operations like sowing, fertiliser/insecticide application, irrigation, harvesting etc. On the per hectare basis, the crop required 19.92, 1.92, 4.47, 31.54, 1.41 and 0.79 hours for carrying out various farm operations by machine labour of tractor, combine harvester, electric motor, submersible pump, diesel engine and generator, respectively. The total diesel used was 112.11 litres per hectare. The growers were found to use 101.49 Kg of seed per hectare. Amongst different farm sizes, on per hectare basis, the highest amount of urea (293.49 kg)was used by medium farms, while the semi-medium farms used the highest amount of DAP (152.50 kg). The crop

required about 4 irrigations during its entire growth period at different stages of its production. The yield on sample farms varied between 37 qtls on large farms which was the highest, while 33.22 qtls on small farms which was the lowest among farm categories.

Table 4.1.6: Physical input use in Wheat crop cultivation on sample farms, Punjab, 2014-15

(Per ha)

Particulars	Marginal	Small	Semi medium	Medium	Large	Overall
Human Labour (Hours)	162.03	124.15	110.85	110.44	123.25	115.90
Tractor use (Hours)	16.74	19.45	20.50	20.66	18.79	19.92
Combine harvester (Hours)	1.50	1.80	2.00	2.03	1.75	1.92
Canal (Hours)	1.05	0.91	1.73	1.07	2.08	1.47
Electric motor (Hours)	4.46	10.76	8.32	4.01	0.00	4.47
Submersible Pump (Hours)	23.21	28.60	20.95	34.56	38.25	31.54
Diesel Engine (Hours)	2.41	3.03	4.00	0.47	0.00	1.41
Generator (Hours)	3.39	0.45	2.14	0.42	0.00	0.79
Total irrigation hours	34.53	43.75	37.14	40.52	40.33	39.68
Diesel used (litres)	104.80	107.48	118.28	113.24	109.63	112.68
Seed	101.70	101.52	101.36	101.88	101.67	101.49
FYM (Qtls)	0.00	0.00	0.00	0.00	0.00	0.00
Urea (Kg)	262.50	286.36	283.86	293.49	292.50	289.15
DAP (Kg)	142.86	145.45	152.50	148.70	134.17	145.23
MOP (Kg)	0.00	1.52	2.27	0.78	0.00	0.96
Others (Kg)	0.72	1.21	3.98	2.97	3.67	3.20
Weedicides (No.)	1.00	1.03	1.05	1.04	1.00	1.03
Insecticides (No.)	1.71	1.73	1.56	1.67	1.67	1.64
Irrigation (No)	4.00	4.30	4.15	4.13	4.07	4.12
Yield (Qtls/ha)						
Main product	43.47	43.47	45.10	46.47	47.57	46.06
By-product	36.16	33.22	34.25	34.79	37.00	35.09

4.1.7 Potato

The input use pattern for the cultivation of potato is given in Table 4.1.7. It indicates that for raising potato crop in one hectare basis, about 534 man hours were required for carrying out the various operations like sowing, fertiliser/insecticide application, irrigation, harvesting etc. This shows that potato is also highly labour intensive crop. The labour requirement was more because most of operations (earthing and digging) required for raising this are done manually. On per hectare basis, it required about 25, 0.68, 40.35 and 41.03 hours of machine, electric motor, submersible pump and generator, respectively. The total diesel used was about 146 litres. The potato growers were found to use about 36 qtls of seed

per hectare. On per hectare basis, semi medium farms used highest amount of urea (339.29 kg) as well as DAP (419.64 kg), while large farms used higher amounts of MOP (160.71 kg) as compared to its low (41.67 kg) use at small farms. The crop required about 4.46 irrigations for its production. The yield was about 219 quintals per hectare on large farms, 187 quintals on small and semi-medium farms and 215 quintals on medium farms.

Table 4.1.7: Physical input use in Potato crop cultivation on sample farms, Punjab, 2014-15

(Per ha)

Particulars	Marginal	Small	Semi medium	Medium	Large	Overall
Human Labour (Hours)	-	449.58	529.73	526.88	558.84	534.21
Tractor use (Hours)	-	20.63	24.69	23.80	27.14	25.12
Canal (Hours)	-	0.00	0.00	0.00	0.00	0.00
Electric motor (Hours)	-	0.00	0.00	2.08	0.00	0.68
Submersible Pump (Hours)	-	50.00	40.36	45.42	36.79	40.35
Diesel Engine (Hours)	-	0.00	0.00	0.00	0.00	0.00
Generator (Hours)	-	0.00	0.00	0.00	0.00	0.00
Total irrigation hours	-	50.00	40.36	47.50	36.79	41.03
Diesel used (litres)	-	129.17	129.64	149.27	156.43	146.41
Seed	-	35.83	35.09	34.90	37.86	35.91
FYM (Qtls)	-	0.00	0.00	0.00	50.00	21.61
Urea (Kg)	-	312.50	339.29	307.29	321.43	317.14
DAP (Kg)	-	375.00	419.64	395.83	375.00	387.36
MOP (Kg)	-	41.67	107.14	98.96	160.71	124.85
Others (Kg)	-	16.66	13.39	14.59	7.14	11.04
Weedicides (No.)	-	1.00	1.00	1.00	1.00	1.00
Insecticides (No.)	-	1.67	2.29	1.75	1.43	1.70
Irrigation (No)	-	4.00	4.79	4.67	4.29	4.46
Yield (Qtls/ha)	-	187.50	187.50	215.00	219.64	208.63

4.2. Economics of major crops

4.2.1 Paddy

The total variable cost on per hectare basis for paddy crop was found to vary between Rs 33407 for small farms to Rs 38967 for the marginal farms due to the high level of cost of machine labour incurred by marginal farms which were mostly using the hired machinery for carrying out the harvesting and other crop operations. On overall basis, the total variable cost on per hectare basis was found to be Rs 35102. Amongst variable cost components, the share of human labour was about 40 per cent.

Table 4.2.1: Cost of cultivation of paddy crop cultivation on sample farms, Punjab, 2014-15

(Rs/ha)

Particulars	Marginal	Small	Semi medium	Medium	Large	Overall
Human Labour	15278 (39.21)	14728 (44.09)	14823 (39.73)	13952 (39.48)	14000 (41.72)	14195 (40.04)
Machine use						
Hired machine charges	5078 (13.03)	3495 (10.46)	2723 (7.30)	2381 (6.74)	2278 (6.79)	2495 (7.11)
Use of diesel	9771 (25.08)	6461 (19.34)	9601 (25.73)	8817 (24.95)	7173 (21.37)	8323 (23.71)
Seed	603 (1.55)	652 (1.95)	644 (1.73)	664 (1.88)	646 (1.92)	654 (1.86)
FYM	667 (1.71)	188 (0.56)	592 (1.59)	709 (2.01)	600 (1.79)	629 (1.79)
Urea	1626 (4.17)	1662 (4.98)	1748 (4.68)	1765 (5.00)	1755 (5.23)	1755 (5.00)
DAP	1250 (3.21)	1313 (3.93)	1287 (3.45)	1167 (3.30)	1400 (4.17	1276 (3.64)
MOP	0 (0.00)	48 (0.14)	45 (0.12)	54 (0.15)	0 (0.00)	33 (0.09)
Other fertilizers	354 (0.91)	819 (2.45)	1166 (3.12)	1190 (3.36)	1025 (3.05)	1104 (3.15)
Weedicides	702 (1.80)	741 (2.22)	845 (2.27)	789 (2.23)	765 (2.28)	789 (2.25)
Insecticides	2969 (7.62)	2727 (8.16)	3193 (8.56)	3242 (9.17)	3342 (9.96)	3246 (9.25)
Interest @ 7% for half period	670 (1.72)	575 (1.72)	642 (1.72)	608 (1.72)	577 (1.72)	604 (1.72)
Total variable cost	38967 (100.00)	33407 (100.00)	37309 (100.00)	35337 (100.00)	33561 (100.00)	35102 (100.00)
Gross returns	96542	96250	97125	101622	99867	100086
ROVC	57574	62843	59816	66285	66305	64984
Benefit-cost ratio	2.48	2.88	2.60	2.88	2.98	2.85

Figures in the brackets indicate the percent to total

It shows that paddy cultivation is highly labour intensive and the farmers have to incur highest expenses on it, which is particularly required during the transplanting of crop. Expenses on machine labour, fertilisers and seed were the other important components of the variable cost. Amongst different farm size categories, on per hectare basis, the large farms had to incur the lowest expenses on machine labour (Rs. 2278). The marginal farmers had to incur the highest expenses on use of diesel (Rs. 9771 per hectare). The average farm was found to incur Rs. 654 per hectare for seed, and there were not large variations amongst different farm size categories (Table 4.2.1). Amongst different fertilisers, on per hectare basis, the highest expenses were incurred on urea (Rs. 1755) followed by DAP (Rs. 1276) and MOP (Rs. 33). The per hectare returns over variable cost were found to vary between Rs. 57574 for marginal farmers to Rs. 66305 for the large farms. Likewise, the benefit cost ratio was found to be the lowest (2.48) for marginal farmers and the highest for the large farms (2.98).

4.2.2 Basmati-paddy

The total variable cost on per hectare basis for basmati-paddy crop was found to vary between Rs 31544 for medium farms to Rs 42028 for the marginal farms which is due to the high level of cost of machine labour incurred by marginal farms which were mostly using the hired machinery for carrying out the various operations during basmati-paddy production (Table 4.2.2). On overall basis, the total variable cost on per hectare basis was found to be Rs 31911. Human labour was found to take larger proportion of the cost as its share was about 49 per cent. Most of the labour is required during the transplantation and harvesting of the crop. The marginal farmers had to incur the highest expenses on use of diesel (Rs. 7486 per hectare). Amongst different farm size categories, on per hectare basis, the marginal farms had to incur the highest expenses on machine labor (Rs. 7167) as they were mostly dependent upon the hired machinery. The expenses for urea on per hectare basis were found to vary between Rs 675 for marginal farms to Rs 1013 for the large farms, while the expenses for DAP were the highest for marginal farms (Rs. 1800). Amongst different farm size categories, on per hectare basis, the marginal farms had to incur the highest expenses on seed (Rs. 1000). The per hectare returns over variable cost were found to vary between Rs. 46572 for marginal farmers to Rs. 77984 for the medium farms. Likewise, the benefit cost ratio was found to be the lowest (2.11) for marginal farmers and the highest for the medium farms (3.47).

Table 4.2.2: Cost of cultivation of basmati-paddy crop on sample farms, Punjab, 2014-15

(Rs/ha)

Particulars	Marginal	Small	Semi medium	Medium	Large	Overall
Human Labour	19602 (46.64)	20375 (60.08)	15335 (44.81)	16695 (52.93)	14599 (46.02)	15689 (49.17)
Machine use						
Hired machine charges	7167 (17.05)	0 (0.00)	1701 (4.97)	690 (2.19)	1716 (5.41)	1290 (4.04)
Use of diesel	7486 (17.81)	4897 (14.44)	8168 (23.87)	4837 (15.34)	6594 (20.78)	6003 (18.81)
Seed	1000 (2.38)	750 (2.21)	819 (2.39)	952 (3.02)	847 (2.67)	879 (2.75)
FYM	0 (0.00)	0 (0.00)	0 (0.00)	464 (1.47)	0 (0.00)	225 (0.71)
Urea	675 (1.61)	810 (2.39)	928 (2.71)	940 (2.98)	1013 (3.19)	931 (2.92)
DAP	1800 (4.28)	1500 (4.42)	1575 (4.60)	1714 (5.43)	1725 (5.44)	1654 (5.18)
MOP	0 (0.00)	0 (0.00)	239 (0.70)	137 (0.43)	0 (0.00)	123 (0.38)
Other fertilizers	375 (0.89)	750 (2.21)	453 (1.32)	776 (2.46)	688 (2.17)	657 (2.06)
Weedicides	700 (1.67)	500 (1.47)	788 (2.30)	769 (2.44)	750 (2.36)	752 (2.36)
Insecticides	2500 (5.95)	3750 (11.06)	3625 (10.59)	3027 (9.60)	3250 (10.24)	3161 (9.90)
Interest @ 7% for half period	723 (1.72)	583 (1.72)	589 (1.72)	543 (1.72)	546 (1.72)	549 (1.72)
Total variable cost	42028 (100.00)	33916 (100.00)	34220 (100.00)	31544 (100.00)	31727 (100.00)	31911 (100.00)
Gross returns						
Main product	76000	82875	84648	99689	105094	94964
by-product	12600	7500	2144	9839	1000	5847
Total	88600	90375	86792	109529	106094	100811
ROVC	46572	56459	52573	77984	74367	68900
Benefit-cost ratio	2.11	2.66	2.54	3.47	3.34	3.16

Figures in the brackets indicate the percent to total

4.2.3 Cotton

The total variable cost on per hectare basis for cotton crop was found to vary between Rs 38629 for marginal farms to Rs 41434 for the large farms. The variation is due to the level of cost of machine labour incurred by these farms. On overall basis, the total variable cost on per hectare basis was found to be Rs 39213. Amongst variable cost components, the share of human labour was about 46 per cent. It shows that cotton cultivation is highly labour intensive and the farmers have to incur highest expenses on it, which is particularly required

during the harvesting of the crop. Expenses on seed, plant protection measures, fertilisers and machine labour were the other important components of the variable cost. Amongst different farm size categories, on per hectare basis, the large farms had to incur the lowest expenses on hired machine labour (Rs. 41), urea (Rs. 1238) and DAP (Rs. 2400).

Table 4.2.3: Cost of cultivation of cotton crop cultivation on sample farms, Punjab, 2014-15

(Rs/ha)

Particulars	Marginal	Small	Semi medium	Medium	Large	Overall
Human Labour	16078 (41.62)	17129 (43.15)	18061 (46.18)	18328 (47.35)	19824 (47.84)	18166 (46.33)
Machine use						0
Hired machine charges	4891 (12.66)	2474 (6.23)	831 (2.12)	253 (0.65)	41 (0.10)	872 (2.22)
Use of diesel	3164 (8.19)	4163 (10.49)	4381 (11.20)	4333 (11.19)	3946 (9.52)	4197 (10.70)
Seed	4306 (11.15)	4391 (11.06)	5242 (13.40)	5298 (13.69)	5950 (14.36)	5213 (13.29)
FYM	0 (0.00)	0 (0.00)	164 (0.42)	214 (0.55)	0 (0.00)	132 (0.34)
Urea	1238 (3.20)	1308 (3.29)	1287 (3.29)	1238 (3.43)	1238 (3.26)	1306 (3.33)
DAP	2833 (7.33)	2550 (6.42)	2531 (6.47)	2571 (6.64)	2400 (5.79)	2535 (6.46)
MOP	64 (0.17)	0 (0.00)	84 (0.21)	191 (0.49)	191 (0.46)	130 (0.33)
Other fertilizers	0 (0.00)	70 (0.18)	0 (0.00)	0 (0.00)	0 (0.00)	8 (0.02)
Weedicides	392 (1.01)	616 (1.55)	692 (1.77)	684 (1.77)	745 (1.80)	671 (1.71)
Insecticides	5000 (12.94)	6313 (15.90)	5164 (13.20)	4839 (12.50)	6275 (15.14)	5309 (13.54)
Interest @ 7% for half period	664 (1.72)	683 (1.72)	673 (1.72)	666 (1.72)	713 (1.72)	674 (1.72)
Total variable cost	38629 (100.00)	39695 (100.00)	39110 (100.00)	38703 (100.00)	41434 (100.00)	39213 (100.00)
Gross returns						
Main product	53963	59920	68805	68710	79935	68513
by-product	1544	1894	2338	2198	2680	2241
Total	55507	61814	71143	70908	82615	70754
ROVC	16878	22119	32033	32205	41181	31541
Benefit-cost ratio	1.44	1.56	1.82	1.83	1.99	1.80

Figures in the brackets indicate the percent to total

The marginal farms had to incur the highest expenses on use of diesel (Rs. 3164). The average farm was found to incur Rs. 5213 per hectare basis for seed, and there was not large variations amongst different farm size categories (Table 4.2.3). The per hectare returns over

variable cost were found to vary between Rs. 16878 for marginal farmers to Rs. 41181 for the large farms. Likewise, the benefit cost ratio was found increase with the increase in farm size.

4.2.4 Maize

The total variable cost on per hectare basis for maize was found to vary between Rs 30721 for medium farms to Rs 33205 for the semi-medium farms (Table 4.2.4).

Table 4.2.4: Cost of cultivation of kharif maize crop on sample farms, Punjab, 2014-15

(Rs/ha)

Particulars	Marginal	Small	Semi medium	Medium	Large	Overall
Human Labour	13985 (42.39)	12682 (39.75)	14826 (44.65)	13975 (45.49)	14223 (44.27)	14153 (44.10)
Machine use						
Hired machine charges	5193 (15.74)	4613 (14.46)	1695 (5.11)	989 (3.22)	603 (1.88)	1916 (5.97)
Use of diesel	3516 (10.66)	4461 (13.98)	5562 (16.75)	4634 (15.08)	5702 (17.75)	5002 (15.59)
Seed	3875 (11.75)	3594 (11.26)	4188 (12.61)	4367 (14.21)	4625 (14.40)	4204 (13.10)
FYM	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)
Urea	844 (2.56)	900 (2.82)	1030 (3.10)	891 (2.90)	1013 (3.15)	953 (2.97)
DAP	3000 (9.09)	3000 (9.40)	2842 (8.56)	3000 (9.77)	3000 (9.34)	2954 (9.20)
MOP	0 (0.00)	0 (0.00)	0 (0.00)	140 (0.46)	287 (0.89)	76 (0.24)
Other fertilizers	0 (0.00)	0 (0.00)	59 (0.18)	0 (0.00)	0 (0.00)	21.21 (0.07)
Weedicides	721 (2.18)	648 (2.03)	718 (2.16)	680 (2.21))	750 (2.33)	698 (2.18)
Insecticides	1292 (3.92)	1458 (4.57)	1712 (5.16)	1517 (4.94)	1375 (4.28)	1564 (4.87)
Interest @ 7% for half period	567 (1.72)	549 (1.72)	571 (1.72)	528 (1.72)	553 (1.72)	552
Total variable cost	32992 (100.00)	31904 (100.00)	33205 (100.00)	30721 (100.00)	32129 (100.00)	32094 (100.00)
Gross returns						
Main product	41117	41899	41578	46038	50000	44116
by-product	3550	3805	4967	3752	4625	4271
Total	44667	45704	46545	49789	54625	48388
ROVC	11675	13800	13341	19068	22496	16294
Benefit-cost ratio	1.35	1.43	1.40	1.62	1.70	1.51

Figures in the brackets indicate the percent to total

On overall basis, the total variable cost on per hectare basis was found to be Rs 32094. About 44 per cent of the operational cost was incurred on human labour, most of which is required during the inter culture and harvesting of the crop. Expenses on fertilisers, seed and machine labour were the other important components of the variable cost and the expenses on these were about 12, 13 and 6 per cent of the total variable cost respectively. Amongst different farm size categories, on per hectare basis, the marginal farms had to incur the highest expenses on hired machine labor (Rs. 5193) and DAP fertiliser (Rs. 3000). The expenses for use of diesel on per hectare basis were found to vary between Rs 3516 for marginal farms to Rs 5702 for the large farms. Amongst different farm size categories, on per hectare basis, the large farms had to incur the highest expenses on seed (Rs. 4625). The per hectare returns over variable cost were found to vary between Rs. 41117 for marginal farmers to Rs. 50000 for the large farms. Likewise, the benefit cost ratio was found to be the lowest (1.35) for marginal farmers and the highest for the large farms (1.70).

4.2.5 Sugarcane

The total variable cost on per hectare basis for sugarcane was found to be Rs 90643 for medium farms and Rs 100219 for the large farms (Table 4.2.5). On overall basis, the total variable cost on per hectare basis was found to be Rs 82780. About 54 per cent of the operational cost was incurred on human labour, most of which is required during the inter culture and harvesting of the crop. Amongst different farm size categories, on per hectare basis, the medium farms had to incur the higher expenses on seed (Rs. 12375), urea (Rs. 2363) and insecticides (Rs. 7083), while the large farms had to incur the higher expenses on use of diesel (Rs. 11007) and weedicides (Rs. 1083). The per hectare returns over variable cost were found to be Rs. 124915 for medium farmers and Rs. 121561 for the large farms with the benefit cost ratio of 2.38 and 2.21, respectively.

Table 4.2.5: Cost of cultivation of sugarcane crop on sample farms, Punjab, 2014-15

(Rs/ha)

Particulars	Marginal	Small	Semi medium	Medium	Large	Overall
Human Labour	-	-	-	51138 (56.42)	53144 (53.03)	44579 (53.85)
Machine use						
Hired machine charges	-	-	-	0 (0.00)	0 (0.00)	0 (0.00)
Use of diesel	-	-	-	6903 (7.62)	11007 (10.98)	8414 (10.16)
Seed	-	-	-	12375 (13.65)	11925 (11.90)	10203 (12.33)
FYM	-	-	-	1667 (1.84)	1667 (1.66)	1412 (1.71)
Urea	-	-	-	2363 (2.61)	2250 (2.25)	1931 (2.33)
DAP	-	-	-	4800 (5.30)	4800 (4.79)	4067 (4.91)
MOP	-	-	-	0 (0.00)	1913 (1.91)	1195 (1.44)
Other fertilizers	-	-	-	500.00 (0.55)	3875.00 (3.87)	2533 (3.06)
Weedicides	-	-	-	750 (0.83)	1083 (1.08)	844 (1.02)
Insecticides	-	-	-	7083 (7.81)	5167 (5.16)	4803 (5.80)
Interest @ 7% for half period	-	-	-	3065 (3.38)	3389 (3.38)	2799 (3.38)
Total variable cost	-	-	-	90643 (100.00)	100219 (100.00)	82780 (100.00)
Gross returns						
Main product	-	-	-	212625	218250	183656
by-product	-	-	-	2933	3530	2858
Total	-	-	-	215558	221780	186514
ROVC	-	-	-	124915	121561	103734
Benefit-cost ratio	-	-	-	2.38	2.21	2.25

Figures in the brackets indicate the percent to total

4.2.6 Wheat

The total variable cost on per hectare basis for wheat crop was found to vary between Rs 25033 for large farms to Rs 29714 for the marginal farms while on overall basis, the total variable cost on per hectare basis was found to be Rs 25651 (Table 4.2.6). Use of diesel was found to take larger proportion of the cost as its share was about 22 per cent. Expenses on machine labour, seed and plant protection measures were the other important components of the variable cost and the expenses on these were about 15, 11 and 11 per cent of the total

variable cost, respectively. Amongst different farm size categories, on per hectare basis, the marginal farms had to incur the highest expenses on machine labour (Rs. 7042) and urea (Rs. 1418). Amongst different farm size categories, on per hectare basis, the semi-medium farms had to incur the highest expenses on DAP fertiliser (Rs. 3660). The per hectare returns over variable cost were found to vary between Rs. 44610 for marginal farms to Rs. 55076 for the large farms. Likewise, the benefit cost ratio was found to be the lowest (2.50) for marginal farmers and the highest for the large farms (3.20).

Table 4.2.6: Cost of cultivation of Wheat crop on sample farms, Punjab, 2014-15

(Rs/ha)

Particulars	Marginal	Small	Semi medium	Medium	Large	Overall
Human Labour	6464 (21.75)	4972 (18.33)	4464 (16.87)	4441 (17.64)	5090 (20.33)	4693 (18.30)
Machine use						0
Hired machine charges	7042 (23.70)	5695 (20.99)	4459 (16.85)	3618 (14.37)	3306 (13.21)	3962 (15.45)
Use of diesel	5187 (17.45)	5319 (19.61)	5849 (22.10)	5604 (22.26)	5401 (21.57)	5569 (21.71)
Seed	2888 (9.72)	2550 (9.40)	2862 (10.81)	2848 (11.31)	3016 (12.05)	2869 (11.19)
FYM	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)
Urea	1418 (4.77)	1546 (5.70)	1533 (5.79)	1585 (6.29)	1580 (6.31)	1561 (6.09)
DAP	3429 (11.54)	3491 (12.87)	3660 (13.83)	3569 (14.17)	3220 (12.86)	3486 (13.59)
MOP	0 (0.00)	23 (0.09)	35 (0.13)	12 (0.05)	0 (0.00)	15 (0.06)
Other fertilizers	53 (0.19)	98 (0.36)	279 (1.05)	279 (1.11)	250 (1.00)	253 (1.00)
Weedicides	1009 (3.40)	1030 (3.80)	1093 (4.13)	1037 (4.12)	1048 (4.19)	1050 (4.09)
Insecticides	1713 (5.76)	1939 (7.15)	1778 (6.72)	1753 (6.96)	1692 (6.76)	1752 (6.83)
Interest @ 7% for half period	511 (1.72)	467 (1.72)	455 (1.72)	433 (1.72)	431 (1.72)	441 (1.72)
Total variable cost	29714 (100.00)	27131 (100.00)	26467 (100.00)	25179 (100.00)	25033 (100.00)	25651 (100.00)
Gross returns						
Main product	63036	63031	65395	67380	68972	66785
by-product	11288	9511	9890	10133	11137	10301
Total	74324	72542	75285	77513	80108	77086
ROVC	44610	45411	48818	52334	55076	51434
Benefit-cost ratio	2.50	2.67	2.84	3.08	3.20	3.01

Figures in the brackets indicate the percent to total

4.2.7 Potato

The total variable cost on per hectare basis for potato crop was found to vary between Rs 67452 for medium farms to Rs 70807 for the large farms (Table 4.2.7).

Table 4.2.7: Cost of cultivation of Potato crop on sample farms, Punjab, 2014-15

(Rs/ha)

Particulars	Marginal	Small	Semi medium	Medium	Large	Overall
Human Labour	-	19871 (28.14)	22013 (31.39)	20860 (30.93)	21934 (30.98)	21335 (30.97)
Machine use						0
Hired machine charges	-	4966 (7.03)	240 (0.34)	248 (0.37)	54 (0.08)	286 (0.42)
Use of diesel	-	6433 (9.11)	6425 (9.16)	7398 (10.97)	7742 (10.93)	7252 (10.53)
Seed	-	23333 (33.04)	22683 (32.35)	21990 (32.60)	23429 (33.09)	22580 (32.78)
FYM	-	0 (0.00)	0 (0.00)	0 (0.00)	428 (0.61)	185 (0.27)
Urea	-	1688 (2.39)	1832 (2.61)	1659 (2.46)	1736 (2.45)	1713 (2.49)
DAP	-	9000 (12.74)	10071 (14.36	9500 (14.08)	9000 (12.71)	9297 (13.49)
MOP	-	638 (0.9)	1639 (2.34)	1514 (2.24)	2459 (3.47)	1910 (2.77)
Other fertilizers		1500 (2.12)	652 (0.93)	740 (1.10)	214 (0.30)	508 (0.74)
Weedicides	-	708 (1.00)	938 (1.34)	896 (1.33)	982 (1.39)	928 (1.35)
Insecticides	-	1875 (2.65)	3018 (4.30)	2063 (3.06)	2214 (3.13)	2298 (3.34)
Interest @ 7% for half period	-	613 (0.87)	608 (0.87)	585 (0.87)	614 (0.87)	598 (0.87)
Total variable cost	-	70624 (100.00)	70119 (100.00)	67452 (100.00)	70807 (100.00)	68890 (100.00)
Gross returns						
Main product	-	91417	88116	94086	85089	88017
Total	-	91417	88116	94086	85089	88017
ROVC	-	20793	17997	26634	14283	19126
Benefit-cost ratio	-	1.29	1.26	1.39	1.20	1.28

Figures in the brackets indicate the percent to total

On overall basis, the total variable cost on per hectare basis was found to be Rs 68890. Human labour was found to take larger proportion of the cost as its share was about 31 per cent. The large farmers had to incur the highest expenses on use of diesel (Rs. 7742 per hectare). Amongst different farm size categories, on per hectare basis, the small farms had to incur the highest expenses on machine labor (Rs. 4966) as they were mostly dependent

upon the hired machinery. The expenses for urea on per hectare basis were found to vary between Rs 1659 for medium farms to Rs 1832 for the semi-medium farms, while the expenses for DAP were the highest for semi-medium farms (Rs. 10071). Amongst different farm size categories, on per hectare basis, the large farms had to incur the highest expenses on seed (Rs. 23429). The per hectare returns over variable cost were found to vary between Rs. 14283 for large farmers to Rs. 26634 for the medium farms. Likewise, the benefit cost ratio was found to be the lowest (1.20) for large farmers and the highest for the medium farms (1.39).

4.3. Summary

Amongst various crops selected for the study, the total variable cost on per hectare basis was found to vary between Rs. 82780 for sugarcane to Rs. 25651 for wheat crop. Amongst variable cost components, the share of human labour was the highest. Expenses on machine labour, fertilisers and seed were the other important components of the variable cost. Urea, DAP and MOP were the important fertilisers used by the sample farmers. The results showed that the returns over variable cost fetched from sugarcane were the highest on per hectare basis (Rs. 103734) and the lowest for maize (Rs. 16294).

CHAPTER-V

AGRICULTURAL SUBSIDIES IN PUNJAB

The present chapter provides information on the flow of agricultural subsidies in Punjab during the last decade. The data pertaining to direct subsidies were obtained from the Directorate of Agriculture and Directorate of Horticulture, Punjab. The information on indirect subsidies i.e. subsidy on fertilizers, irrigation power etc. was obtained from the relevant departments. Besides, the present chapter also encompasses the direct subsidy availed by sample farmers.

5.1 Subsidies disbursed by different departments

5.1.1 Direct Subsidies

5.1.1.1 Subsidies on wheat seed

The per quintal subsidy provided by the Department of Agriculture in Punjab on wheat seed was found to be to the tune of Rs. 500 per quintal for the years 2012-13 and 2013-14, which increased to Rs. 700 per quintal during 2014-15 (Table 5.1.1). There was almost 3 fold increase in the per hectare subsidy in 2014-15 (Rs. 102) from Rs. 37 in 2012-13, which was mainly due to the doubling of quantity of wheat seed supplied from 2.63 lakh quintals to 5.1 lakh quintals during this period. Ferozepur, Hoshiarpur and Mukatsar were the leading districts in availing the subsidy during 2012-13, 2013-14 and 2014-15, respectively.

5.1.1.2 Subsidies provided for agricultural machinery by the Department of Agriculture

Table 5.1.2 highlights the provisional and actual amount of subsidy provided for agricultural machinery by the department of Agriculture in Punjab from 2002-03 to 2014-15. During this period the amount of subsidies varied considerably from year to year, showing an overall increasing trend. The actual expenditure on subsidies was Rs. 7.4 million during 2002-03. It increased continuously and reached its peak of Rs. 627.41 million during 2014-15. The proportion of amount actually spent to provisional amount varied from about 77 per cent during 2002-03 to as high 100 per cent since 2013-14. Some administrative bottlenecks need to be overcome in addition to invigorating the disbursement process in the state.

Table 5.1.1: District-wise distribution of subsidy on wheat seed, Department of Agriculture, GOP, 2012-13 to 2014-15

Districts	2012-13		2013-14		2014-15	
	Quantity (q)	Value (Rs lakh)	Quantity (q)	Value (Rs lakh)	Quantity (q)	Value (Rs lakh)
Amritsar	16764	83.82	16856	84.28	22773	159.41
Barnala	7918	39.59	6924	34.62	16863	118.04
Bathinda	33650	168.25	22366	111.83	45892	321.24
Faridkot	276	1.38	6920	34.60	10588	74.12
Fatehgarh	98	0.49	3444	17.22	8276	57.93
Firozepur	60844	304.22	34604	173.02	27289	191.02
Fazilika	-	-	-	-	39380	275.66
Gurdaspur	19094	95.47	13098	65.49	18933	132.53
Hoshiarpur	26404	132.02	24108	120.54	31843	222.90
Jalandhar	254	1.27	11300	56.50	15888	111.22
Kapurthala	2168	10.84	4656	23.28	12299	86.09
Ludhiana	30	0.15	7922	39.61	36021	252.15
Mansa	9604	48.02	9142	45.71	38477	269.34
Mukatsar	16348	81.74	13218	66.09	47301	331.10
Moga	1950	9.75	7084	35.42	33448	234.14
Mohali	4010	20.05	3930	19.65	9578	67.05
Nawan Shahar	30	0.15	7484	37.42	13437	94.06
Patiala	6764	33.82	5832	29.16	14739	103.17
Pathankot	-	-	-	-	4989	34.92
Ropar	6862	34.31	3444	17.22	9319	65.23
Sangrur	39438	197.19	14790	73.95	31381	219.67
Tarntaran	10254	51.27	14084	70.42	21612	151.28
Total	262760	1313.80	231206	1156.03	510325	3572.28
Subsidy (Rs/q)	500		500		700	
Subsidy of wheat acreage (Rs/ha)	37		32		102	

Source: Director of Agriculture, Punjab

Table 5.1.2: Subsidies provided on agricultural machinery, Department of Agriculture, GOP, 2002-03 to 2014-15

(Rs lakh)

Year	Total provision	Actual expenditure	Actual expenditure as % of budget provision
2002-03	97.00	74.23	76.53
2005-06	33.85	33.24	98.20
2006-07	140.50	140.09	99.71
2007-08	200.00	199.00	99.50
2008-09	374.29	365.30	97.60
2010-11	356.00	350.27	98.39
2012-13	263.75	248.53	94.23
2013-14	3370.00	3370.00	100.00
2014-15	6274.14	6274.14	100.00

Source: Director of Agriculture, Punjab

5.1.1.3 Subsidies disbursed by the Department of Horticulture in Punjab

Table 5.1.3 presents the amount of subsidy disbursed by the Department of Horticulture in Punjab from 2005-06 to 2014-15. The horticultural subsidies are disbursed under two schemes viz. National Horticulture Mission Scheme (NHMS) and Rashtriya Krishi Vikas Yojana (RKVY). There is no particular trend in the amount of subsidies during the last decade. The subsidies under NHMS amounted to Rs. 5.39 crores during 2005-06, peaked at Rs. 76.88 crores during 2012-13 and then declined to Rs. 44.24 crores during 2014-15. The proportion of amount actually spent to provisional amount varied from about 19 per cent during 2005-06 to as high about 168 per cent during 2008-09. The proportion is more than 100 per cent for some of the years due to utilization of unspent balance of previous year and interest accrued. The subsidies under RKVY peaked at Rs. 12.95 crores during 2013-14 and then declined to Rs. 8 crores during 2014-15. The funds allocated were fully utilized for the scheme.

Table 5.1.3: Scheme-wise subsidy on horticulture, Punjab

(Rs crores)

Year	NHMS			RKVY			Total		
	Provision	Actual expenditure	Actual expenditure as % of provision	Provision	Actual expenditure	Actual expenditure as % of provision	Provision	Actual expenditure	Actual expenditure as % of provision
2005-06	28.69	5.39	18.79	-	-	-	28.69	5.39	18.79
2006-07	11.5	18.95	164.78	-	-	-	11.5	18.95	164.78
2007-08	27.22	19.32	70.98	-	-	-	27.22	19.32	70.98
2008-09	17.52	29.42	167.92	-	-	-	17.52	29.42	167.92
2009-10	31.54	42.23	133.89	8.00	8.00	100.00	39.54	50.23	127.04
2010-11	41.27	43.38	105.11	6.45	6.45	100.00	47.715	49.825	104.42
2011-12	46.74	46.49	99.47	7.00	7.00	100.00	53.74	53.49	99.53
2012-13	76.36	76.88	100.68	11.75	11.75	100.00	88.11	88.63	100.59
2013-14	67.67	67.2	99.31	12.95	12.95	100.00	80.62	80.15	99.42
2014-15	44.32	44.24	99.82	8.00	8.00	100.00	52.32	52.24	99.85

Note: Expenditure utilization more than 100 per cent includes the unspent balance of previous years & interest accrued

5.1.2 Indirect Subsidies

5.1.2.1 Fertilizer subsidy

Fertilizer consumption has been increasing in India and in Punjab. Its use is responsive to price changes. Every time the prices have been increased, the increase in fertilizer consumption has come down. Studies have also shown positive association between fertilizer use and farm size, which became even sharper once again after the price hike in nineties. It has made the small farmers feel bitter due to non-neutrality of the institutional support and affordability.

The fertilizer subsidy in India as well as in Punjab from 2010-11 to 2014-15 have been presented in Table 5.1.4. The fertilizer subsidy in India as well as in Punjab has followed an fluctuating trend from 2010-11 to 2014-15; it decreased from Rs. 68217 crore to Rs. 50700 crore and in Punjab from Rs. 4581 crore to Rs. 3492 crore. The share of Punjab state in total fertilizer subsidies in India increased continuously from 6.71 per cent during 2010-11 to 7.74 per cent during 2012-13 and then declined to 6.89 per cent during 2014-15.

Table 5.1.4: Nutrient based fertilizer subsidy in India and Punjab, 2010-11 to 2014-15

(Rs crores)

Year	Punjab				India				Punjab as percentage of India			
	N	P	K	Total (NPK)	N	P	K	Total (NPK)	N	P	K	Total (NPK)
2010-11	3259	1143	179	4581	38460	21151	8605	68217	8.47	5.40	2.08	6.71
2011-12	3845	1449	144	5438	46976	25593	6891	79460	8.18	5.66	2.10	6.84
2012-13	3566	1007	58	4631	40370	14507	4948	59826	8.83	6.94	1.16	7.74
2013-14	2852	607	43	3502	34966	10523	3952	49441	8.16	5.77	1.10	7.08
2014-15	2822	613	57	3492	35382	11392	3926	50700	7.98	5.38	1.46	6.89

Note: Subsidy is calculated by multiplying the consumption of N, P and K with per unit subsidy of each individual nutrient.

5.1.2.2 Electricity consumption and subsidy

Table 5.1.5 highlights the electricity consumption and subsidy in Punjab agriculture from 2002-03 to 2014-15. The electricity consumption in Punjab agriculture increased from 5818 million KWH in 2002-03 to 10641 million KWH in 2014-15. The total cost of supply of electricity to agriculture increased from Rs. 900 crore in 2002-03 to Rs. 4454 crore during 2014-15. The electricity supply to agriculture sector is free. The per unit cost/subsidy in agriculture has also been continuously increasing from Rs. 1.55 per unit in 2002-03 to Rs. 4.19 per unit in 2014-15

Table 5.1.5: Consumption of power and power subsidy in Punjab agriculture, 2000-01 to 2014-15

Year	Consumption (Million Kwh/unit)	Subsidy	
		Total (Rs crores)	(Rs/unit)
2002-03	5818	900.00	1.55
2003-04	6243	787.69	1.26
2004-05	6468	873.61	1.35
2005-06	7313	1385.92	1.90
2006-07	8229	1423.80	1.73
2007-08	10022	2548.73	2.54
2008-09	9325	2305.39	2.47
2009-10	10469	3082.06	2.94
2010-11	10117	2793.54	2.76
2011-12	10249	3870.95	3.78
2012-13	10779	4787.07	4.44
2013-14	10224	4778.13	4.67
2014-15	10641	4454.54	4.19

Source: Punjab State Power Corporation Ltd.

5.2 Direct subsidies availed by the farmers

The direct subsidy availed by sample farmers is depicted in Table 5.2.1 and 5.2.2. The subsidy was found to vary between Rs. 804 for marginal farms to Rs. 20581 for the medium farms, which was mainly due to the high level of farm machinery subsidy availed by the medium farms (Rs. 18715). The level of subsidies availed by marginal, medium and large farms were the highest for farm machinery, while the small and medium farms availed highest subsidy on the wheat seed. On per hectare basis, the subsidy was found to vary between Rs. 210 for large farms to Rs. 1333 for medium farms, which was mainly due to the high level of farm machinery subsidy availed by the medium farms (Rs. 1212). The level of subsidies availed by large and medium farms were the highest for farm machinery, while the marginal, small and semi-medium farms availed highest subsidy on the wheat seed. The farmers also availed the subsidy on pesticides use for paddy and wheat crops.

Table 5.2.1: Direct subsidy availed by sampled farmers, 2014-15

(Rs/farm)

Size group/component	Marginal	Small	Semi-medium	Medium	Large	Overall
Crops: seed						
Wheat	241	1561	1455	1677	1267	1322
Crops: Pesticides						
Wheat	11	92	35	93	0	54
Paddy	0	0	19	96	0	31
Farm machinery:	552	39	430	18715	5378	5667
Total subsidy	804	1692	1939	20581	6645	7074

Table 5.2.2: Direct subsidy availed by sampled farmers, 2014-15

(Rs/ha)

Size group/component	Marginal	Small	Semi-medium	Medium	Large	Overall
Crops: Seed						
Wheat	161	428	198	109	40	133
Crops: Pesticides						
Wheat	7	25	5	6	0	6
Paddy	0	0	2	6	0	3
Farm machinery:	368	11	58	1212	170	571
Total subsidy	536	464	263	1333	210	713

5.3 Summary

The per quintal subsidy provided by the Department of Agriculture in Punjab on wheat seed was found to be to the tune of Rs. 500 for the years 2012-13 and 2013-14, which increased to Rs. 700 during 2014-15. There was almost three fold increase in the per hectare subsidy in 2014-15 (Rs. 102) from Rs. 37 in 2012-13, which was mainly due to the doubling of quantity of wheat seed supplied from 2.63 lakh quintals to 5.1 lakh quintals during this period. Ferozpur, Hoshiarpur and Muktsar were the leading districts in availing the subsidy during 2012-13, 2013-14 and 2014-15, respectively. The amount of subsidy provided for agricultural machinery by the department of Agriculture in Punjab from 2002-03 to 2014-15 increased from Rs. 7.4 million during 2002-03 to Rs. 627.41 million during 2014-15. The proportion of amount actually spent to provisional amount varied from about 77 per cent during 2002-03 to as high 100 per cent since 2013-14. The amount of subsidy disbursed by the Department of Horticulture in Punjab under NHMS amounted to Rs. 5.39 crores during 1990-91, peaked at Rs. 76.88 crores during 2012-13 and then declined to Rs. 44.24 crores during 2014-15. The proportion of amount actually spent to provisional amount varied from about 19 per cent during 2005-06 to as high about 168 per cent during 2008-09. The subsidies under RKVY peaked at Rs. 12.95 crores during 2013-14 and then declined to Rs. 8 crores during 2014-15. The funds allocated were fully utilized for the scheme. The fertilizer subsidy in India as well as in Punjab has followed an increasing trend from 2010-11 to 2014-15; it decreased from Rs. 68217 crore to Rs. 50700 crore and in Punjab from Rs. 4581 crore to Rs. 3492 crore. The share of Punjab state in total fertilizer subsidies in India increased continuously from 6.71 per cent during 2010-11 to 7.74 per cent during 2012-13 and then declined to 6.89 per cent during 2014-15. The electricity consumption in Punjab agriculture increased from 5818 million KWH in 2002-03 to 10641 million KWH in 2014-15. The total cost of supply of electricity to agriculture increased from Rs. 900 crore in 2002-03 to Rs. 4454 crore during 2014-15. The electricity supply to agriculture sector is free. The per unit cost/subsidy in agriculture has also been continuously increasing from Rs. 1.55 in 2002-03 to Rs. 4.19 in 2014-15. The direct subsidy availed by sample farmers was found to vary between Rs. 804 for marginal farms to Rs. 20581 for the medium farms, which was mainly due to the high level of farm machinery subsidy availed by the medium farms (Rs. 18715). The level of subsidies availed by marginal, medium and large farms were the highest for farm machinery, while the small and medium farms availed highest subsidy on the wheat seed. On per hectare basis, the subsidy was found to vary between Rs. 209 for large farms to Rs. 1333 for medium

farms, which was mainly due to the high level of farm machinery subsidy availed by the medium farms (Rs. 1212). The level of subsidies availed by large and medium farms were the highest for farm machinery, while the marginal, small and semi-medium farms availed highest subsidy on the wheat seed. The farmers also availed the subsidy on pesticides used for paddy and wheat crops.

CHAPTER-VI

CROP-WISE AND COMPONENT-WISE INPUT SUBSIDY

The crop-wise as well as component-wise input subsidy provided to the sample farmer was estimated and presented in the present chapter.

6.1 Crop-wise cost and return with and without subsidy

6.1.1 Paddy

Cost and returns with and without subsidies from paddy crop have been shown in Table 6.1.1. It can be seen that without subsidies there was an overall increase in the cost of growing paddy by Rs. 8486 per hectare. The farm category wise analysis revealed that there was increase in total cost of paddy growing by Rs.11268 per hectare on large farms followed by medium (Rs. 10009), semi-medium (Rs. 8504), small (Rs. 6753) and marginal (Rs. 4994) farms. The quantum of increase in cost due to withdrawal of subsidies in paddy crop was significantly higher on large, medium and semi-medium farms as compared to other farm categories which show the greater subsidy benefit realized by these farm categories.

Per farm basis analysis reveal that without benefit of subsidies there was an overall increase in the cost of paddy crop by 24.18 per cent which was Rs. 24272 per farm in value terms. On the other hand, decline in net returns in paddy growing was 13.06 per cent without subsidies on overall farms. As far as farm size wise increase in cost of production of paddy due to withdrawal of subsidies is concerned, there was the highest increase in cost of paddy production on large farms by 33.57 per cent followed by medium (28.34%), semi-medium (22.80%), small (20.21%) and marginal (12.82%) farms. Thus, subsidy benefit realized in paddy cultivation increased with increase in farm size showing advantage to medium and large category farmers.

Table 6.1.1: Costs and returns with and without subsidies from paddy, 2014-15

Category	With Subsidies			Without subsidies			Increase in total cost/Decline in net returns		
	GR	TC (A)	NR (B)	GR	TC	NR	Value (C)	% increase in TC (C/A*100)	% decline in NR (C/B*100)
Per hectare									
Marginal	96542	38967	57575	96542	43961	52581	4994	12.82	8.67
Small	96250	33407	62843	96250	40160	56090	6753	20.21	10.75
Semi-med	97125	37298	59827	97125	45802	51323	8504	22.80	14.21
Medium	101622	35316	66306	101622	45325	56297	10009	28.34	15.10
Large	99867	33561	66306	99867	44829	55038	11268	33.57	16.99
Overall	100086	35092	64994	100086	43578	56508	8486	24.18	13.06
Per farm									
Marginal	23170	9352	13818	23170	10551	12619	1199	12.82	8.67
Small	65450	22717	42733	65450	27309	38141	4592	20.21	10.75
Semi-med	160256	61541	98715	160256	75573	84683	14032	22.80	14.21
Medium	468476	162808	305668	468476	208948	259528	46140	28.34	15.10
Large	1159452	389646	769806	1159452	520464	638988	130818	33.57	16.99
Overall	286247	100362	185885	286247	124634	161613	24272	24.18	13.06

Note: GR stands for gross returns, TC stands for total costs and NR stands for net returns.

6.1.2 Basmati-paddy

Per hectare and per farm cost and returns with and without subsidies for basmati-paddy crop have been depicted in Table 6.1.2. It was observed that without subsidies there was an overall increase in the cost of growing basmati-paddy by Rs. 5933 per hectare. The increase in total cost without subsidies worked out to be Rs.8392 per hectare on large farms followed by medium (Rs. 7330), semi-medium (Rs. 6029), small (Rs. 3079) and marginal (Rs. 2804) farms. Therefore, in basmati-paddy growing there was higher subsidy benefit enjoyed by semi-medium, medium and large farmers followed by other farm categories.

Further, it can be observed that without benefit of subsidies there was an overall increase in the cost of basmati growing by 18.60 per cent or in other way decline in net returns by 8.61 per cent, which in monetary terms worked out at Rs. 1306 per farm. According to farm size, increase in cost of basmati-paddy production without any subsidy was 26.46 per cent on large farms followed by medium (23.24%), semi-medium (17.62%), small (9.14%) and marginal (6.67%) farms. Both per hectare and per farm analysis revealed higher quantum of subsidy benefit realized by farmers in upper hierarchy.

6.1.3 Cotton

Cost and returns with and without subsidies in case of cotton crop (Table 6.1.3) revealed that in overall scenario there was increase in cost of growing cotton by Rs. 4532 per hectare without subsidies. The increase in cost or decline in net returns in cotton crop without subsidies was by Rs. 5573 per hectare on large farms followed by medium (Rs. 4957), semi-medium (Rs. 4320) small (Rs. 4091) and marginal (Rs. 4058) farms.

It is quite obvious that without subsidies on per farm basis there was an overall increase in the cost of growing cotton by Rs. 2764 per farm which was 11.56 per cent in relative terms. Subsequently, net returns in cotton growing decline by 14.37 per cent. Increase in cost of growing cotton with no subsidy benefit was Rs. 6185 per farm in case of large farms which was actually 13.45 per cent increase in total cost and this was followed by increase in cost on medium (12.81%), semi-medium (11.05%), marginal (10.50%) and small (10.31%) farms. Thus, increase in cost of growing cotton without subsidy was highest on large and medium farms followed by other farm categories which shows the higher relative subsidy benefit realized by these farmers.

Table 6.1.2: Costs and returns with and without subsidies from basmati-paddy, 2014-15

Category	With Subsidies			Without subsidies			Increase in total cost/Decline in net returns		
	GR	TC (A)	NR (B)	GR	TC	NR	Value (C)	% increase in TC (C/A*100)	% decline in NR (C/B*100)
Per hectare									
Marginal	88600	42028	46572	88600	44832	43768	2804	6.67	6.02
Small	90375	33916	56459	90375	36995	53380	3079	9.14	5.45
Semi-med	86792	34220	52572	86792	40249	46543	6029	17.62	11.47
Medium	109529	31544	77985	109529	38874	70655	7330	23.24	9.40
Large	106094	31727	74367	106094	40119	65975	8392	26.46	11.28
Overall	100811	31911	68900	100811	37844	62967	5933	18.60	8.61
Per farm									
Marginal	2658	1261	1397	2658	1345	1313	84	6.67	6.02
Small	904	339	565	904	370	534	31	9.14	5.45
Semi-med	14755	5817	8938	14755	6842	7913	1025	17.62	11.47
Medium	43811	12618	31193	43811	15550	28261	2932	23.24	9.40
Large	64717	19353	45364	64717	24473	40244	5120	26.46	11.28
Overall	22178	7020	15158	22178	8326	13852	1306	18.60	8.61

Note: GR stands for gross returns, TC stands for total costs and NR stands for net returns.

Table 6.1.3: Costs and returns with and without subsidies from cotton, 2014-15

Category	With Subsidies			Without subsidies			Increase in total cost/Decline in net returns		
	GR	TC (A)	NR (B)	GR	TC	NR	Value (C)	% increase in TC (C/A*100)	% decline in NR (C/B*100)
Per hectare									
Marginal	55507	38629	16878	55507	42687	12820	4058	10.50	24.04
Small	61814	39695	22119	61814	43786	18028	4091	10.31	18.50
Semi-med	71143	39110	32033	71143	43430	27713	4320	11.05	13.49
Medium	70908	38703	32205	70908	43660	27248	4957	12.81	15.39
Large	82615	41434	41181	82615	47007	35608	5573	13.45	13.53
Overall	70754	39213	31541	70754	43745	27009	4532	11.56	14.37
Per farm									
Marginal	10546	7340	3206	10546	8110	2436	770	10.50	24.04
Small	22253	14290	7963	22253	15763	6490	1473	10.31	18.50
Semi-med	44109	24248	19861	44109	26927	17182	2679	11.05	13.49
Medium	60981	33285	27696	60981	37548	23433	4263	12.81	15.39
Large	91703	45992	45711	91703	52177	39526	6185	13.45	13.53
Overall	43160	23920	19240	43160	26684	16476	2764	11.56	14.37

Note: GR stands for gross returns, TC stands for total costs and NR stands for net returns.

6.1.4 Maize

Per hectare and per farm cost and returns with and without subsidies in maize crop have been shown in Table 6.1.4. In overall scenario, there was increase in cost of growing maize by Rs. 4514 per hectare without subsidies. It was seen that without subsidies increase in total cost or decline in net returns in maize crop was by Rs.5343 per hectare on large farms followed by medium (Rs. 4859), semi-medium (Rs. 4584) small (Rs. 4053) and marginal (Rs. 3612) farms. Thus, in raising maize crop also, quantum of subsidy benefit realized was higher on large, medium and semi-medium farms.

In case of maize crop, per farm cost and returns analysis revealed that without subsidies there was an overall increase in the cost or decline in net returns of growing maize by Rs. 2618 per farm which was 14.06 per cent in relative terms while decline in net returns was by 27.70 per cent. Increase in cost of growing maize without subsidy was Rs. 3985 per farm in case of medium farms followed by semi-medium (Rs. 3118), large (Rs. 2992), small (Rs. 1946) and marginal (Rs. 469) farms. However, relative increase in cost of growing maize without subsidy was highest at large (16.63%), medium (15.82%) farms followed by other farm categories which show the higher subsidy benefit realized by the large and medium category farmers. Per farm analysis of maize growing in value terms revealed higher subsidy benefit realized by medium, semi-medium farmers as compared to other farm categories.

6.1.5 Sugarcane

In case of sugarcane crop, cost and returns with and without subsidies have been shown in Table 6.1.5. It was observed that without subsidies there was an overall increase in the cost of growing sugarcane by Rs. 9963 per hectare. According to farm category there was increase in total cost of sugarcane growing without subsidy by Rs.14203 per hectare on large farms followed by Rs.11930 on medium farms. Again, it was seen that the benefit of subsidy was higher on large farm category.

Per farm analysis revealed that without subsidies there was an overall increase in the cost of producing sugarcane by Rs. 598 per farm which was 12.04 per cent in relative terms. Also, there was 9.60 per cent decline in net returns without subsidies. As far as increase in cost of growing sugarcane due to withdrawal of subsidies is concerned, there was highest increase in cost of sugarcane growing on large farms by 14.17 per cent followed by medium (13.16%) farms. Thus, large farmers category enjoyed higher benefit of subsidy in case of sugarcane crop also.

Table 6.1.4: Costs and returns with and without subsidies from maize, 2014-15

Category	With Subsidies			Without subsidies			Increase in total cost/Decline in net returns		
	GR	TC (A)	NR (B)	GR	TC	NR	Value (C)	% increase in TC (C/A*100)	% decline in NR (C/B*100)
Per hectare									
Marginal	44667	32992	11675	44667	36604	8063	3612	10.93	30.94
Small	45704	31904	13800	45704	35957	9747	4053	12.70	29.37
Semi-med	46545	33205	13340	46545	37789	8756	4584	13.81	34.36
Medium	49789	30721	19068	49789	35580	14209	4859	15.82	25.48
Large	54625	32129	22496	54625	37472	17153	5343	16.63	23.75
Overall	48388	32094	16294	48388	36608	11780	4514	14.06	27.70
Per farm									
Marginal	5807	4289	1518	5807	4758	1049	469	10.93	30.94
Small	21938	15314	6624	21938	17260	4678	1946	12.70	29.37
Semi-med	31651	22579	9072	31651	25697	5954	3118	13.81	34.36
Medium	40827	25191	15636	40827	29176	11651	3985	15.82	25.48
Large	30590	17992	12598	30590	20984	9606	2992	16.63	23.75
Overall	28065	18615	9450	28065	21233	6832	2618	14.06	27.70

Note: GR stands for gross returns, TC stands for total costs and NR stands for net returns.

Table 6.1.5: Costs and returns with and without subsidies from sugarcane, 2014-15

Category	With Subsidies			Without subsidies			Increase in total cost/Decline in net returns		
	GR	TC (A)	NR (B)	GR	TC	NR	Value (C)	% increase in TC (C/A*100)	% decline in NR (C/B*100)
Per hectare									
Marginal	-	-	-	-	-	-	-	-	
Small	-	-	-	-	-	-	-	-	
Semi-med	-	-	-	-	-	-	-	-	
Medium	215558	90643	124915	215558	102573	112985	11930	13.16	9.55
Large	221780	100219	121561	221780	114422	107358	14203	14.17	11.68
Overall	186514	82780	103734	186514	92743	93771	9963	12.04	9.60
Per farm									
Marginal	-	-	-	-	-	-	-	-	
Small	-	-	-	-	-	-	-	-	
Semi-med	-	-	-	-	-	-	-	-	
Medium	10778	4532	6246	10778	5129	5649	597	13.16	9.55
Large	99801	45099	54702	99801	51490	48311	6391	14.17	11.68
Overall	11191	4967	6224	11191	5565	5626	598	12.04	9.60

Note: GR stands for gross returns, TC stands for total costs and NR stands for net returns.

6.1.6 Wheat

Cost and returns with and without subsidies in case of wheat crop have been shown in Table 6.1.6. It is quite clear that without subsidies there was an overall increase in the cost of growing wheat by Rs. 5763 per hectare. The increase in total cost or decline in net returns without subsidies was to the tune of Rs.6213 per hectare in case of small farms followed by medium (Rs. 6211), large (Rs. 6062), semi-medium (Rs.5759) and marginal (Rs. 4892) farms. In case of wheat crop, quantum of subsidy benefit realized per hectare was higher on small and medium farms as compared to other farm categories.

Per farm analysis brought out that there was an overall increase in the cost or decline in net returns of growing wheat by Rs. 22647 per farm without subsidy benefit and it was 22.78 per cent while the decline in net returns for wheat was 11.13 per cent in overall scenario without subsidy benefit. As far as farm size wise increase in cost of wheat growing due to withdrawal of subsidies is concerned, there was highest increase in the cost of wheat growing on medium farms by 24.96 per cent followed by large (24.32%), small (23.88%), semi-medium (22.17%) and marginal (16.69%) farms. Therefore, in case of wheat crop also large, medium and semi-medium category farmers got higher per farm subsidy benefit due to more area under wheat cultivation. However, per cent increase in total cost without subsidy was higher on medium, large, small and semi-medium farms and least on marginal farms.

6.1.7 Potato

Per hectare and per farm cost and returns with and without subsidies in potato crop have been shown in Table 6.1.7. It was observed that in overall scenario, there was increase in total cost of growing potato by Rs. 10031 per hectare without subsidies. Further, it was seen that without subsidies increase in cost or decline in returns in potato was by Rs.10645 per hectare on large farms followed by semi-medium (Rs.10544), medium (Rs.10400) and small (Rs.8884) farms. Also, in case of potato crop, subsidy benefit realized was higher on large, semi-medium and medium farms as compared to small farms.

Per farm results revealed that there was an overall increase in the cost of potato crop by 14.56 per cent which was Rs. 4815 per farm in monetary terms. On the contrary, decline in net returns of potato growing was by 52.44 per cent without any subsidy benefit. According to farm size there was 15.42 per cent increase in potato growing due to withdrawal of subsidies on medium category farms followed by large, semi-medium (15.04%) and small (12.58%) farms. Thus, the quantum of subsidy benefit realized per farm was highest on large farm category due to more area under potato cultivation but relative increase in total cost was nearly equal as compared to other farm categories except small farms.

Table 6.1.6: Costs and returns with and without subsidies from wheat, 2014-15

Category	With Subsidies			Without subsidies			Increase in total cost/Decline in net returns		
	GR	TC (A)	NR (B)	GR	TC	NR	Value (C)	% increase in TC (C/A*100)	% decline in NR (C/B*100)
Per hectare									
Marginal	74324	29314	45010	74324	34206	40118	4892	16.69	10.87
Small	72542	26022	46520	72542	32235	40307	6213	23.88	13.36
Semi-med	75285	25974	49311	75285	31733	43552	5759	22.17	11.68
Medium	77513	24888	52625	77513	31099	46414	6211	24.96	11.80
Large	80108	24927	55181	80108	30989	49119	6062	24.32	10.99
Overall	77086	25301	51785	77086	31064	46022	5763	22.78	11.13
Per farm									
Marginal	46824	18468	28356	46824	21550	25274	3082	16.69	10.87
Small	108088	38773	69315	108088	48030	60058	9257	23.88	13.36
Semi-med	227360	78441	148919	227360	95833	131527	17392	22.17	11.68
Medium	471278	151316	319962	471278	189082	282196	37766	24.96	11.80
Large	965305	300376	664929	965305	373414	591891	73038	24.32	10.99
Overall	302947	99434	203513	302947	122081	180866	22647	22.78	11.13

Note: GR stands for gross returns, TC stands for total costs and NR stands for net returns.

Table 6.1.7: Costs and returns with and without subsidies from potato, 2014-15

Category	With Subsidies			Without subsidies			Increase in total cost/Decline in net returns		
	GR	TC (A)	NR (B)	GR	TC	NR	Value (C)	% increase in TC (C/A*100)	% decline in NR (C/B*100)
Per hectare									
Marginal	-	-	-	-	-	-	-	-	
Small	91417	70624	20793	91417	79508	11909	8884	12.58	42.73
Semi-med	88116	70119	17997	88116	80663	7453	10544	15.04	58.59
Medium	94086	67452	26634	94086	77852	16234	10400	15.42	39.05
Large	85089	70807	14282	85089	81452	3637	10645	15.04	74.53
Overall	88017	68890	19127	88017	78921	9096	10031	14.56	52.44
Per farm									
Marginal	-	-	-	-	-	-	-	-	
Small	6399	4944	1455	6399	5566	833	622	12.58	42.73
Semi-med	28197	22438	5759	28197	25812	2385	3374	15.04	58.59
Medium	55511	39797	15714	55511	45933	9578	6136	15.42	39.05
Large	211872	176308	35564	211872	202816	9056	26508	15.04	74.53
Overall	42248	33067	9181	42248	37882	4366	4815	14.56	52.44

Note: GR stands for gross returns, TC stands for total costs and NR stands for net returns.

6.1.8 Overall crop-production

In overall crop production (including fodder), cost and returns realized with and without subsidies have been shown in Table 6.1.8. A perusal of the table reveals that without subsidies there was an overall increase in the cost of crops by 19.24 per cent which was Rs. 6410 per hectare and Rs.63653 per farm. On the other hand, deviation in net returns in overall crop production without subsidies was 12.66 per cent in relative terms. On large farms there was highest increase (Rs. 8361) in total cost per hectare without availing the benefit of subsidy followed by medium (Rs. 7263), semi-medium (Rs. 6021), small (Rs. 5302) and marginal (Rs. 4036) farms. The per cent increase in cost without subsidy benefit for growing all the crops was highest on large farms (24.38%) followed by medium (22.11%), semi-medium (17.90%), small (16.73%) and marginal (12.11%) farms. This shows the higher subsidy benefit accrued by the large, medium and semi-medium category farmers in crop cultivation as compared to small and marginal farmers.

Table 6.1.8: Costs and returns with and without subsidies from overall crop production (including fodder etc), 2014-15

Category	With Subsidies			Without subsidies			Increase in total cost/Decline in net returns		
	GR	TC (A)	NR (B)	GR	TC	NR	Value (C)	% increase in TC (C/A*100)	% decline in NR (C/B*100)
Per hectare									
Marginal	73378	33315	40063	73378	37351	36027	4036	12.11	10.07
Small	73205	31683	41522	73205	36985	36220	5302	16.73	12.77
Semi-med	77968	33641	44327	77968	39662	38306	6021	17.90	13.58
Medium	85303	32845	52458	85303	40108	45195	7263	22.11	13.85
Large	90976	34292	56684	90976	42653	48323	8361	24.38	14.75
Overall	83956	33308	50648	83956	39718	44238	6410	19.24	12.66
Per farm									
Marginal	110067	49972	60095	110067	56027	54040	6055	12.11	10.07
Small	267197	115645	151552	267197	134995	132202	19350	16.73	12.77
Semi-med	573843	247597	326246	573843	291911	281932	44314	17.90	13.58
Medium	1317080	507127	809953	1317080	619265	697815	112138	22.11	13.85
Large	2885774	1087739	1798035	2885774	1352946	1532828	265207	24.38	14.75
Overall	833762	330786	502976	833762	394439	439323	63653	19.24	12.66

Note: GR stands for gross returns, TC stands for total costs and NR stands for net returns.

6.2 Component-wise extent of crop subsidy

6.2.1 Subsidy on fertilizers

The extent of fertilizer subsidy realized on sample farms has been shown in Table 6.2.1. It is quite clear that per hectare subsidy on fertilizers worked out to be Rs.4384 on large farms followed by Rs. 4180 on medium, Rs.4069 on semi-medium, Rs. 3729 on small and Rs.3375 on marginal farms. Individual subsidy benefit on all the farm categories in overall scenario was found to be Rs.2667 on urea, Rs.1435 on DAP and Rs.83 per hectare on MOP. Thus, on per hectare basis, the quantum of fertilizer subsidy benefit availed was higher on large farms as compared to other farm categories. This also infers higher fertilizer use on large farms as compared to other farm categories.

Per farm analysis revealed that the quantum of fertilizer subsidy realized by the large farmers was the highest (Rs. 139061) as compared to other farm categories due to higher area under crop cultivation. Per farm total subsidy benefit declined with decrease in the farm size and was the lowest (Rs. 5062) on marginal farms. Similar situation was observed in case of individual subsidy benefit realized by the farmers while using urea, DAP and MOP. In overall scenario, subsidy benefit realized by all the farm categories on urea was Rs. 26181 per farm followed by DAP (Rs. 14252) and MOP (Rs. 828) while total subsidy on fertilizers worked out at Rs. 41261 per farm. Thus, larger share in fertilizer subsidy benefit was enjoyed by large farmers as compared to farmers from other farm categories.

Table 6.2.1: Extent of fertilizer subsidy on sample farm households in Punjab, 2014-15

(Rupees)

Size group/component	Marginal	Small	Semi-medium	Medium	Large	Overall
Per hectare						
Urea	2152	2364	2529	2686	2774	2637
DAP	1217	1346	1472	1424	1469	1435
MOP	5	19	68	70	141	83
Total subsidy	3375	3729	4069	4180	4384	4155
Per farm						
Urea	3228	8630	18610	41468	88004	26181
DAP	1826	4913	10836	21989	46586	14252
MOP	7	68	499	1086	4471	828
Total subsidy	5062	13611	29945	64543	139061	41261

Per hectare crop-wise fertilizer subsidy has been shown in Table 6.2.2. It was seen that biggest chunk of fertilizer subsidy worked out in case of potato (Rs.8990) followed by sugarcane (Rs.6253), wheat (Rs.4578), paddy (Rs.3797), cotton (Rs.3706), maize (Rs.3261) and basmati-paddy (Rs. 2580) crop. The crop-wise difference in fertilizer use attributed to

higher fertilizer subsidy in case of potato and sugarcane crops. Farm category- wise analysis showed higher benefit realized by medium and large farmers in majority of the crops.

The crop-wise fertilizer subsidies on per farm basis shown in the table reveal that the quantum of fertilizer subsidy was the highest in case of wheat crop. i.e. Rs.17993 per farm followed by paddy (Rs.10860), potato (Rs.4315) cotton (Rs.2261), maize (Rs.1892), basmati-paddy (Rs.568) and sugarcane (Rs.375) on the sample farms. Thus, nearly 70 per cent of the total subsidy on fertilizers attributed to cultivation of wheat and paddy crops due to higher area under these crops and, therefore, higher fertilizer use as well. In case of almost all the crops except maize, the quantum of fertilizer subsidy per farm was highest on large farms and least on marginal farms which shows the highest subsidy benefit realized by medium and large farmers as compared to their counterparts.

Table 6.2.2: Crop-wise fertilizer subsidies on sample farm households in Punjab, 2014-15

(Rupees)

Size group/crops	Marginal	Small	Semi-medium	Medium	Large	Overall
Per hectare						
Wheat	4284	4560	4630	4661	4465	4578
Paddy	3533	3659	3797	3772	3840	3797
Cotton	3697	3637	3641	3797	3751	3706
Maize	3044	3144	3294	3213	3518	3261
Sugarcane	-	-	-	6670	7633	6253
Basmati-paddy	2126	2212	2606	2637	2688	2580
Potato		8019	9436	8759	9212	8990
Others	1261	1655	1932	3133	2298	2498
Total	3375	3729	4069	4180	4384	4155
Per farm						
Wheat	2699	6794	13981	28340	53803	17993
Paddy	848	2488	6265	17388	44587	10860
Cotton	702	1309	2257	3265	4164	2261
Maize	396	1509	2240	2635	1970	1892
Sugarcane	0	0	0	334	3435	375
Basmati-paddy	64	22	443	1055	1640	568
Potato	0	561	3020	5168	22937	4315
Others	353	927	1739	6359	6526	2998
Total	5062	13611	29945	64543	139061	41261

6.2.2 Power subsidy

The crop-wise per hectare power subsidy on sample farms (Table 6.2.3) reveals that power subsidy in case of paddy crop, which needs frequent irrigations, worked out at Rs.4289 per hectare followed by sugarcane (Rs. 3320), basmati-paddy (Rs. 3073), potato (Rs. 1041),

maize (Rs. 1020), wheat (Rs. 834) and cotton (Rs. 631). Thus, the crops requiring higher number of irrigations accrued higher proportion of power subsidy realized by the agricultural sector. On per hectare basis, the maximum benefit of power subsidy was realized by large and medium category farmers as compared to other farmer categories since some of the marginal and small farmers did not possess electrical tube wells/ submersible pumps for irrigating their small piece of lands, hence depend upon diesel engines for running tube-wells at farm level. Therefore, power subsidy benefit is largely taken by semi-medium, medium and large farmers.

Table 6.2.3: Crop-wise power subsidies on sample farm households in Punjab, 2014-15

(Rupees)

Size group/crops	Marginal	Small	Semi-medium	Medium	Large	Overall
Per hectare						
Wheat	207	544	636	1259	1491	834
Paddy	1007	2792	4248	5803	7090	4289
Cotton	214	260	476	959	1638	631
Maize	404	703	1032	1431	1559	1020
Sugarcane	-	-	-	4939	6059	3320
Basmati-paddy	331	640	3042	4467	5399	3073
Potato		865	1107	1641	1434	1041
Others	270	851	991	1918	2665	1331
Total	367	1009	1589	2805	3787	1962
Per farm						
Wheat	131	811	1922	7656	17968	3277
Paddy	242	1898	7009	26753	82317	12267
Cotton	41	94	295	825	1818	385
Maize	53	338	702	1173	873	592
Sugarcane	-	-	-	247	2727	199
Basmati-paddy	10	6	517	1787	3293	676
Potato	-	61	354	968	3571	500
Others	76	477	892	3894	7567	1585
Total	551	3684	11692	43304	120134	19481

A perusal of the table reveals that on per farm basis in overall scenario, highest power subsidy was worked out for paddy crop i.e. Rs.12267 per farm followed by wheat (Rs. 3277), basmati-paddy (Rs. 676), maize (Rs. 592), potato (Rs. 500) and cotton (Rs. 385). Due to higher area under paddy and wheat crops on the sample farms, the power subsidy quantum was higher for these crops as compared to other crops sown on the sample farms. Obviously, the proportion of power subsidy benefit was more on large farms as compared to other farm categories. Hence, major chunk of power subsidy in agricultural sector in Punjab has been

galloped by semi-medium, medium and large farmers due to higher area under crop cultivation as compared to small and marginal farmers.

6.2.3 Diesel subsidy

Diesel prices were decontrolled in October, 2014 resulting in withdrawal of subsidy. So, the diesel subsidy could not be worked out for the crops sown during *rabi* season i.e. potato, wheat. The crop-wise diesel subsidy per hectare has been shown in Table 6.2.4. A perusal of the table reveals that the extent of diesel subsidy was Rs. 391 per hectare in sugarcane crop followed by paddy (Rs. 390), basmati-paddy (Rs.280), maize (Rs.232) and cotton (Rs. 195). Farm category wise analysis shows that in aggregate per hectare diesel subsidy benefit was higher on semi-medium (Rs.159), medium (Rs.157) and large farms (Rs.150) as compared to marginal (Rs. 127) and small (Rs. 111) farms. The extent of diesel subsidy was higher for sugarcane and paddy crops due to higher generator/ diesel engine use for irrigating these crops particularly in hot summer months. The diesel subsidy benefit was more on marginal farms in case of paddy crop due to higher diesel engine use for irrigating the crop as compared to other farm categories.

The extent of diesel subsidy per farm worked out to be Rs. 1114 per farm for paddy crop, which was also nearly 74 per cent of the total diesel subsidy on various crops grown on the selected farms. Diesel subsidy per farm worked out to be Rs. 135 for maize, Rs. 119 for cotton, Rs. 62 for basmati-paddy and Rs.23 for sugarcane. In aggregate diesel subsidy realized on large farms was Rs. 4744 per farm followed by medium (Rs. 2427), semi-medium (Rs. 1168), small (Rs. 403) and marginal (Rs. 190) farms. Thus, higher benefit of diesel subsidy was enjoyed by large and medium farmers as compared to farmers from other farm categories due to higher area under crop cultivation.

Table 6.2.4: Crop-wise diesel subsidies on sample farm households in Punjab, 2014-15

(Rupees)

Size group/crops	Marginal	Small	Semi-medium	Medium	Large	Overall
Per hectare						
Wheat	-	-	-	-	-	-
Paddy	454	302	448	413	337	390
Cotton	147	193	204	201	183	195
Maize	163	207	258	215	265	232
Sugarcane	-	-	-	321	511	391
Basmati-paddy	348	228	381	227	306	280
Potato	-	-	-	-	-	-
Others	77	48	70	34	22	43
Total	127	111	159	157	150	151
Per farm						
Wheat	-	-	-	-	-	-
Paddy	109	205	739	1902	3914	1114
Cotton	28	70	126	173	203	119
Maize	21	99	176	177	148	135
Sugarcane	-	-	-	16	230	23
Basmati-paddy	10	2	65	91	187	62
Potato	-	-	-	-	-	-
Others	21	27	63	68	62	51
Total	190	403	1168	2427	4744	1504

6.2.4 Aggregate indirect subsidies

Crop-wise aggregate subsidies have been depicted in Table 6.2.5. A perusal of the table reveals that in overall, on per hectare basis, aggregate indirect subsidies worked out to be the highest for potato i.e. Rs. 10031 per hectare followed by sugarcane (Rs.9963), paddy (Rs. 8476), basmati-paddy (Rs. 5933), wheat (Rs. 5412), cotton (Rs. 4531) and maize (Rs. 4514). Per hectare subsidy benefit in respect of above mentioned crops realized by large farmers was comparatively higher as compared to other farm categories. Thus, per hectare indirect subsidies increased with increase in farm size being lowest on marginal farms.

Similarly, on per farm basis also, major quantum of indirect subsidies benefit was reaped by large and medium category farmers while according to crop-wise analysis it was found that out of total indirect subsidy, nearly 73 per cent of the subsidy pertained to paddy and wheat crops only. Hence, there is wide disparity in the quantum of use of indirect subsidies favouring large and medium farmers. There is a need to rationalize these subsidies for the overall benefit of marginal and small farmers.

Table 6.2.5: Crop-wise aggregate indirect subsidies on sample farm households in Punjab, 2014-15

(Rupees)

Size group/crops	Marginal	Small	Semi-medium	Medium	Large	Overall
Per hectare						
Wheat	4492	5104	5266	5920	5956	5412
Paddy	4994	6753	8493	9988	11268	8476
Cotton	4058	4090	4320	4957	5573	4531
Maize	3612	4054	4585	4859	5342	4514
Sugarcane	-	-	-	11929	14203	9963
Basmati-paddy	2805	3079	6029	7330	8393	5933
Potato	-	8884	10543	10400	10646	10031
Others	1607	2555	2994	5085	4984	3862
Total	3869	4849	5816	7142	8321	6268
Per farm						
Wheat	2830	7605	15903	35996	71771	21270
Paddy	1199	4592	14013	46044	130818	24241
Cotton	771	1473	2679	4263	6186	2764
Maize	469	1946	3118	3984	2992	2618
Sugarcane	-	-	-	596	6391	598
Basmati-paddy	84	31	1025	2932	5120	1305
Potato	-	622	3374	6136	26508	4815
Others	450	1431	2694	10322	14155	4634
Total	5803	17698	42805	110273	263940	62246

6.2.5 Aggregate (Direct & Indirect) Subsidies

6.2.5.1 Direct subsidies

Direct subsidies are target group based and directly accrued by the respondents. Its benefits are realized by the beneficiaries by receiving it monetarily. The direct subsidies in the agricultural sector are mostly given for the purchase of new seed, pesticides, farm machinery, horticultural plants and livestock. Although the quantum of these subsidies in agricultural sector is quite low but many farmers are realizing its benefits in the country.

Crop-wise and component-wise direct and indirect subsidies per hectare and per farm have been shown in Table 6.2.6. & 6.2.7 The quantum of total direct subsidy received per hectare by the sample respondents in aggregate was highest on medium (Rs. 1333) category farms followed by marginal (Rs. 536), small (Rs. 464), semi-medium (Rs. 263) and large (Rs. 210) farms. Similar situation was observed on per farm basis where the quantum of subsidy benefit realized by medium category farms was Rs.20580 per farm followed by large (Rs. 6645), semi-medium (Rs. 1939), small (Rs. 1692) and marginal (Rs. 804) farms. Thus, the higher benefit of direct subsidies was also realized by medium and large category farmers as compared to marginal and small farmers. This shows the disparity in disbursement of direct subsidies.

6.2.5.2 Indirect Subsidies

Indirect subsidies benefits are realized equally by all the beneficiaries in terms of lower purchase price but monetary benefits are accrued by the co-operative/company/ firm producing or marketing it. These subsides are widely prevalent in the agricultural sector of the country. Indirect subsidies are mostly given for fertilizers, irrigation and electric power supplied to the agricultural sector for running submersible pumps/ electric motors for irrigating crops. Also, there are numerous field preparation/ marketing operations undertaken by using tractor and diesel engine is also used to irrigate the crops. These farm operations require adequate quantity of subsidized diesel for operating. It is pertinent to mention that diesel subsidy was being enjoyed by the farming sector before October, 2014 but diesel prices were decontrolled thereafter resulting in withdrawal of diesel subsidy.

The benefit of indirect subsidies availed by the farmers revealed that per hectare indirect subsidy realized by the large farmers was highest being Rs. 8531 per hectare followed by medium (Rs. 8475), semi-medium (Rs. 6079), small (Rs. 5313) and marginal farmers. Similar trend was observed on per farm basis also. Therefore, indirect subsidies benefits were largely accrued by large and medium category farmers as compared to small and marginal farmers.

Thus, in totality large and medium farmers availed higher benefits of subsidies as compared to their counterparts.

Table 6.2.6: Crop-wise and component-wise total (direct + indirect) subsidies on sample farm households in Punjab, 2014-15

(Rupees/ha)

Size group/crops	Marginal	Small	Semi-medium	Medium	Large	Overall
Direct subsidy						
Seed	161	428	198	109	40	133
Pesticides	7	25	7	12	0	9
Farm machinery	368	11	58	1212	170	571
Total Direct subsidy (A)	**536**	**464**	**263**	**1333**	**210**	**713**
Indirect subsidy						
Wheat	4492	5104	5266	5920	5956	5412
Paddy	4994	6753	8493	9988	11268	8476
Cotton	4058	4090	4320	4957	5573	4531
Maize	3612	4054	4585	4859	5342	4514
Sugarcane				11929	14203	9963
Basmati-paddy	2805	3079	6029	7330	8393	5933
Potato		8884	10543	10400	10646	10031
Others crops	1607	2555	2994	5085	4984	3862
Total indirect subsidy (B)	3869	4849	5816	7142	8321	6268
Total (A+B)	**4405**	**5313**	**6079**	**8475**	**8531**	**6981**

Table 6.2.7: Crop-wise total (direct + indirect) subsidies on sample farm households in Punjab, 2014-15

(Rupees/farm)

Size group/crops	Marginal	Small	Semi-medium	Medium	Large	Overall
Direct subsidy						
Seed	241	1561	1455	1677	1267	1322
Pesticides	11	92	54	188	0	85
Farm Machinery	552	39	430	18715	5378	5667
Total Direct subsidy (A)	**804**	**1692**	**1939**	**20580**	**6645**	**7074**
Indirect subsidy						
Wheat	2830	7605	15903	35996	71771	21270
Paddy	1199	4591	14012	46044	130817	24242
Cotton	771	1472	2679	4263	6186	2764
Maize	469	1946	3118	3984	2992	2618
Sugarcane	0	0	0	596	6391	598
Basmati-paddy	84	31	1025	2932	5120	1305
Potato	0	622	3374	6136	26508	4815
Others	450	1431	2694	10322	14155	4634
Total indirect subsidy (B)	**5803**	**17698**	**42805**	**110273**	**263940**	**62246**
Total (A+B)	6607	19390	44744	130853	270585	69320

6.3 Summary

In case of paddy crop, there was increase in the cost of growing by Rs. 8486 per hectare without availing subsidies. The farm category wise analysis revealed that there was increase in total cost of paddy growing by Rs.11268 per hectare on large farms followed by other farm categories. Per farm basis analysis revealed that without benefit of subsidies there was an overall increase in the cost of paddy growing by 24.18 per cent which was Rs. 24272 in value terms. In overall, net returns in paddy growing declined by 13.06 per cent. Thus, subsidy benefit in paddy crop was realized more by large and medium category farmers.

In basmati-paddy also, without subsidies there was an increase in the cost of growing basmati by Rs. 5933 per hectare. The increase in total cost without subsidies worked out to be

Rs.8392 per hectare on large farms followed by other farm categories. Further, it was observed that without benefit of subsidies there was an overall increase in the cost of raising basmati crop by 18.60 per cent or decline in net returns by 8.61 per cent, which in monetary terms worked out at Rs. 1306 per farm. According to farm size, increase in cost of basmati production without any subsidy was 26.46 per cent on large farms followed by other farm categories. Both per hectare and per farm analysis revealed higher quantum of subsidy benefit realized by farmers in upper hierarchy.

In cotton cop, there was increase in cost of growing cotton by Rs. 4532 per hectare without subsidies. The increase in cost or decline in returns in cotton crop without subsidies was by Rs.5573 per hectare on large farms followed by other farm categories. On per farm basis there was an overall increase in the cost of growing cotton by Rs. 2764 per farm which was 10.36 per cent in relative terms while on the contrary net returns in cotton growing declined by 14.37 per cent. Increase in cost of growing cotton with no subsidy benefit was 13.45 per cent on large farms which was highest followed by other farm categories. Thus, increase in cost of growing cotton without subsidy was highest on large and medium farms followed by other farm categories which shows the higher relative subsidy benefit realized by these farmers.

In maize, there was increase in cost of growing maize by Rs. 4514 per hectare without subsidies. It was seen that without subsidies increase in cost or decline in returns in maize crop was by Rs.5343 per hectare on large farms and lower on other farm categories. Per farm cost and returns analysis revealed that without subsidies there was an overall increase in the total cost or decline in returns of growing maize by Rs. 2618 per farm which was 14.06 per cent increase in cost or 27.70 per cent decline in net returns. Increase in cost of growing maize without subsidy was Rs. 3985 per farm in case of medium farms followed by semi-medium, large, small and marginal farms. However, relative increase in cost of growing maize without subsidy was highest at large farms. Per farm analysis revealed higher subsidy benefit realized by medium, semi-medium farmers as compared to other farm categories.

In sugarcane crop, without subsidies there was an increase in the cost of growing sugarcane by Rs. 9963 per hectare. According to farm category there was increase in total cost of sugarcane growing without subsidy by Rs.14203 per hectare on large farms followed by Rs.11930 on medium farms. Again, it was seen that the benefit of subsidy was higher on large farm category. Per farm analysis revealed that without subsidies there was an increase in the cost of producing sugarcane by Rs. 598 per farm which was 12.04 per cent increase in cost or decline in net returns by 9.60 per cent. There was higher increase in cost of sugarcane

growing on large farms as compared to other farm categories. Hence, large farmerôs category enjoyed more benefit of subsidy in case of sugarcane crop also.

In case of wheat crop, without subsidies there was increase in the cost of growing wheat by Rs. 5763 per hectare. The increase in total cost without subsidies was to the tune of Rs.6213 per hectare in case of small farms followed by medium, large, semi-medium and marginal farms. Per farm analysis brought out that there was an overall increase in the cost of growing wheat by Rs. 22647 per farm without subsidy benefit and it was 22.78 per cent in relative terms. Decline in net returns of wheat cultivation was 11.13 per cent. There was highest increase in the cost of wheat growing on medium farms by 24.96 per cent followed by large, small, semi-medium and marginal farms. Therefore, in case of wheat crop also large, medium and semi-medium category farmers got higher per farm subsidy benefit due to more area under wheat cultivation. However, per cent increase in total cost without subsidy was higher on medium, large, small and semi-medium farms and least on marginal farms.

In potato crop, there was increase in total cost of growing potato by Rs. 10031 per hectare without subsidies. Further, it was seen that without subsidies increase in cost or decline in returns in potato was by Rs.10645 per hectare on large farms followed by other farm categories. Per farm results revealed that there was an overall increase in the cost of potato crop by 14.56 per cent which was Rs. 4815 per farm in monetary terms. Net returns in potato growing declined by 52.44 per cent without subsidies. According to farm size there was 13.36 per cent increase in potato growing due to withdrawal of subsidies on medium category farms followed by large, semi-medium and small farms. Thus, the quantum of subsidy benefit realized per farm was highest on large farm category due to more area under potato cultivation but relative increase in total cost was nearly equal as compared to other farm categories except small farms.

In overall crop production (including fodder), it was found that without subsidies there was an overall increase in the cost of crops by 19.24 per cent which was Rs. 6410 per hectare and Rs.63653 per farm. Net returns in overall crop production declined by 12.66 per cent. On large farms there was highest increase in total cost per hectare without availing the benefit of subsidy followed by other farm categories The per cent increase in cost without subsidy for growing all the crops was highest on large farms (24.38%) followed by medium, semi-medium, small and marginal farms. This shows the higher subsidy benefit accrued by the large, medium and semi-medium category farmers in crop cultivation as compared to small and marginal farmers.

Component wise subsidy revealed that per hectare subsidy on fertilizers worked out to be Rs.4384 on large farms followed by medium, semi-medium, small and marginal farms. Individual subsidy benefit on all the farm categories in overall scenario was found to be Rs.2667 on urea, Rs.1435 on DAP and Rs.83 per hectare on MOP. Per farm analysis revealed that the quantum of fertilizer subsidy realized by the large farmers was highest (Rs.139061) as compared to other farm categories. Per farm total subsidy benefit declined with decrease in the farm size and was lowest on marginal farms. Similar situation was observed in case of individual subsidy benefit realized by the farmers while using urea, DAP and MOP. Thus, larger share in fertilizer subsidy benefit was enjoyed by large farmers as compared to farmers from other farm categories.

Per hectare crop-wise fertilizer subsidy revealed that biggest chunk of fertilizer subsidy worked out in case of potato (Rs.8990) followed by sugarcane, wheat, paddy, cotton, maize and basmati crop. The crop-wise difference in fertilizer use attributed to higher fertilizer subsidy in case of potato and sugarcane crops. Farm category- wise analysis showed higher benefit realized by medium and large farmers in majority of the crops. The crop-wise fertilizer subsidies on per farm basis revealed that the quantum of fertilizer subsidy was highest in case of wheat crop followed by other crops. Thus, nearly 70 per cent of the total subsidy on fertilizers attributed to cultivation of wheat and paddy crops due to higher area under these crops.

The crop-wise per hectare power subsidy revealed that power subsidy in case of paddy crop, worked out at Rs.4289 per hectare followed by sugarcane, basmati, potato, maize, wheat and cotton. Thus, the crops requiring higher number of irrigations accrued higher proportion of power subsidy realized by the agricultural sector. On per hectare basis, the maximum benefit of power subsidy was realized by large and medium category farmers as compared to other farmer categories. On per farm basis also, highest power subsidy was worked out for paddy crop i.e. Rs.12267 per farm followed by wheat, basmati, maize, potato and cotton. Due to higher area under paddy and wheat crops on the sample farms, the power subsidy quantum was higher for these crops as compared to other crops. Obviously, the proportion of power subsidy benefit was more on large farms as compared to other farm categories.

As far as diesel subsidy is concerned, it was Rs. 391 per hectare in sugarcane crop followed by paddy, basmati, maize and cotton. Farm category wise analysis revealed that diesel subsidy benefit was highest on semi-medium, medium and large farms as compared to marginal and small farms. The extent of diesel subsidy was higher for sugarcane and paddy crops due to higher generator/ diesel engine use for irrigating these crops particularly in hot

summer months. The extent of diesel subsidy per farm worked out to be Rs.1114 per farm for paddy crop, which was also nearly 74 per cent of the total diesel subsidy on various crops grown on the selected farms. Diesel subsidy per farm worked out to be Rs. 135 for maize, which was highest followed by cotton, basmati and sugarcane. In aggregate diesel subsidy realized on large farms was Rs.4744 per farm followed by other farm categories. Thus, higher benefit of diesel subsidy was enjoyed by large and medium farmers as compared to farmers from other farm categories due to higher area under crop cultivation.

The quantum of total direct subsidy received per hectare by the sample respondents in aggregate was highest on medium category farms followed by marginal, small, semi-medium and large farms. On per farm basis also it was highest on medium farms followed by large, semi-medium, small and marginal farms. Thus, the higher benefit of direct subsidies was also realized by medium and large category farmers on per farm basis as compared to marginal and small farmers. This shows the disparity in disbursement of direct subsidies. The benefit of indirect subsidies availed by the farmers revealed that per hectare indirect subsidy realized by the large farmers was highest being Rs.8531 per hectare followed by medium, semi-medium, small and marginal farmers. Similar trend was observed on per farm basis also. Therefore, indirect subsidies benefits were largely accrued by large and medium category farmers as compared to small and marginal farmers.

CHAPTER-VII

SUBSIDY INTENSITY AND EFFECT OF SUBSIDIES ON AGRICULTURE

To investigate the effect of subsidies on agriculture the sample households were grouped into three categories viz. low, medium and high on the basis of input subsidies used per hectare through cumulative frequency method. Further analysis was undertaken as per previous chapter.

7.1 Socio-economic characteristics of farmers based on subsidy intensity

7.1.1 Household's distribution

The distribution of sample households on the basis of total agricultural subsidy availed per hectare (Table 7.1.1) revealed that 36.67 per cent of the households fell in the low subsidy group of up to Rs. 5818 followed by 33.33 per cent in Rs. 5819-7572 group and remaining 30 per cent in > Rs.7572 group . Hence, higher number of households fell in low subsidy group as compared to medium and high subsidy groups.

Table 7.1.1: Distribution of sampled households on the basis of total agricultural subsidy availed in Punjab, 2014-15

(N=180)

Group	Subsidy (Rs/ha)	Number	Per cent
Low	Up to 5818	66	36.67
Medium	5819 - 7572	60	33.33
High	> 7572	54	30.00

7.1.2 Farm- subsidy wise household classification

Farm subsidy-wise classification of households (Table 7.1.2) revealed that nearly 35 per cent of the households were marginal and small farmers and about 57 per cent were semi-medium and medium and remaining eight per cent were large farmers. It is pertinent to mention here that majority of the marginal and small farmers fell in low subsidy farm group while semi-medium farmers fell in both low and medium subsidy groups and large and medium category farmers in medium and high subsidy groups. Thus, largest chunk of farm subsidy was availed by medium and large category farmers

Table 7.1.2: Farm subsidy-wise classification of sample farm households in Punjab, 2014-15

(Number)

Category/intensity of subsidy	Low	Medium	High	Overall
Marginal	22	5	2	29 (16.11)*
Small	19	9	5	33 (18.33)
Semi-med	21	20	14	55 (30.56)
Medium	4	19	25	48 (26.67
Large	0	7	8	15 (8.33)
Overall	66	60	54	180 (100)

* Figures in parentheses indicate percentages of total

7.1.3 Land holding details

Land holding details of sample farm households on the basis of farm subsidy has been given in Table 7.1.3. A perusal of the table reveals that total operational area of the farmers falling under low subsidy group was 2.27 hectare; under medium subsidy group was 5.33 hectare and nearly seven hectare in case of high subsidy group. Thus, higher operational area resulted in giving more subsidies to the farmers falling in high subsidy group.

Table 7.1.3: Land holding details of sample farm households in Punjab, 2014-15

(Hectare)

Size Group	Owned	Leased-in	Leased-out	Total operational area
Low	1.407	0.867	0.003	2.271
Medium	3.018	2.345	0.027	5.337
High	3.538	3.463	0.000	7.001
Overall	2.583	2.138	0.010	4.712

7.1.4 Access to credit

Access of sample farm households to various sources of agricultural credit (Table 7.1.4) revealed that in overall scenario; nearly 90 per cent of the credit was taken by the sample households from co-operative societies and commercial banks with major share from

commercial banks while remaining 9.51 per cent was taken from commission agents. The quantum of credit availed by medium and high subsidy group farmers was nearly three times as compared to low subsidy farm group.

Table 7.1.4: Access of sample farm households to various sources of agricultural credit in Punjab, 2014-15

(Rs./farm)

Size Group	Cooperative societies	Commercial banks	Commission agents	Total
Low	53121	78030	21212	152364
Medium	104300	287000	42167	433467
High	121296	349074	39259	509630
Overall	90633 (25.66)	229000 (64.83)	33611 (9.51)	353244 (100)

Note: Figures in the parentheses are the percentage to total

7.1.5 Cropping pattern followed by sample households

Cropping pattern followed by sample households according to the subsidy intensity has been given in Table 7.1.5 and 7.1.6. It was seen in overall scenario that paddy was dominant crop in *kharif* season which was sown of 28.80 per cent of the gross cropped area on the sample farms followed by Bt cotton (6.14%), maize (5.84%), fodder (3.32%), basmati-paddy (2.22%), sugarcane (0.60%) and other minor crops. Farm category-wise analysis revealed that paddy was dominating crop on medium and high subsidy intensity farms in *kharif* season while it was Bt cotton followed by maize and paddy on low subsidy intensity farms. During *rabi* season, wheat occupied 39.58 per cent of the gross cropped area in overall scenario as well as occupied highest percentage area according to farm categories, followed by fodder (3.22%), potato (3.02%) and peas (1.01%) in overall. Spring maize (2.22%) was major crop sown during *zaid* season in overall followed by potato (1.81%), summer moong (1.01%) and sunflower (0.60%). Similar trend was witnessed according to farm categories during *zaid* season. Hence, paddy, wheat, Bt cotton, maize and spring maize occupied major chunk of area under sample farms and thus subsidy intensity was higher for these crops.

Table 7.1.5: Cropping pattern on sample farm households in Punjab, 2014-15

(Ha/farm)

Season/crop	Low	Medium	High	Overall
Kharif season				
Paddy	0.44	3.44	5.19	2.86
Basmati-paddy	0.07	0.17	0.45	0.22
Bt cotton	0.76	0.60	0.42	0.61
Sugarcane	0.00	0.09	0.10	0.06
Maize	0.66	0.67	0.38	0.58
Fodder	0.25	0.37	0.40	0.33
Guara	0.09	0.00	0.03	0.04
Vegetables	0.00	0.00	0.03	0.01
Total	2.27	5.34	7.00	4.71
Rabi seasons				
Wheat	1.95	4.45	5.76	3.93
Barley	0.00	0.00	0.00	0.00
Gram	0.00	0.00	0.00	0.00
Rapeseed & mustard	0.00	0.01	0.00	0.001
Potato	0.02	0.27	0.67	0.30
Fodder	0.23	0.36	0.40	0.32
Peas	0.07	0.16	0.07	0.10
Sugarcane	0.00	0.09	0.10	0.06
Vegetables	0.00	0.00	0.00	0.00
Total	2.27	5.34	7.00	4.71
Zaid Season				
Sunflower	0.04	0.05	0.10	0.06
Mentha	0.00	0.00	0.00	0.00
Spring Maize	0.08	0.26	0.36	0.22
Summer moong	0.00	0.10	0.23	0.10
Fodder	0.00	0.02	0.01	0.01
Potato	0.00	0.18	0.38	0.18
Vegetables	0.00	0.00	0.00	0.00
Total	0.12	0.61	1.08	0.57
Gross cropped area	4.66	11.20	14.98	9.93
Cropping intensity (%)	205.29	209.74	214.00	210.83

Table 7.1.6: Cropping pattern on sample farm households in Punjab, 2014-15

(% to total area)

Season/Crop	Low	Medium	High	Overall
Kharif season				
Paddy	9.44	30.71	34.65	28.80
Basmati-paddy	1.50	1.52	3.00	2.22
Bt cotton	16.31	5.36	2.80	6.14
Sugarcane	0.00	0.80	0.67	0.60
Maize	14.16	5.98	2.54	5.84
Fodder	5.36	3.30	2.67	3.32
Guara	1.93	0.00	0.20	0.40
Vegetables	0.00	0.00	0.20	0.10
Total	48.71	47.68	46.73	47.43
Rabi seasons	0.00	0.00	0.00	0.00
Wheat	41.85	39.73	38.45	39.58
Barley	0.00	0.00	0.00	0.00
Gram	0.00	0.00	0.00	0.00
Rapeseed & mustard	0.00	0.09	0.00	0.00
Potato	0.43	2.41	4.47	3.02
Fodder	4.94	3.21	2.67	3.22
Peas	1.50	1.43	0.47	1.01
Sugarcane	0.00	0.80	0.67	0.60
Vegetables	0.00	0.00	0.00	0.00
Total	48.71	47.68	46.73	47.43
Zaid Season	0.00	0.00	0.00	0.00
Sunflower	0.86	0.45	0.67	0.60
Mentha	0.00	0.00	0.00	0.00
Spring Maize	1.72	2.32	2.40	2.22
Summer moong	0.00	0.89	1.54	1.01
Fodder	0.00	0.18	0.07	0.10
Potato	0.00	1.61	2.54	1.81
Vegetables	0.00	0.00	0.00	0.00
Total	2.58	5.45	7.21	5.74
Gross cropped area	100.00	100.00	100.00	100.00

7.2 Crop-wise cost and return with and without subsidy

7.2.1 Paddy

Cost and returns with and without subsidies from paddy crop according to subsidy intensity have been shown in Table 7.2.1. A perusal of the table reveals that without subsidies there was an overall increase in the cost of growing paddy by Rs. 8486 per hectare. Subsidy intensity wise analysis showed that there was increase in total cost of paddy growing by Rs. 10307 per hectare on high subsidy intensity farms followed by medium (Rs. 8919) and low (Rs. 5617) intensity farms. Therefore, the resultant increase in cost or decline in net returns due to withdrawal of subsidies in paddy crop was higher on high subsidy intensity farms as compared to medium and low intensity farms.

Analysis on per farm basis revealed that without subsidy benefit there was an overall increase in the total cost of paddy cultivation by 24.18 per cent or decrease in net returns by 13.06 per cent, which was Rs. 24272 per farm in value terms. According to subsidy intensity there was highest increase in cost of paddy production on high subsidy intensity farms by 28.61 per cent followed by medium (25.54%) and low subsidy intensity (16.81%) farms. Thus, subsidy benefits realized by farmers in paddy cultivation were higher on high subsidy intensity farms.

7.2.2 Basmati-paddy

Cost and returns with and without subsidies according to subsidy intensity for basmati crop (Table 7.2.2) revealed that without subsidies there was an overall increase in the cost of growing basmati by Rs. 5933 per hectare. The increase in total cost without subsidies was Rs. 7422 per hectare on high intensity farms followed by medium (Rs. 6321) and low subsidy intensity (Rs. 3805) farms. Thus, increase in total cost of basmati cultivation on high intensity farms would be nearly double as that of low intensity farms.

It was seen that without benefit of subsidies s According to subsidy intensity, increase in total cost of basmati cultivation without any subsidy was 24.66 per cent on high intensity farms followed by medium (17.65%) and low subsidy intensity (11.63%) farms. Thus, quantum of subsidy benefit realized on high and medium subsidy intensity farms was higher as compared to low subsidy intensity farms. Therefore, large and medium farmers realized the benefits of farm subsidies as compared to other farm categories.

Table 7.2.1: Costs and returns with and without subsidies from paddy, 2014-15

Category	With Subsidies			Without subsidies			Increase in total cost/Decline in net returns		
	GR	TC (A)	NR (B)	GR	TC	NR	Value (C)	% increase in TC (C/A*100)	% decline in NR (C/B*100)
Per hectare									
Low	95417	33415	62002	95417	39032	56385	5617	16.81	9.06
Medium	99341	34916	64425	99341	43835	55506	8919	25.54	13.84
High	101262	36022	65240	101262	46329	54933	10307	28.61	15.80
Overall	100086	35092	64994	100086	43578	56508	8486	24.18	13.06
Per farm									
Low	41983	14703	27280	41983	17174	24809	2471	16.81	9.06
Medium	341732	120110	221622	341732	150791	190941	30681	25.54	13.84
High	525550	186956	338594	525550	240447	285103	53491	28.61	15.80
Overall	286247	100362	185885	286247	124634	161613	24272	24.18	13.06

Note: GR stands for gross returns, TC stands for total costs and NR stands for net returns.

Table 7.2.2: Costs and returns with and without subsidies from basmati-paddy, 2014-15

Category	With Subsidies			Without subsidies			Increase in total cost/Decline in net returns		
	GR	TC (A)	NR (B)	GR	TC	NR	Value (C)	% increase in TC (C/A*100)	% decline in NR (C/B*100)
Per hectare									
Low	91713	32705	59008	91713	36510	55203	3805	11.63	6.45
Medium	98863	35811	63052	98863	42132	56731	6321	17.65	10.03
High	106454	30100	76354	106454	37522	68932	7422	24.66	9.72
Overall	100811	31911	68900	100811	37844	62967	5933	18.60	8.61
Per farm									
Low	6420	2289	4131	6420	2556	3864	267	11.63	6.45
Medium	16807	6088	10719	16807	7162	9645	1074	17.65	10.03
High	47904	13545	34359	47904	16885	31019	3340	24.66	9.72
Overall	22178	7020	15158	22178	8326	13852	1306	18.60	8.61

Note: GR stands for gross returns, TC stands for total costs and NR stands for net returns.

7.2.3 Cotton

Cost and returns with and without subsidies with respect to subsidy intensity in case of cotton crop (Table 7.2.3) revealed that in overall scenario there was increase in total cost of cotton cultivation by Rs. 4532 per hectare without subsidies. The increase in cost of cotton crop without subsidies was by Rs. 5166 per hectare on medium subsidy intensity farms followed by high (Rs. 4730) and low subsidy intensity (Rs. 3979) farms.

On per farm basis there was an overall increase in the cost or decline in net returns of growing cotton by Rs. 2764 per farm which was 11.56 per cent in terms of increase in total cost and 14.37 per cent in decline in net returns without subsidy benefit. Increase in total cost of cotton cultivation without subsidy benefit was Rs. 3099 per farm on medium and Rs. 3024 per farm on low subsidy intensity farms due to higher area under cotton cultivation followed by high (Rs. 1987) subsidy intensity farms. Thus, increase in cost of growing cotton without subsidy was higher on medium subsidy intensity farms followed by high and low subsidy intensity farms.

7.2.4 Maize

In case of maize crop (Table 7.2.4) there was increase in cost or decline in net returns of maize growing by Rs. 4514 per hectare without subsidies which was 14.06 per cent in relative terms. The increase in cost or decline in returns in maize crop was by Rs. 4740 per hectare on medium subsidy intensity farms followed by high (Rs. 4699) and low (Rs. 4001) subsidy intensity farms.

Per farm cost and returns analysis for maize revealed that without subsidies there was an overall increase in the cost or decrease in net returns of growing maize by Rs. 2618 per farm. Also, there was 27.70 per cent decline in net returns without subsidies. Increase in cost of growing maize without subsidy was Rs. 3175 per farm on medium subsidy intensity farms followed by low (Rs. 2640) and high (Rs. 1785) subsidy intensity farms. The relative increase in cost of growing maize without subsidy was higher at medium (14.98%) subsidy intensity farms followed by high (14.75%) and low (12.20%) intensity farms Thus, in maize crop, subsidy intensity benefit was higher medium intensity farms as compared to low and high subsidy intensity farms.

Table 7.2.3: Costs and returns with and without subsidies from cotton, 2014-15

Category	With Subsidies			Without subsidies			Increase in total cost/Decline in net returns		
	GR	TC (A)	NR (B)	GR	TC	NR	Value (C)	% increase in TC (C/A*100)	% decline in NR (C/B*100)
Per hectare									
Low	63965	38327	25638	63965	42306	21659	3979	10.38	15.52
Medium	72211	40333	31878	72211	45499	26712	5166	12.81	16.21
High	75931	40472	35459	75931	45202	30729	4730	11.69	13.34
Overall	70754	39213	31541	70754	43745	27009	4532	11.56	14.37
Per farm									
Low	48613	29129	19484	48613	32153	16460	3024	10.38	15.52
Medium	43327	24200	19127	43327	27299	16028	3099	12.81	16.21
High	31891	16998	14893	31891	18985	12906	1987	11.69	13.34
Overall	43160	23920	19240	43160	26684	16476	2764	11.56	14.37

Note: GR stands for gross returns, TC stands for total costs and NR stands for net returns.

Table 7.2.4: Costs and returns with and without subsidies from maize, 2014-15

Category	With Subsidies			Without subsidies			Increase in total cost/Decline in net returns		
	GR	TC (A)	NR (B)	GR	TC	NR	Value (C)	% increase in TC (C/A*100)	% decline in NR (C/B*100)
Per hectare									
Low	48057	32804	15253	48057	36805	11252	4001	12.20	26.23
Medium	49181	31640	17541	49181	36380	12801	4740	14.98	27.02
High	43191	31865	11326	43191	36564	6627	4699	14.75	41.49
Overall	48388	32094	16294	48388	36608	11780	4514	14.06	27.70
Per farm									
Low	31717	21651	10066	31717	24291	7426	2640	12.20	26.23
Medium	32951	21199	11752	32951	24374	8577	3175	14.98	27.02
High	16412	12109	4303	16412	13894	2518	1785	14.75	41.49
Overall	28065	18615	9450	28065	21233	6832	2618	14.06	27.70

Note: GR stands for gross returns, TC stands for total costs and NR stands for net returns.

7.2.5 Sugarcane

In case of sugarcane crop (Table 7.2.5) it was observed that without subsidies there was an overall increase in the cost of growing sugarcane by Rs. 9963 per hectare. According to farm category there was increase in total cost of sugarcane growing without subsidy by Rs. 13371 per hectare on high subsidy intensity farms followed by Rs. 11458 on medium farms. Thus, subsidy benefit in case of sugarcane crop was higher on high intensity farms showing higher benefit to large farmers.

Per farm analysis revealed that without subsidies there was an overall increase in total cost or decrease in net returns of sugarcane growing by Rs. 598 per farm which was 12.04 per cent and 9.60 per cent, respectively. Further, it was observed that subsidy benefit realized on high subsidy intensity farms was Rs. 1337 and Rs. 1032 on medium intensity farms.

7.2.6 Wheat

In wheat crop cost and returns with and without subsidies have been shown in Table 7.2.6. It was seen that without subsidies there was an overall increase in the cost of growing wheat by Rs. 5763 per hectare. The increase in total cost without subsidies was Rs.6370 per hectare on high subsidy intensity farms followed by medium (Rs. 5853) and low (Rs. 4914) subsidy intensity farms.

Analysis on per farm basis revealed that there was an overall increase in the cost of growing wheat by Rs. 22647 per farm without subsidy benefit and it was 18.55 per cent in relative terms. It was found that net returns in wheat growing decreased by 11.13 per cent without subsidy benefit. According to subsidy intensity, there was higher increase in cost of wheat cultivation on high subsidy intensity farms by 25.29 per cent followed by medium (22.52%) and low (18.57%) subsidy intensity farms. Thus, biggest chunk of subsidy in wheat crop was reaped by large farmers who owned high subsidy intensity farms.

Table 7.2.5: Costs and returns with and without subsidies from sugarcane, 2014-15

Category	With Subsidies			Without subsidies			Increase in total cost/Decline in net returns		
	GR	TC (A)	NR (B)	GR	TC	NR	Value (C)	% increase in TC (C/A*100)	% decline in NR (C/B*100)
Per hectare									
Low	-	-	-	-	-	-	-	-	
Medium	209808	95725	114083	209808	107183	102625	11458	11.97	10.04
High	227530	95137	132393	227530	108508	119022	13371	14.05	10.10
Overall	186514	82780	103734	186514	92743	93771	9963	12.04	9.60
Per farm									
Low	-	-	-	-	-	-	-	-	
Medium	18883	8615	10268	18883	9647	9236	1032	11.97	10.04
High	22753	9514	13239	22753	10851	11902	1337	14.05	10.10
Overall	11191	4967	6224	11191	5565	5626	598	12.04	9.60

Note: GR stands for gross returns, TC stands for total costs and NR stands for net returns.

Table 7.2.6: Costs and returns with and without subsidies from wheat, 2014-15

Category	With Subsidies			Without subsidies			Increase in total cost/Decline in net returns		
	GR	TC (A)	NR (B)	GR	TC	NR	Value (C)	% increase in TC (C/A*100)	% decline in NR (C/B*100)
Per hectare									
Low	73535	26461	47074	73535	31375	42160	4914	18.57	10.44
Medium	75999	25985	50014	75999	31838	44161	5853	22.52	11.70
High	77743	25187	52556	77743	31557	46186	6370	25.29	12.12
Overall	77086	25301	51785	77086	31064	46022	5763	22.78	11.13
Per farm									
Low	143394	51599	91795	143394	61181	82213	9582	18.57	10.44
Medium	338196	115635	222561	338196	141681	196515	26046	22.52	11.70
High	447799	145076	302723	447799	181766	266033	36690	25.29	12.12
Overall	302947	99434	203513	302947	122081	180866	22647	22.78	11.13

Note: GR stands for gross returns, TC stands for total costs and NR stands for net returns.

7.2.7 Potato

In potato crop have (Table 7.2.7) it was observed that in overall, there was increase in total cost of growing potato by Rs. 10031 per hectare without subsidies. According to subsidy intensity wise analysis, it was observed that there was increase in cost of potato growing by Rs.11130 per hectare on high subsidy intensity farms followed by medium (Rs.9521) and low (Rs.7171) subsidy intensity farms.

As far as per farm analysis is concerned, it was found that there was an overall increase in the cost of potato growing by 14.56 per cent without subsidies while decline in net returns was by 52.44 per cent. According to subsidy intensity, there was 15.86 per cent increase in cost of potato growing due to withdrawal of subsidies on high subsidy intensity farms followed by medium (13.61%) and low (12.01%) subsidy intensity farms. Thus, the subsidy benefit realized by high subsidy intensity group was comparatively higher than medium and low subsidy intensity group.

7.2.8 Overall crop-production

In overall crop production (including fodder) shown in Table 7.2.8 it was observed that there was an overall increase in the cost of growing crops by 19.24 per cent which was Rs. 6410 per hectare and Rs.63653 per farm. The decline in net returns without subsidies was 12.66 per cent on the sample farms. On high subsidy intensity farms there was higher increase (Rs. 7855) in total cost per hectare without subsidy followed by medium (Rs.6735) and low (Rs.4261) subsidy intensity farms. The per cent increase in cost without subsidy for growing all the crops was highest on high subsidy intensity farms (22.86%) followed by medium (19.93%), and low (13.51%) subsidy intensity farms. Thus, higher subsidy benefits were realized by large and medium farmers who fall in high and medium subsidy intensity group.

Table 7.2.7: Costs and returns with and without subsidies from potato, 2014-15

Category	With Subsidies			Without subsidies			Increase in total cost/Decline in net returns		
	GR	TC (A)	NR (B)	GR	TC	NR	Value (C)	% increase in TC (C/A*100)	% decline in NR (C/B*100)
Per hectare									
Low	97813	59696	38117	97813	66867	30946	7171	12.01	18.81
Medium	92878	69957	22921	92878	79478	13400	9521	13.61	41.54
High	87620	70184	17436	87620	81314	6306	11130	15.86	63.83
Overall	88017	68890	19127	88017	78921	9096	10031	14.56	52.44
Per farm									
Low	1956	1194	762	1956	1337	619	143	12.01	18.81
Medium	41795	31480	10315	41795	35765	6030	4285	13.61	41.54
High	92001	73694	18307	92001	85380	6621	11686	15.86	63.83
Overall	42248	33067	9181	42248	37882	4366	4815	14.56	52.44

Note: GR stands for gross returns, TC stands for total costs and NR stands for net returns.

Table 7.2.8: Costs and returns with and without subsidies from overall crop production (including fodder etc), 2014-15

Category	With Subsidies			Without subsidies			Increase in total cost/Decline in net returns		
	GR	TC (A)	NR (B)	GR	TC	NR	Value (C)	% increase in TC (C/A*100)	% decline in NR (C/B*100)
Per hectare									
Low	71631	31539	40092	71631	35800	35831	4261	13.51	10.63
Medium	83951	33793	50158	83951	40528	43423	6735	19.93	13.43
High	88197	34362	53835	88197	42217	45980	7855	22.86	14.59
Overall	83956	33308	50648	83956	39718	44238	6410	19.24	12.66
Per farm									
Low	333802	146973	186829	333802	166829	166973	19856	13.51	10.63
Medium	940248	378484	561764	940248	453915	486333	75431	19.93	13.43
High	1321196	514750	806446	1321196	632405	688791	117655	22.86	14.59
Overall	833762	330786	502976	833762	394439	439323	63653	19.24	12.66

Note: GR stands for gross returns, TC stands for total costs and NR stands for net returns.

7.3 Effect of subsidies on agriculture

7.3.1 Subsidy intensity-wise fertiliser use

Subsidy intensity-wise fertilizer use per hectare and per farm has been given in Tables 7.3.1 and 7.3.2. It was clearly observed that there was significantly higher use of fertilizers on high subsidy intensity farms as compared to medium and low categories. On low subsidy intensity farms, urea, DAP and MOP use was 225 kg, 100 kg and 1 kg per hectare while it was 290 kg., 126 kg and 12 kg per hectare on high subsidy intensity farms which was also similar in monetary terms also. Per farm analysis revealed that on low subsidy intensity farms, urea, DAP and MOP use was 1049kg, 465kg and 7 kg. per farm while it was 4342 kg., 1892 kg and 172 kg per farm on high subsidy intensity farms. This clearly reveals that fertilizer usage was higher on high subsidy intensity farms which were reflected in terms of higher subsidy benefit realized by large farmers as compared to other farm categories.

Table 7.3.1: Component-wise fertilizer use on sample farm households in Punjab, 2014-15

Size group	Urea	DAP	MOP	Others	Total
Kg/ha					
Low	225	100	1	3	329
Medium	280	118	7	12	417
High	290	126	12	10	438
Overall	275	116	9	10	410
Rs/ha					
Low	1216	2398	22	134	3769
Medium	1512	2838	113	614	5077
High	1565	3032	176	461	5235
Overall	1482	2787	137	484	4890

Table 7.3.2: Component-wise fertilizer use on sample farm households in Punjab, 2014-15

Size group	Urea	DAP	MOP	Others	Total
Kg/farm					
Low	1049	465	7	14	1535
Medium	3137	1324	83	131	4675
High	4342	1892	172	152	6558
Overall	2727	1154	89	99	4070
Rs/farm					
Low	5666	11173	102	624	17564
Medium	16937	31782	1269	6871	56859
High	23444	45421	2637	6911	78413
Overall	14727	27706	1363	4812	48608

7.3.2 Crop-wise fertilizer use w.r.t. subsidy intensity

Crop-wise fertilizer usage according to subsidy intensity on per hectare and per farm basis has been given in Tables 7.3.3 & 7.3.4. It is quite clear that total fertilizer usage per hectare in total was 438 kg. per hectare on high subsidy intensity farms followed by medium (417 kg.) and low (329 kg.) subsidy intensity farms. Crop-wise per hectare fertilizer usage revealed that fertilizer usage was higher on high subsidy intensity farms in case of potato, sugarcane and wheat while on medium subsidy intensity farms it was higher for paddy, cotton, basmati and maize. Fertilizer usage per hectare was least for all the crops on low subsidy intensity farms.

Per farm analysis revealed that fertilizer usage on high subsidy intensity farms was 6558 kg, followed by medium (4675 kg.) and low (1535 kg.) subsidy intensity farms due to difference in size of farm. Thus, the analysis further revealed that the quantum of fertilizer usage was significantly higher on high subsidy intensity farms, in case of all the crops discussed earlier, as compared to medium and low subsidy intensity farms. Hence, fertilizer subsidy benefit enjoyed by large farmers was higher as compare to other farm categories.

Table 7.3.3: Total and crop-wise fertilizer use on sample farm households in Punjab, 2014-15

(Kg/ha)

Size group	Wheat	Paddy	Cotton	Basmati	Maize	Sugarcane	Potato	others	Total
Kg/ha									
Low	393	352	344	225	300	0	613	165	329
Medium	447	416	374	318	305	688	774	273	417
High	463	403	365	245	297	754	896	250	438
Overall	439	406	357	265	305	638	840	243	410
Rs/ha									
Low	4657	3044	3795	2755	3968	0	10388	1631	3769
Medium	5494	4483	4348	4778	4054	9063	12812	3212	5077
High	5594	4054	4009	2583	3786	11438	14361	2850	5235
Overall	5314	4169	3979	3364	4005	9726	13427	2734	4890

Table 7.3.4: Total and crop-wise fertilizer use on sample farm households in Punjab, 2014-15

(Kg/farm)

Size group	Wheat	Paddy	Cotton	Basmati	Maize	Sugarcane	Potato	others	Total
Kg/farm									
Low	767	155	261	16	198	0	12	126	1535
Medium	1989	1429	225	54	204	62	348	364	4675
High	2666	2092	153	110	113	75	941	408	6558
Overall	1723	1162	218	58	177	38	403	290	4070
Rs/farm									
Low	9082	1339	2884	193	2619	0	208	1239	17564
Medium	24448	15422	2609	812	2716	816	5765	4271	56859
High	32220	21040	1684	1162	1439	1144	15079	4646	78413
Overall	20886	11923	2427	740	2323	584	6445	3281	48608

7.3.3 Crop-wise power use w.r.t. subsidy intensity

Crop-wise power usage according to subsidy intensity on per hectare and per farm basis has been given in Tables 7.3.5 & 7.3.6. It was observed that total power units usage per hectare in total was 675 units per hectare on high subsidy intensity farms followed by medium (495 units) and low (124 units.) subsidy intensity farms. Crop-wise per hectare analysis revealed that power usage was higher on high subsidy intensity farms in case of paddy, sugarcane, basmati-paddy, potato, maize and wheat while on medium subsidy intensity farms it was higher for cotton crop only. Power usage per hectare was least for all the crops on low subsidy intensity farms. Per farm analysis revealed that power usage on high subsidy intensity farms was 10113 units followed by medium (5543 units) and low (579 units subsidy intensity farms on the basis of farm size.

Power usage in monetary terms revealed that total power usage per hectare in aggregate was Rs. 3078 per hectare on high subsidy intensity farms followed by medium (Rs. 2257) and low (Rs.567) subsidy intensity farms. Crop-wise per farm analysis revealed that paddy and wheat crops consumed nearly 80 per cent of the total power subsidy on high and medium subsidy intensity farms while it was about 58 per cent on low subsidy intensity farms. Hence, power subsidy benefit was mostly enjoyed by large and medium farm category farmers with major chunk of share that of paddy and wheat crops.

Table 7.3.5: Total and crop-wise power use on sample farm households in Punjab, 2014-15

Size group	Wheat	Paddy	Cotton	Basmati	Maize	Sugarcane	Potato	others	Total
Units/farm									
Low	155	182	38	22	83	0	3	95	579
Medium	890	3534	141	107	185	83	116	487	5543
High	1446	6889	65	469	106	120	352	666	10113
Overall	719	2690	84	148	130	44	110	348	4272
Units/ha									
Low	80	414	51	318	126	0	138	124	124
Medium	200	1027	236	631	276	921	258	366	495
High	251	1327	155	1043	280	1204	335	408	675
Overall	183	941	138	674	224	728	228	292	430

Table 7.3.6: Total and crop-wise power use on sample farm households in Punjab, 2014-15

Size group	Wheat	Paddy	Cotton	Basmati	Maize	Sugarcane	Potato	others	Total
Rs/farm									
Low	709	831	175	102	380	0	13	431	2640
Medium	4060	16114	645	489	843	378	529	2219	25277
High	6596	31412	296	2140	484	549	1603	3035	46116
Overall	3277	12267	385	676	592	199	500	1585	19481
Rs/ha									
Low	363	1888	230	1452	576	0	630	567	567
Medium	912	4684	1075	2875	1259	4202	1175	1669	2257
High	1145	6052	705	4756	1275	5492	1527	1862	3078
Overall	834	4289	631	3073	1020	3320	1041	1331	1962

7.4 Summary

The distribution of sample households on the basis of total agricultural subsidy availed per hectare revealed that 36.67 per cent of the households fell in the low subsidy group of up to Rs. 5818 followed by 33.33 per cent in Rs. 5819-7572 group and remaining 30 per cent in > Rs.7572 group . It was seen that higher number of households fell in low subsidy group as compared to medium and high subsidy groups. Majority of the marginal and small farmers fell in low subsidy farm group while semi-medium farmers fell in both low and medium subsidy groups and large and medium category farmers in medium and high subsidy groups. Further, it was seen that total operational area of the farmers falling under low subsidy group was 2.27 hectare; under medium subsidy group was 5.33 hectare and nearly seven hectare in case of high subsidy group. Paddy, wheat, Bt cotton and maize dominated the cropping pattern of respondent households.

In paddy crop, subsidy intensity wise analysis revealed that there was increase in total cost of paddy growing by Rs.10307 per hectare on high subsidy intensity farms followed by medium and low intensity farms. Analysis on per farm basis revealed that without subsidy benefit there was an overall increase in the cost of paddy cultivation by 24.18 per cent or decrease in net returns by 13.06 per cent. According to subsidy intensity, there was highest increase in cost of paddy cultivation on high subsidy intensity farms by 28.61 per cent followed by medium and low subsidy intensity farms. Thus, subsidy benefits realized by farmers in paddy cultivation were higher on high subsidy intensity farms.

In basmati-paddy, it was seen that increase in total cost without subsidies was Rs.7422 per hectare on high intensity farms followed by medium and low subsidy intensity farms. Thus, increase in total cost of basmati cultivation on high intensity farms was nearly double as that of low intensity farms. According to subsidy intensity, increase in total cost of basmati cultivation without any subsidy was 24.66 per cent per farm on high intensity farms followed by medium and low subsidy intensity farms.

In case of cotton crop there was increase in total cost of cultivation by Rs. 4532 per hectare without subsidies. The increase in cost of cotton crop without subsidies was by Rs.5166 per hectare on medium subsidy intensity farms followed by high and low subsidy intensity farms. On per farm basis increase in total cost of cotton cultivation, without subsidy benefit, was Rs. 3099 per farm on medium followed by low and high subsidy intensity farms.

In case of maize crop the increase in cost or decline in returns in maize crop was by Rs.4740 per hectare on medium subsidy intensity farms followed by high and low subsidy intensity farms. Per farm cost and returns analysis revealed that there was increase in cost of

growing maize without subsidy by Rs. 3175 per farm on medium subsidy intensity farms followed by other farms. Thus, in maize crop, subsidy intensity benefit was higher on medium intensity farms as compared to low and high subsidy intensity farms.

In case of sugarcane crop there was increase in the cost of growing sugarcane by Rs. 9963 per hectare. According to category based on subsidy intensity, there was increase in total cost without subsidy in sugarcane growing by Rs.13371 per hectare on high subsidy intensity farms followed by other farms. Per farm analysis revealed that subsidy benefit realized on high subsidy intensity farms was Rs. 1337 and Rs. 1032 on medium intensity farms.

In wheat crop, the increase in total cost without subsidies was Rs.6370 per hectare on high subsidy intensity farms followed by medium and low subsidy intensity farms. Subsidy intensity per farm showed that there was higher increase in cost of wheat cultivation on high subsidy intensity farms by 25.29 per cent followed by medium and low subsidy intensity farms. Thus, biggest chunk of subsidy in wheat crop was reaped by large farmers.

In potato, there was increase in cost of potato growing by Rs.11130 per hectare on high subsidy intensity farms followed by other farms. As far as per farm analysis is concerned, there was 15.86 per cent increase in potato growing due to withdrawal of subsidies on high subsidy intensity farms followed by medium and low subsidy intensity farms. Thus, the subsidy benefit realized by high subsidy intensity group was comparatively higher than medium and low subsidy intensity group.

As far as analysis on quantum of fertilizer usage is concerned, there was significantly higher use of fertilizers on high subsidy intensity farms as compared to medium and low categories. Thus, on high subsidy intensity farms; urea, DAP and MOP use was higher than medium and low subsidy intensity farms on both per hectare and per farm basis. Crop-wise per hectare fertilizer usage revealed that fertilizer usage was higher on high subsidy intensity farms in case of potato, sugarcane and wheat while on medium subsidy intensity farms it was higher for paddy, cotton, basmati and maize. Fertilizer usage per hectare was least for all the crops on low subsidy intensity farms. This clearly reveals that fertilizer usage was higher on high subsidy intensity farms which was reflected in terms of higher subsidy benefit realized by large farmers as compared to other farm categories.

Crop-wise per hectare analysis revealed that power usage was higher on high subsidy intensity farms in case of paddy, sugarcane, basmati, potato, maize and wheat while on medium subsidy intensity farms it was higher for cotton crop only. Power usage in monetary

terms revealed that total power usage per hectare in aggregate was Rs. 3078 per hectare on high subsidy intensity farms followed by medium and low subsidy intensity farms. Crop-wise per farm analysis revealed that paddy and wheat crops consumed nearly 80 per cent of the total power subsidy on high and medium subsidy intensity farms while it was about 58 per cent on low subsidy intensity farms. Hence, power subsidy benefit was mostly enjoyed by large and medium farm category farmers with major chunk of share that of paddy and wheat crops.

CHAPTER-VIII

SUMMARY & POLICY RECOMMENDATIONS

Subsidy is a benefit given by the Government to groups or individuals usually in the form of a cash payment or reduction in price of a service/commodity. It is usually given to remove some type of burden and is often considered to be in the interest of the public. There are often considerable opportunities for both raising productivity and reducing costs. One of the institutional supports to agriculture development in India has been that of fiscal incentives in the form of input subsidies. The reduced costs of subsidized inputs increase their profitability and reduce the risks perceived by farmers with a limited knowledge of input benefits and of correct usage. Subsidies in Indian agriculture can be classified into two broad categories viz., direct and indirect subsidies. Direct subsidies are implemented through various schemes in agricultural sector by the government and indirect subsidies confine itself to three major inputs viz., fertilizer, irrigation and power. Presently, the input subsidies are the far most expensive instrument of Indiaôs food and agricultural policy regime, requiring a steadily larger budget share. The government pays fertilizer producers directly in exchange of selling fertilizer at lower than market prices. Irrigation and electricity, on the other hand, are supplied directly to the farmers at prices that are below the production cost. The cost of agricultural input subsidies as a share of agricultural output almost doubled from 6.0 per cent in 2003-04 to 11.6 per cent in 2009-10, driven by large increase in the subsidies to fertilizer and electricity (Arora, 2013). However, farm subsidies are reported to be crowding out the public investment and are not sustainable beyond a limit and time-period. Other serious problems due to continued subsidies are the degradation of land and water resources and their impact on sustainability of agricultural growth. As per reports, the subsidies prompt the end-users to overuse the services/ inputs resulting in soil degradation, soil nutrient imbalances, environmental pollution and ground water depletion, all of which result into decreased effectiveness of inputs and cause loss to the society as a whole. Though subsidies as incentives are effective in pushing agricultural growth to a certain extent, but it is important to make their rational use and also it should be ensured that they do not become a permanent feature of the economy. It is high time to take a fresh look at the issue of farm input subsidies.

Objectives of the study

The study was taken up with the following specific objectives:

1. To study the trends and distribution pattern of various input subsidies provided by the Union and State Governments to farm sector in Punjab.

2. To examine the utilization pattern of subsidies by different categories of farmers.
3. To analyze the overall effect of differences in the levels of input subsidy used by various categories of farmers on crop pattern, cropping intensity, adoption of improved technology, input use, crop productivity and returns.
4. To suggest policy measures for rational use of such subsidies in farm sector to further improve the farming lot in Punjab.

Methodology

The study covers both the direct and indirect agricultural input subsidies and is based on primary as well as secondary data. The secondary data on subsidies for supplying the selected inputs i.e. seeds/ saplings, fertilizers, canal water and electricity to agricultural sector were collected from various published sources. To meet the specific objectives of the study, at first stage of sampling three districts of Punjab viz. Hoshiarpur, Ludhiana and Bathinda representing each regions of the state were selected randomly. At second stage, two blocks from each of the selected district were selected. Thus overall six blocks from the sample districts were selected. At next stage of sampling a cluster comprising 2-3 villages from each of the selected blocks were selected randomly for the farm household survey. Finally from each of the selected village cluster, 30 representative farm households, in proportion to their respective proportionate share in different categories as per standard national level definition of operational holdings viz., marginal (< 1 ha), small (1.01 to 2 ha), semi-medium (2.01 to 4 ha), medium (4.01 to 10 ha) and large (> 10 ha acres) were selected randomly. Thus, overall from state total sample of 180 farmer households comprising 29 marginal, 33 small, 55 semi-medium, 48 medium and 15 large farmers forms the basis for the present enquiry Information on production of crops and use of inputs in physical as well as monetary terms along with other socio-economic aspects of farm households was collected from the sample farmers through the interview method using the specially designed schedules for the purpose. The information pertains to the crop year 2014-15 (Reference year).

Agro-economic profile of the selected farmers

The overall family size for sample households was 6.17 and the family size showed an increase with the increase in farm size. The family size varied between 7.8 on large farms to 5.41 for the marginal farm size category. Most of the heads of the household were in the age group of 36 to 50 years (about 47%). Overall, 16.67 per cent household heads were illiterate, another 8.89 per cent were basic literates (Primary). About 22 per cent of the household heads had studied up to 8^{th} standard (Middle). Most of the heads of the household (about 37%) were matriculate and only 6 per cent were qualified up to graduation/post

graduation. The average operational holding size of sample households was 4.71 hectare. The level of leased in land (2.14 hectare) was much higher than the leased out land (0.01 hectare) among the sample respondents. Almost all the area had the irrigation facilities highlighting well developed irrigation infrastructure in the study region. The overall access to credit was Rs. 3.53 lakh/farm and access to credit improved with an increase in farm size. The proportion of institutional credit was about 90 per cent with the rest coming from non-institutional sources. On per hectare basis, the overall access to credit was Rs. 69558 and access to credit decreased with an increase in farm size. The per hectare credit from commercial banks declined with increase in farm size varying from Rs 81656 on marginal farms to Rs 27150 on large farms with an average Rs 45093 on the sample farm households. Paddy and wheat were the major kharif and rabi crops in the study area grown on about 29 and 40 per cent of total cropped area during the season, respectively. The area under paddy was found to increase with the increase in farm size. Cotton, basmati-paddy and sugarcane occupied about 6, 3 and one per cent of the total cropped area, respectively. Fodder was grown in the kharif, rabi and summer seasons in the state and the net cropped area under these crops was about 3, 3 and one per cent during the different seasons, respectively. Wheat was the major rabi season crop in the study area. Potato was the other important crops of the season which occupied about 3 per cent area of the total cropped area. Maize and summer moong were the important summer crops. On an average the cropping intensity for different farm size categories was 210.83 per cent, which increased with an increase in farm size. The average sample household was found to possess assets worth about Rs. 5 lakh and the asset value was found to increase with the increasing farm size. Machines and implements, livestock and farm buildings constituted about 60, 30 and 10 per cent of the total value of assets. On an average, sample farms were found to possess tractors of Rs. 1.84 lakh per farm, submersible pumps/electric motors of Rs. 8222 and generator and diesel engine of Rs. 11731 per farm.

Economics of Production of Important Crops in Punjab

On per hectare basis for paddy cultivation, about 352 hours were required for carrying out the various operations like sowing, transplanting, fertiliser/insecticide application, irrigation, harvesting etc. Transplanting is the labour intensive operation in paddy crop. The paddy crop also required about 15 tractor hours particularly for field preparation. Harvesting of crop through combine harvester required about 2 hours. For irrigation, on per hectare basis, paddy required submersible pumps for 161 hours, electric motor for 26 hours along with canal irrigation for about 2 hours. Besides, for carrying out various operations, on an

average on per hectare basis, the generator use was for about 9 hours along with diesel consumption of 149.85 litres. It was found that they used about 17 Kg of seed per hectare. Amongst different categories, on per hectare basis, the highest use of urea, DAP and MOP was by medium farms (326.9 kg), large farms (58.33 kg) and medium farms (3.53 kg), respectively. Being highly water intensive crop, about 29 irrigations are required at different stages of paddy production.

For the cultivation of basmati-paddy about 386 hours per hectare were required for carrying out the various operations like sowing, transplanting, fertiliser/insecticide application, irrigation, harvesting etc. The labour requirement was more for fine varieties of paddy because manual harvesting of crop was more popular in basmati-paddy. The basmati-paddy crop also required about 13 machine labour hours of tractor particularly for field preparation and 1.06 hours of combine harvester. For irrigation, on per hectare basis, basmati-paddy required submersible pumps for 116 hours, electric motor for 17 hours and canal irrigation for less than one hour. Besides, for carrying out various operations, on an average on per hectare basis, the generator use was for about 5hours along with diesel consumption of 107.78 litres. The basmati-paddy growers were found to use about 16 Kg of seed per hectare, which is lower as compared to the recommended level of 20 Kg/hectare. Amongst different categories, on per hectare basis, the highest use of urea, DAP and MOP was by large farms (187.5 kg), marginal farms (75 kg) and semi-medium farms (15.63 kg), respectively. Basmati-paddy required about 20 irrigations at different stages of its production which is lower as compared to other varieties of paddy.

For cotton, about 535 hours per hectare were required for carrying out various farm operations like sowing, fertiliser/insecticide application, irrigation, harvesting etc. This shows that cotton is highly labour intensive crop. Since the cotton crop is picked manually, therefore the requirement of labour was more as compared to other competing crops grown during kharif season. On per hectare basis, it required about 14 machine labour hours, 8.35 electric motor hours, 22.86 submersible pump hours and 81.58 hours of diesel engine+generator particularly for field preparation. The total diesel used was about 75 litres per hectare. The cotton growers were found to use 4.62 Kg of seed per hectare. Amongst different size farms, on per hectare basis, use of urea was the highest (250 kg) for large farms, 118.06 kg of DAP for marginal farms, while the use of MOP was the highest (12.50 kg) at large and medium farms. Overall, the cotton crop required 4.92 irrigations during its production which is sufficiently lower as compared to its requirement for paddy.

For maize, on per hectare basis, about 362 hours were required for carrying out various farm operations like sowing, fertiliser/insecticide application, irrigation, harvesting etc. On per hectare basis, the maize crop required about 18 hours of machine labour of tractor, harvester combine (0.35 hours), and electric motor (0.5 hours), submersible pump (40 hours) particularly for field preparation and for carrying out different inter- culture operations. Total diesel consumption was found to be about 89 litres per hectare. The maize growers used 20.56 Kg of seed per hectare, which is almost comparable to the recommended level of 20 Kg/hectare. Amongst different categories, on per hectare basis, the highest amount of urea was used by semi medium farms (190.79kg) in comparison to 156.25 kg used by marginal farms. DAP was used in lesser amounts by semi-medium farms (118.42 kg) as compared to 125kg for others. MOP and Zinc were also used by the growers for the production of maize. The maize crop generally required about 4 irrigations at different stages of its production.

For the cultivation of sugarcane, on per hectare basis about 1110 hours were required for carrying out the various operations like sowing, fertiliser/insecticide application, irrigation, harvesting etc. It reveals that the labour requirement of this crop was more than other crops. It is due to the fact that more manual labour was required for harvesting of crop. The crop also required about 29.46 machine labour hours of tractor, 15.46 hours of electric motor and 126 hours of submersible pump particularly for field preparation and sowing. Total diesel consumption was found to be 150 litres. The sugarcane growers used about 38 Kg of seed per hectare. On per hectare basis, Medium farms use 437.5 kg of urea was which very close to 416.67 kg used by large farms. The quantity of DAP (200 kg) used by either medium or large farms was also similar to that used on overall basis. However, large farms used 125kg of MOP which was almost double than an overall value of 62.5 kg. Medium farms used almost 4 kg less and large farms used 4 kg more zinc as compared overall value of 20.83 kg by the sugarcane growers. It was found that sulphur was not used for the production of sugarcane. The plant protection measures taken by medium farms for weedicides and insecticides were 1 and 3.67, respectively. The sugarcane crop required about 20 irrigations at different stages of its production, which were also lower as compared to paddy.

For wheat, about 116 hours per hectare were required for carrying out the various operations like sowing, fertiliser/insecticide application, irrigation, harvesting etc. On the per hectare basis, the crop required 19.92, 1.92, 4.47, 31.54, 1.41 and 0.79 hours for carrying out various farm operations by machine labour of tractor , combine harvester, electric motor, submersible pump, diesel engine and generator, respectively. The total diesel used was 112.11 litres per hectare. The growers were found to use 101.49 Kg of seed per hectare. Amongst different

farm sizes, on per hectare basis, the highest amount of urea (293.49 kg) was used by medium farms, while the semi-medium farms used the highest amount of DAP (152.50 kg). The crop required about 4 irrigations during its entire growth period at different stages of its production.

For raising potato crop in one hectare basis, about 534 hours were required for carrying out the various operations like sowing, fertiliser/insecticide application, irrigation, harvesting etc. This shows that potato is also highly labour intensive crop. The labour requirement was more because most of operations (earthing and digging) required for raising this are done manually. On per hectare basis, it required about 25, 0.68, 40.35and 41.03 hours of machine, electric motor, submersible pump and generator, respectively. The total diesel used was about 146 litres. The potato growers were found to use about 36 Kg of seed per hectare. On per hectare basis, semi medium farms used highest amount of urea (339.29 kg) as well as DAP (419.64 kg), while large farms used higher amounts of MOP (160.71 kg) as compared to its low (41.67 kg) use at small farms. The crop required about 4.46 irrigations for its production.

For paddy, the total variable cost on per hectare basis was found to be Rs 35102. Amongst variable cost components, the share of human labour was about 40 per cent. It shows that paddy cultivation is highly labour intensive and the farmers have to incur highest expenses on it, which is particularly required during the transplanting of crop. Expenses on machine labour, fertilisers and seed were the other important components of the variable cost. Amongst different farm size categories, on per hectare basis, the large farms had to incur the lowest expenses on machine labour (Rs. 2278). The marginal farmers had to incur the highest expenses on use of diesel (Rs. 5078 per hectare). The average farm was found to incur Rs. 654 per hectare for seed, and there were not large variations amongst different farm size categories. Amongst different fertilisers, on per hectare basis, the highest expenses were incurred on urea (Rs. 1755) followed by DAP (Rs. 1276) and MOP (Rs. 33). The per hectare returns over variable cost were found to vary between Rs. 57574 for marginal farmers to Rs. 66305 for the large farms. Likewise, the benefit cost ratio was found to be the lowest (2.48) for marginal farmers and the highest for the large farms (2.98).

For basmati-paddy, the total variable cost on per hectare basis was found to be Rs 31911. Human labour was found to take larger proportion of the cost as its share was about 49 per cent. Most of the labour is required during the transplantation and harvesting of the crop. The marginal farmers had to incur the highest expenses on use of diesel (Rs. 7486 per hectare). Amongst different farm size categories, on per hectare basis, the marginal farms had to incur the highest expenses on machine labor (Rs. 7167) as they were mostly dependent

upon the hired machinery. The expenses for urea on per hectare basis were found to vary between Rs 675 for marginal farms to Rs 1013 for the large farms, while the expenses for DAP were the highest for marginal farms (Rs. 1800). Amongst different farm size categories, on per hectare basis, the marginal farms had to incur the highest expenses on seed (Rs. 1000). The per hectare returns over variable cost were found to vary between Rs. 46572 for marginal farmers to Rs. 77984 for the medium farms. Likewise, the benefit cost ratio was found to be the lowest (2.11) for marginal farmers and the highest for the medium farms (3.47).

For cotton, the total variable cost on per hectare basis was found to be Rs 39213. Amongst variable cost components, the share of human labour was about 46 per cent. It shows that cotton cultivation is highly labour intensive and the farmers have to incur highest expenses on it, which is particularly required during the harvesting of the crop. Expenses on seed, plant protection measures, fertilisers and machine labour were the other important components of the variable cost. Amongst different farm size categories, on per hectare basis, the large farms had to incur the lowest expenses on hired machine labour (Rs. 41), urea (Rs. 1238) and DAP (Rs. 2400). The semi-medium farms had to incur the highest expenses on use of diesel (Rs. 3164). The average farm was found to incur Rs. 5213 per hectare basis for seed, and there was not large variations amongst different farm size categories. The per hectare returns over variable cost were found to vary between Rs. 16878 for marginal farmers to Rs. 41181 for the large farms. Likewise, the benefit cost ratio was found increase with the farm size.

For maize, the total variable cost on per hectare basis was found to be Rs 32094. About 44 per cent of the operational cost was incurred on human labour, most of which is required during the inter culture and harvesting of the crop. Expenses on fertilisers, seed and machine labour were the other important components of the variable cost and the expenses on these were about 16, 14 and 12 per cent of the total variable cost respectively. Amongst different farm size categories, on per hectare basis, the marginal farms had to incur the highest expenses on hired machine labor (Rs. 5193) and DAP fertiliser (Rs. 3000). The expenses for use of diesel on per hectare basis were found to vary between Rs 3516 for marginal farms to Rs 5702 for the large farms. Amongst different farm size categories, on per hectare basis, the large farms had to incur the highest expenses on seed (Rs. 4625). The per hectare returns over variable cost were found to vary between Rs. 41117 for marginal farmers to Rs. 50000 for the large farms. Likewise, the benefit cost ratio was found to be the lowest (1.35) for marginal farmers and the highest for the large farms (1.70).

For sugarcane, the total variable cost on per hectare basis was found to be Rs 82780. About 54 per cent of the operational cost was incurred on human labour, most of which is required during the inter culture and harvesting of the crop. Amongst different farm size categories, on per hectare basis, the medium farms had to incur the higher expenses on seed (Rs. 12375), urea (Rs. 2363) and insecticides (Rs. 7083), while the large farms had to incur the higher expenses on use of diesel (Rs. 11007) and weedicides (Rs. 1083). The per hectare returns over variable cost were found to be Rs. 124915 for medium farmers and Rs. 121561 for the large farms with the benefit cost ratio of 2.38 and 2.21, respectively.

For wheat, total variable cost on per hectare basis was found to be Rs 25651. Use of diesel was found to take larger proportion of the cost as its share was about 22 per cent. Expenses on machine labour, seed and plant protection measures were the other important components of the variable cost and the expenses on these were about 15, 11 and 11 per cent of the total variable cost respectively. Amongst different farm size categories, on per hectare basis, the marginal farms had to incur the highest expenses on machine labour (Rs. 7042) and urea (Rs. 1418). Amongst different farm size categories, on per hectare basis, the semi-medium farms had to incur the highest expenses on DAP fertiliser (Rs. 3660). The per hectare returns over variable cost were found to vary between Rs. 44610 for marginal farmers to Rs. 55076 for the large farms. Likewise, the benefit cost ratio was found to be the lowest (2.5) for marginal farmers and the highest for the large farms (3.2).

For potato, the total variable cost on per hectare basis was found to be Rs 68890. Human labour was found to take larger proportion of the cost as its share was about 31 per cent. The large farmers had to incur the highest expenses on use of diesel (Rs. 7742 per hectare). Amongst different farm size categories, on per hectare basis, the small farms had to incur the highest expenses on machine labor (Rs. 4966) as they were mostly dependent upon the hired machinery. The expenses for urea on per hectare basis were found to vary between Rs 1659 for medium farms to Rs 1832 for the semi-medium farms, while the expenses for DAP were the highest for semi-medium farms (Rs. 10071). Amongst different farm size categories, on per hectare basis, the large farms had to incur the highest expenses on seed (Rs. 23429). The per hectare returns over variable cost were found to vary between Rs. 14283 for large farmers to Rs. 26634 for the medium farms. Likewise, the benefit cost ratio was found to be the lowest (1.2) for large farmers and the highest for the medium farms (1.39).

Agricultural subsidies in Punjab

The per quintal subsidy provided by the Department of Agriculture in Punjab on wheat seed was found to be to the tune of Rs. 500 for the years 2012-13 and 2013-14, which

increased to Rs. 700 during 2014-15. There was almost three fold increase in the per hectare subsidy in 2014-15 (Rs. 102) from Rs. 37 in 2012-13, which was mainly due to the doubling of quantity of wheat seed supplied during this period. Ferozpur, Hoshiarpur and Muktsar were the leading districts in availing the subsidy during 2012-13, 2013-14 and 2014-15, respectively. The amount of subsidy provided for agricultural machinery by the department of Agriculture in Punjab increased from Rs. 7.4 million during 2002-03 to Rs. 627.41 million during 2014-15. The proportion of amount actually spent to provisional amount varied from about 77 per cent during 2002-03 to as high 100 per cent since 2013-14. The amount of subsidy disbursed by the Department of Horticulture in Punjab under NHMS amounted to Rs. 5.39 crores during 1990-91, peaked at Rs. 76.88 crores during 2012-13 and then declined to Rs. 44.24 crores during 2014-15. The proportion of amount actually spent to provisional amount varied from about 19 per cent during 2005-06 to as high about 168 per cent during 2008-09. The subsidies under RKVY peaked at Rs. 12.95 crores during 2013-14 and then declined to Rs. 8 crores during 2014-15. The funds allocated were fully utilized for the scheme. The fertilizer subsidy in India as well as in Punjab has followed an decreasing trend from 2010-11 to 2014-15; it decreased from Rs. 68217 crore to Rs. 50700 crore and in Punjab from Rs. 4581 crore to Rs. 3492 crore. The share of Punjab state in total fertilizer subsidies in India increased continuously from 6.71 per cent during 2010-11 to 7.74 per cent during 2012-13 and then declined to 6.89 per cent during 2014-15. The electricity consumption in Punjab agriculture increased from 5818 million KWH in 2002-03 to 10641 million KWH in 2014-15. The total cost of supply of electricity to agriculture increased from Rs. 900 crore to Rs. 4454 crore during this period. The electricity supply to agriculture sector is free. The per unit cost/subsidy in agriculture has also been continuously increasing from Rs. 1.55 in 2002-03 to Rs. 4.19 in 2014-15. The direct subsidy availed by sample farmers was found to vary between Rs. 804 for marginal farms to Rs. 20581 for the medium farms, which was mainly due to the high level of farm machinery subsidy availed by the medium farms (Rs. 18715). The level of subsidies availed by marginal, medium and large farms were the highest for farm machinery, while the small and medium farms availed highest subsidy on the wheat seed. On per hectare basis, the subsidy was found to vary between Rs. 209 for large farms to Rs. 1333 for medium farms, which was mainly due to the high level of farm machinery subsidy availed by the medium farms (Rs. 1212). The level of subsidies availed by large and medium farms were the highest for farm machinery, while the marginal, small and semi-medium farms availed highest subsidy on the wheat seed. The farmers also availed the subsidy on pesticides used for paddy and wheat crops.

Crop-wise and component-wise input subsidy

In case of paddy crop, there was increase in the cost of growing by Rs. 8486 per hectare without availing subsidies. The farm category wise analysis revealed that there was increase in total cost of paddy growing by Rs.11268 per hectare on large farms followed by other farm categories. Per farm basis analysis revealed that without benefit of subsidies there was an overall increase in the cost of paddy growing by 24.18 per cent which was Rs. 24272 in value terms. In overall, net returns in paddy growing declined by 13.06 per cent. Thus, subsidy benefit in paddy crop was realized more by large and medium category farmers.

In basmati-paddy also, without subsidies there was an increase in the cost of growing basmati by Rs. 5933 per hectare. The increase in total cost without subsidies worked out to be Rs.8392 per hectare on large farms followed by other farm categories. Further, it was observed that without benefit of subsidies there was an overall increase in the cost of raising basmati crop by 18.60 per cent or decline in net returns by 8.61 per cent, which in monetary terms worked out at Rs. 1306 per farm. According to farm size, increase in cost of basmati production without any subsidy was 26.46 per cent on large farms followed by other farm categories. Both per hectare and per farm analysis revealed higher quantum of subsidy benefit realized by farmers in upper hierarchy.

In cotton cop, there was increase in cost of growing cotton by Rs. 4532 per hectare without subsidies. The increase in cost or decline in returns in cotton crop without subsidies was by Rs.5573 per hectare on large farms followed by other farm categories. On per farm basis there was an overall increase in the cost of growing cotton by Rs. 2764 per farm which was 10.36 per cent in relative terms while on the contrary net returns in cotton growing declined by 14.37 per cent. Increase in cost of growing cotton with no subsidy benefit was 13.45 per cent on large farms which was highest followed by other farm categories. Thus, increase in cost of growing cotton without subsidy was highest on large and medium farms followed by other farm categories which shows the higher relative subsidy benefit realized by these farmers.

In maize, there was increase in cost of growing maize by Rs. 4514 per hectare without subsidies. It was seen that without subsidies increase in cost or decline in returns in maize crop was by Rs.5343 per hectare on large farms and lower on other farm categories. Per farm cost and returns analysis revealed that without subsidies there was an overall increase in the total cost or decline in returns of growing maize by Rs. 2618 per farm which was 14.06 per cent increase in cost or 27.70 per cent decline in net returns. Increase in cost of growing maize without subsidy was Rs. 3985 per farm in case of medium farms followed by semi-

medium, large, small and marginal farms. However, relative increase in cost of growing maize without subsidy was highest at large farms. Per farm analysis revealed higher subsidy benefit realized by medium, semi-medium farmers as compared to other farm categories.

In sugarcane crop, without subsidies there was an increase in the cost of growing sugarcane by Rs. 9963 per hectare. According to farm category there was increase in total cost of sugarcane growing without subsidy by Rs.14203 per hectare on large farms followed by Rs.11930 on medium farms. Again, it was seen that the benefit of subsidy was higher on large farm category. Per farm analysis revealed that without subsidies there was an increase in the cost of producing sugarcane by Rs. 598 per farm which was 12.04 per cent increase in cost or decline in net returns by 9.60 per cent. There was higher increase in cost of sugarcane growing on large farms as compared to other farm categories. Hence, large farmerôs category enjoyed more benefit of subsidy in case of sugarcane crop also.

In case of wheat crop, without subsidies there was increase in the cost of growing wheat by Rs. 5763 per hectare. The increase in total cost without subsidies was to the tune of Rs.6213 per hectare in case of small farms followed by medium, large, semi-medium and marginal farms. Per farm analysis brought out that there was an overall increase in the cost of growing wheat by Rs. 22647 per farm without subsidy benefit and it was 22.78 per cent in relative terms. Decline in net returns of wheat cultivation was 11.13 per cent. There was highest increase in the cost of wheat growing on medium farms by 24.96 per cent followed by large, small, semi-medium and marginal farms. Therefore, in case of wheat crop also large, medium and semi-medium category farmers got higher per farm subsidy benefit due to more area under wheat cultivation. However, per cent increase in total cost without subsidy was higher on medium, large, small and semi-medium farms and least on marginal farms.

In potato crop, there was increase in total cost of growing potato by Rs. 10031 per hectare without subsidies. Further, it was seen that without subsidies increase in cost or decline in returns in potato was by Rs.10645 per hectare on large farms followed by other farm categories. Per farm results revealed that there was an overall increase in the cost of potato crop by 14.56 per cent which was Rs. 4815 per farm in monetary terms. Net returns in potato growing declined by 52.44 per cent without subsidies. According to farm size there was 13.36 per cent increase in potato growing due to withdrawal of subsidies on medium category farms followed by large, semi-medium and small farms. Thus, the quantum of subsidy benefit realized per farm was highest on large farm category due to more area under potato cultivation but relative increase in total cost was nearly equal as compared to other farm categories except small farms.

In overall crop production (including fodder), it was found that without subsidies there was an overall increase in the cost of crops by 19.24 per cent which was Rs. 6410 per hectare and Rs.63653 per farm. Net returns in overall crop production declined by 12.66 per cent. On large farms there was highest increase in total cost per hectare without availing the benefit of subsidy followed by other farm categories The per cent increase in cost or decline in returns without subsidy for growing all the crops was highest on large farms (24.38%) followed by medium, semi-medium, small and marginal farms. This shows the higher subsidy benefit accrued by the large, medium and semi-medium category farmers in crop cultivation as compared to small and marginal farmers.

Component wise subsidy revealed that per hectare subsidy on fertilizers worked out to be Rs.4384 on large farms followed by medium, semi-medium, small and marginal farms. Individual subsidy benefit on all the farm categories in overall scenario was found to be Rs.2667 on urea, Rs.1435 on DAP and Rs.83 per hectare on MOP. Per farm analysis revealed that the quantum of fertilizer subsidy realized by the large farmers was highest (Rs.139061) as compared to other farm categories. Per farm total subsidy benefit declined with decrease in the farm size and was lowest on marginal farms. Similar situation was observed in case of individual subsidy benefit realized by the farmers while using urea, DAP and MOP. Thus, larger share in fertilizer subsidy benefit was enjoyed by large farmers as compared to farmers from other farm categories.

Per hectare crop-wise fertilizer subsidy revealed that biggest chunk of fertilizer subsidy worked out in case of potato (Rs.8990) followed by sugarcane, wheat, paddy, cotton, maize and basmati crop. The crop-wise difference in fertilizer use attributed to higher fertilizer subsidy in case of potato and sugarcane crops. Farm category- wise analysis showed higher benefit realized by medium and large farmers in majority of the crops. The crop-wise fertilizer subsidies on per farm basis revealed that the quantum of fertilizer subsidy was highest in case of wheat crop followed by other crops. Thus, nearly 70 per cent of the total subsidy on fertilizers attributed to cultivation of wheat and paddy crops due to higher area under these crops.

The crop-wise per hectare power subsidy revealed that power subsidy in case of paddy crop, worked out at Rs.4289 per hectare followed by sugarcane, basmati, potato, maize, wheat and cotton. Thus, the crops requiring higher number of irrigations accrued higher proportion of power subsidy realized by the agricultural sector. On per hectare basis, the maximum benefit of power subsidy was realized by large and medium category farmers as compared to other farmer categories. On per farm basis also, highest power subsidy was worked out for paddy crop i.e. Rs.12267 per farm followed by wheat, basmati, maize, potato

and cotton. Due to higher area under paddy and wheat crops on the sample farms, the power subsidy quantum was higher for these crops as compared to other crops. Obviously, the proportion of power subsidy benefit was more on large farms as compared to other farm categories.

As far as diesel subsidy is concerned, it was Rs. 391 per hectare in sugarcane crop followed by paddy, basmati, maize and cotton. Farm category wise analysis revealed that diesel subsidy benefit was highest on semi-medium, medium and large farms as compared to marginal and small farms. The extent of diesel subsidy was higher for sugarcane and paddy crops due to higher generator/ diesel engine use for irrigating these crops particularly in hot summer months. The extent of diesel subsidy per farm worked out to be Rs.1114 per farm for paddy crop, which was also nearly 74 per cent of the total diesel subsidy on various crops grown on the selected farms. Diesel subsidy per farm worked out to be Rs. 135 for maize, which was highest followed by cotton, basmati and sugarcane. In aggregate diesel subsidy realized on large farms was Rs.4744 per farm followed by other farm categories. Thus, higher benefit of diesel subsidy was enjoyed by large and medium farmers as compared to farmers from other farm categories due to higher area under crop cultivation.

The quantum of total direct subsidy received per hectare by the sample respondents in aggregate was highest on medium category farms followed by marginal, small, semi-medium and large farms. But on per farm basis it was highest on medium farms followed by large, semi-medium, small and marginal farms. Thus, the higher benefit of direct subsidies was also realized by medium and large category farmers on per farm basis as compared to marginal and small farmers. This shows the disparity in disbursement of direct subsidies. The benefit of indirect subsidies availed by the farmers revealed that per hectare indirect subsidy realized by the large farmers was highest being Rs.8531 per hectare followed by medium, semi-medium, small and marginal farmers. Similar trend was observed on per farm basis also. Therefore, indirect subsidies benefits were largely accrued by large and medium category farmers as compared to small and marginal farmers.

Subsidy intensity and effect of subsidies on agriculture

The distribution of sample households on the basis of total agricultural subsidy availed per hectare revealed that 36.67 per cent of the households fell in the low subsidy group of up to Rs. 5818 followed by 33.33 per cent in Rs. 5819-7572 group and remaining 30 per cent in > Rs.7572 group . It was seen that higher number of households fell in low subsidy group as compared to medium and high subsidy groups. Majority of the marginal and small farmers fell in low subsidy farm group while semi-medium farmers fell in both low and

medium subsidy groups and large and medium category farmers in medium and high subsidy groups. Further, it was seen that total operational area of the farmers falling under low subsidy group was 2.27 hectare; under medium subsidy group was 5.33 hectare and nearly seven hectare in case of high subsidy group. Paddy, wheat, Bt cotton and maize dominated the cropping pattern of respondent households.

In paddy crop, subsidy intensity wise analysis revealed that there was increase in total cost of paddy growing by Rs.10307 per hectare on high subsidy intensity farms followed by medium and low intensity farms. Analysis on per farm basis revealed that without subsidy benefit there was an overall increase in the cost of paddy cultivation by 24.18 per cent or decrease in net returns by 13.06 per cent. According to subsidy intensity, there was highest increase in cost of paddy cultivation on high subsidy intensity farms by 28.61 per cent followed by medium and low subsidy intensity farms. Thus, subsidy benefits realized by farmers in paddy cultivation were higher on high subsidy intensity farms.

In basmati-paddy, it was seen that increase in total cost without subsidies was Rs.7422 per hectare on high intensity farms followed by medium and low subsidy intensity farms. Thus, increase in total cost of basmati cultivation on high intensity farms was nearly double as that of low intensity farms. According to subsidy intensity, increase in total cost of basmati cultivation without any subsidy was 24.66 per cent per farm on high intensity farms followed by medium and low subsidy intensity farms.

In case of cotton crop there was increase in total cost of cultivation by Rs. 4532 per hectare without subsidies. The increase in cost of cotton crop without subsidies was by Rs.5166 per hectare on medium subsidy intensity farms followed by high and low subsidy intensity farms. On per farm basis increase in total cost of cotton cultivation, without subsidy benefit, was Rs. 3099 per farm on medium followed by low and high subsidy intensity farms.

In case of maize crop the increase in cost or decline in returns in maize crop was by Rs.4740 per hectare on medium subsidy intensity farms followed by high and low subsidy intensity farms. Per farm cost and returns analysis revealed that there was increase in cost of growing maize without subsidy by Rs. 3175 per farm on medium subsidy intensity farms followed by other farms. Thus, in maize crop, subsidy intensity benefit was higher on medium intensity farms as compared to low and high subsidy intensity farms.

In case of sugarcane crop there was increase in the cost of growing sugarcane by Rs. 9963 per hectare. According to category based on subsidy intensity, there was increase in total cost without subsidy in sugarcane growing by Rs.13371 per hectare on high subsidy intensity farms followed by other farms. Per farm analysis revealed that subsidy benefit

realized on high subsidy intensity farms was Rs. 1337 and Rs. 1032 on medium intensity farms.

In wheat crop, the increase in total cost without subsidies was Rs.6370 per hectare on high subsidy intensity farms followed by medium and low subsidy intensity farms. Subsidy intensity per farm showed that there was higher increase in cost of wheat cultivation on high subsidy intensity farms by 25.29 per cent followed by medium and low subsidy intensity farms. Thus, biggest chunk of subsidy in wheat crop was reaped by large farmers.

In potato, there was increase in cost of potato growing by Rs.11130 per hectare on high subsidy intensity farms followed by other farms. As far as per farm analysis is concerned, there was 15.86 per cent increase in potato growing due to withdrawal of subsidies on high subsidy intensity farms followed by medium and low subsidy intensity farms. Thus, the subsidy benefit realized by high subsidy intensity group was comparatively higher than medium and low subsidy intensity group.

As far as analysis on quantum of fertilizer usage is concerned, there was significantly higher use of fertilizers on high subsidy intensity farms as compared to medium and low categories. Thus, on high subsidy intensity farms; urea, DAP and MOP use was higher than medium and low subsidy intensity farms on both per hectare and per farm basis. Crop-wise per hectare fertilizer usage revealed that fertilizer usage was higher on high subsidy intensity farms in case of potato, sugarcane and wheat while on medium subsidy intensity farms it was higher for paddy, cotton, basmati and maize. Fertilizer usage per hectare was least for all the crops on low subsidy intensity farms. This clearly reveals that fertilizer usage was higher on high subsidy intensity farms which was reflected in terms of higher subsidy benefit realized by large farmers as compared to other farm categories.

Crop-wise per hectare analysis revealed that power usage was higher on high subsidy intensity farms in case of paddy, sugarcane, basmati, potato, maize and wheat while on medium subsidy intensity farms it was higher for cotton crop only. Power usage in monetary terms revealed that total power usage per hectare in aggregate was Rs. 3078 per hectare on high subsidy intensity farms followed by medium and low subsidy intensity farms. Crop-wise per farm analysis revealed that paddy and wheat crops consumed nearly 80 per cent of the total power subsidy on high and medium subsidy intensity farms while it was about 58 per cent on low subsidy intensity farms. Hence, power subsidy benefit was mostly enjoyed by large and medium farm category farmers with major chunk of share that of paddy and wheat crops.

Policy recommendations

Direct subsidy benefit should be target group based especially for small and marginal farmers since major chunk of direct subsidies are taken by medium and large category farmers and hence should be totally discontinued for this group. The resultant savings by way of withdrawal of direct subsidies, this benefit should be given to marginal and small farmers to improve their economic condition for welfare of the society. In case of indirect subsidies, especially fertilizer and power subsidies, these should be continued for marginal and small farmers in the present form and it should be given to the medium and large farmers with a rider. Nominal charges for power usage by medium and large category farmers in agricultural sector can be one of the options. These policy issues can be helpful in rational use of agricultural subsidies and bridge the farm category gap and disparity in agricultural sector.

REFERENCES

Acharya S S and Jogi R L (2004) Farm input subsidies in Indian Agriculture *Agricultural Economics Research Review* 17 (1): 11-41.

Badi R V and Badi N V (2002), Rural Marketing, Himalaya Publishing House, pp.225.

Bumb, B. L. , Johnson, M. E. & Fuentes, P. A. 2011 . Policy options for improving regional fertilizer markets in west Africa . IFPRI Discussion Paper 01084. Washington DC: IFPRI .

Djurfeldt, G. , Holmen, H. , Jirstrom, M. & Larsson, R. (eds) 2005 . The African Food Crisis: Lessons from the Asian Green Revolution . Wallingford : CAB International Publishing .

Dorward, A. R. , Kydd, J. G. , Morrison, J. A. & Urey, I. (2004). A policy agenda for pro-poor agricultural growth. World Development, 32, 73ï 89.

Economist Intelligence Unit (2008) . Lifting African and Asian Farmers out of Poverty: Assessing the Investment Needs. A Custom Research Project for the Bill and Melinda Gates Foundation. New York : The Economist Intelligence Unit.

Fan, Shengyen, Ashok Gulati and Sukhaseo Thorat (2008) Investment, Subsidies and Pro-poor growth in Rural India*, Agricultural Economic*, 39(2): 163-170

Ephraim Chirwa and Andrew Dorward (2013). Agricultural Input Subsidies: The Recent Malawi Experience, Oxford University Press, Oxford, OX2 6DP, United Kingdom.

Fan, S. , Gulati, A. & Thorat, S. (2007). Investment, subsidies, and pro-poor growth in rural India. IFPRI Discussion Paper 716. Washington DC: IFPRI.

Gulati, Ashok (2007) Investment, subsidies and pro-poor growth in rural India*, Economic and Political Weekly*, 18(3): 115-129.

Gulati, Ashok and Sudha Narayanan (2003) *The subsidy syndrome in Indian Agriculture* (Oxford University Press, New Delhi)

Gulati, Ashok (1989) Impact subsidies in Indian Agriculture: A state-wise analysis *Economic and Political Weekly* 24 (25): A57-A65.

Gupta, Anjali (1984), Impact of agricultural subsidies, *Economic and Political Weekly,* 39(4): 48-53

Jayne, T. S. , Minot, N. & Rashid, S. (2009). Fertilizer marketing in eastern and southern Africa. Background document for Seminar: ôFertilizer Policy Symposiumõ, Livingstone, 15ï 19 June.

Kaur R and Sharma B B (2012) Agricultural Subsidies in India Boon or Curse IOSR *Journal of Humanities and Social Science (JHSS)* 2(4): 40-46.

Kumar Praduman and Joshi P K (2014) Input Subsidy vs Farm Technology - Which is More Important for Agricultural Development? *Agricultural Economics Research Review* 27 (1): 1-18.

Morris, M. , Kelly, V. A. , Kopicki, R. & Byerlee, D. (2007) . Fertilizer Use in African Agriculture. Washington DC: World Bank.

Mundle, S. and M. Govinda Rao (1991). Volume and Composition of Government Subsidies in India 1987-88. Economic and Political Weekly.

Salunkhe H A and Deshmush B B (2013) An Overview of Government Agriculture Subsidies in India *Pratibha: International Journal of Science, Spirituality, Business And Technology (IJSSBT)*, 1(2): 62-66.

Sharma, V.K. (1982) Impact of agricultural subsidies on Nation Income and agricultural production, *Economic and Political Weekly*, 47(7): 66-71

Steve Wiggins (2010) Input Subsidies in Developing Countries, *Global Forum on agriculture Policies for Agricultural Development, Poverty Reduction and Food Security OECD Headquarters*, Paris: p 10

Ratna D K and Sharma Atul (1992) Price subsidies and irrigation investment in India: Macro implications *Economic and Political Weekly* 27 (39): A117-A121.

Ratnareddy V and Deshpande R S (1992) Input subsidies: Whither the direction of policy changes Indian Journal of Agricultural Economics 47 (3): 351-56.

Paroda R S (2000) Input subsidies in agriculture: Needed Reforms *Agricultural Situation in India* 57 (7): 363-365.

Vaidyanathan A (2000) Agricultural input subsidies *Agricultural Situation in India* 57 (5): 261-265.

Appendix I

Reviewer comments on the Research Report "Status and Utilization of Input Subsidies in Punjab Agriculture" by D K Gover, J.M.Singh, S.Kumar and J. Singh

The success of Green Revolution has much to do with input subsidies to enhance production, and ókickstartô markets first within staple crops and later in other crops. It is also argued that these subsidies did not have the kind of positive response in the later phase of Green Revolution as observed in the initial phase. Also, strong arguments are made that subsidies crowd out investments in agriculture as they form 11.6% of agricultural output in 2009-10, apart from causing erosion of natural resources like soil, water and air. Therefore, there is a need to take a fresh look at both the direct and indirect subsidies and associated effects, to órationaliseô these subsidies.

Contributions of the Report:

1. Examined trends and distribution pattern of input subsidies; utilization pattern by different categories of farmers; and overall effects on cropping pattern, intensity, technology-adoption, input use, crop productivity and returns, besides offering policy suggestions for rational use of subsides.

2. The study combines use of secondary data with primary data collected from 180 farmer households in three districts representing different agro-climatic zones in Punjab.

3. Total subsidies hovering at around Rs.5000 crores, cost of crop cultivation could be higher by 19.24% or Rs.6410/ha and net returns might go down by 12.66% with lower input use.

4. The impact on both costs and returns would be higher on large farms with higher cost escalation and higher dip in net returns as they enjoy higher share of subsidies.

5. Subsidies were observed to be encouraging higher doses of key inputs like seeds, fertilisers, and irrigation. Marginal farmers dominate in using machinery subsidies

Shortcomings of the Report:

1. The study is not situated in a thorough review of literature and conceptual framework

2. The physical input use and costs of cultivation do not seem to be based on sufficient and desirable degrees of freedom.

3. Poor readability of the report laced with too many numbers even in summaries of chapters make it difficult for the reader to get a feel of the work and emerging evidence.

4. The authors may at least include a brief and readable executive summary at the beginning of the report.

5. Most importantly, the study fails to generate any counterfactual to the subsidy scenarios. With the recent advances in methodologies, that could have been done.

Recommendation: This is one of the best reports on input subsidies as it creatively combines secondary and primary data to work out both direct and indirect subsidies in farming in one of the input-intensive agriculture in the north-western region of the country. And this report also shows the effects on input use pattern and returns. The finding of the study, that direct subsidies are cornered by medium and large farmers, has huge policy relevance. This study addresses one of the crucial research gaps. **I recommend approval of the report with some revision** on the lines of the suggestions given above, to make it more readable.

Appendix II

ACTION TAKEN ON THE COMMENTS BY AERC, LUDHIANA

Status and Utilization of Input Subsidies in Punjab Agriculture

The authors feel elevated reproducing the paragraph of the reviewer as ñThis is one of the best reports on input subsidies as it creatively combines secondary and primary data to work out both direct and indirect subsidies in farming in one of the input-intensive agriculture in the north-western region of the countryôô.

However, serious efforts have been made to further improve upon the draft report in the light of reviewerôs following comments/ observations:

(i) Thorough review of literature and conceptual framework has been generated as suggested.

(ii) The study has been based on the data, collected from an adequately large sample size of 180 farm households representing all the farm size categories as well as all the agro-climatic zones of the state. Hence, drawing analytical inferences relating to physical input-use and cost of cultivation in the state is quite logical.

(iii) The content has been modified to the possible extent to make the text more reader friendly as pointed out.

(iv) The brief executive summary in the form of an abstract is included in the final report. The same as per earlier practice has been added in the revised report.

(v) All the possible efforts have been put to accomplish the designed study objectives following relevant/ requisite study design/ research methodology.

D.K.Grover
AERC, Ludhiana