



Economic Analysis of Input Subsidies Availed by Farmers in Punjab

J M Singh, D K Grover, Arjinder Kaur, Sanjay Kumar and Jasdev Singh

Department of Economics and Sociology, PAU, Ludhiana (Punjab)

ABSTRACT

Input subsidies are given in the farming sector to encourage the farmers to use the resources judiciously for getting higher yield level of crops. The direct subsidy benefit is realized by the farmers in monetary terms by reduction in price of farm inputs, farm machinery etc. while indirect subsidies are mostly given especially for chemical fertilizers, electric power supply for running tube wells to irrigate crops. Keeping in view the importance of subsidies in agricultural sector, the present study was undertaken to work-out the quantum of input subsidies availed by Punjab farmers with major emphasis on paddy and wheat crops. The data were collected from a representative sample of 180 farmers from all farm categories encompassing one district each selected randomly from three agro-climatic regions of Punjab. The results revealed that the quantum of direct subsidy facility provided by the government departments was mainly availed by medium, large farm category farmers showing disparity in their distribution. Crop-wise subsidy pattern showed that paddy cultivation availed Rs. 8486/-ha subsidy while it was Rs. 5763/-ha in case of wheat crop. The analysis revealed decline in net returns from paddy and wheat crops by about 13 and 11 per cent, respectively due to withdrawal of input subsidies. Fertilizer, power and diesel subsidies availed by large and medium farm category farmers were comparatively higher than being used by their counterparts. The crop-wise analysis revealed major subsidy chunk being used for raising paddy and wheat crops due to higher area under these crops. Major policy option brought out was to lay emphasis on rationalization of subsidies largely in favour of marginal and small farmers while giving with a rider to medium and large category farmers in order to decrease economic disparity in the agricultural sector.

Key Words: Subsidy, returns, farm category, rationalization.

INTRODUCTION

Agricultural subsidy is a way of improving the profitability of input use, in addition to raising physical productivity of inputs, improving efficiency to reduce the cost of inputs and increasing output prices. Subsidy can be considered as a benefit given by the Government to group or individuals as an opportunity to raise productivity and reducing cost (Morris *et al*, 2007; Jayne *et al*, 2009; Bumb *et al*, 2001). The substantial success of green revolution in the country has been assisted by input subsidies especially in food staples (Dyurfeldt *et al*, 2005; Dorward *et al*, 2004).

Subsidies in Indian agriculture can be classified into two broad categories *i.e.*, direct and indirect subsidies. Direct subsidies are implemented through various schemes to the agricultural sector by the government whereas indirect subsidies confine itself to three major inputs *viz.*, fertilizer, irrigation and power. At present input subsidies are the most expensive component of India's food and agricultural policy regime. The cost of agricultural input subsidies as a share of agricultural input almost doubled from 6 per cent in 2003-04 to 11.6 per cent in 2009-10, driven by huge increase in subsidizing fertilizer and electricity. Punjab has been

in the forefront in adoption of Green Revolution technology and has remained the major contributor of wheat and Paddy to the central pool of food grains rightly garnering the title of food bowl of India. The remarkable progress of Punjab agriculture is credited to the use of inputs like fertilizer, improved seeds, irrigation, plant protection chemicals; machinery, credit and technology back up along with zeal and hard work of its enterprising framers. It is a leading state in ensuring the timely availability and efficient delivery system of these vital inputs require for wheat and paddy of the cropping pattern in the state. Though subsidies as incentives are effective in pursuing agricultural growth to a certain extent, but it is also important to use these rationally. So, this study has been devised to have an in-depth analysis of extent and economics of wheat and paddy crops in the state in relation to input subsidies.

MATERIALS AND METHODS

To work out the quantum and distribution of input subsidies among the major crops and farm categories in the state, farm level primary data were collected using randomized sampling technique. One district was selected from each agro-climatic zone of the state and then two blocks were taken from each selected district. For the farm household survey, cluster of villages were selected from each selected block and 180 farm households were selected with probability proportional to size. From five standard categories of operational holdings comprising 29 marginal, 33 small, 55 semi-medium,

48 medium and 15 large farmers across the state were selected.

The data collected from farm households were analyzed 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-ammonium phosphate (DAP) and muriate 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. 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 average and percentage were used for the interpretation of the results.

RESULTS AND DISCUSSION

Direct subsidies availed by sampled farmers

The direct subsidy availed by sampled farmers has been shown in Tables 1 and 2. The subsidy was found to vary between Rs. 804/- for marginal farms

Table 1. Direct subsidy availed by sampled farmers.

(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

Economic Analysis of Input Subsidies

Table 2. Direct subsidy availed by sampled farmers. (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

to Rs. 20581/- for the medium farms, which was mainly due to the high level of farm machinery subsidy availed by the medium farms. 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 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 wheat seed. The farmers also availed the subsidy on pesticides use for paddy and wheat crops. Thus, the quantum of direct subsidy facility provided by the Govt. departments was majorly availed by medium, large farm categories farmers followed by farmers from other farm categories. This shows high disparity in distribution of direct subsidy among the farm categories on the selected farms.

Crop-wise cost and returns obtained (with and without subsidy)

Paddy Crop

Cost and returns with and without subsidies from paddy crop have been shown in Table 3. It can be seen that without subsidies there was an overall increase in the cost of growing paddy by Rs. 8486/-

ha. The farm category wise analysis revealed that there was increase in total cost of paddy growing by Rs.11268/-ha on large farms followed by medium (Rs. 10009/-ha), 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 revealed 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.

Wheat Crop

Cost and returns with and without subsidies in case of wheat crop have been shown in Table 4. It was evident that without subsidies there was an

Table 3. Costs and returns with and without subsidies from paddy crop.

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.

overall increase in the cost of growing wheat by Rs. 5763/-ha. The increase in total cost or decline in net returns without subsidies was to the tune of Rs.6213/-he 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 was 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%) .

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.

Component-wise quantum of crop subsidy

Fertilizer subsidy

The extent of fertilizer subsidy for all the crops 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. 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 for all the crops realized by the

Economic Analysis of Input Subsidies

Table 4. Costs and returns with and without subsidies from wheat crop.

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

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. Thus, larger share in fertilizer subsidy benefit was enjoyed by large farmers as compared to farmers from other farm categories.

The crop-wise fertilizer subsidies revealed that the quantum of fertilizer subsidy was the highest in case of wheat crop *i.e.*, Rs.17993/-farm followed by paddy Rs.10860/- crop on the sample farms. Thus, nearly 70 per cent of the total subsidy on fertilizers attributed to cultivation of wheat and paddy crops only due to higher area under these crops and, therefore, higher fertilizer use as well. Higher per hectare subsidy in case on wheat crop vis-à-vis paddy was due to higher fertilizer usage in case of wheat especially di-ammonium phosphate (DAP).

Power subsidy

The crop-wise per hectare power subsidy on sample farms revealed that power subsidy in case of paddy crop, which needs frequent irrigations, worked out at Rs.4289/- ha as compared to Rs. 834/- in case of wheat. The crop 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.

It was noted that on farm basis in overall scenario, highest power subsidy was worked out

Table 5. Crop-wise and component-wise total (direct + indirect) subsidies on sample farm households in Punjab. (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
Total indirect subsidy (B)*	3869	4849	5816	7142	8321	6268
Total (A+B)	4405	5313	6079	8475	8531	6981

* Taken together for all the crops

for paddy crop (Rs.12267/-) per farm followed by wheat crop (Rs. 3277/-). 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.

Diesel subsidy

Diesel prices were decontrolled in October, 2014 resulting in withdrawal of subsidy. So, the diesel subsidy could not be worked out for wheat and other *rabi* season crops. The crop-wise diesel subsidy per hectare has shown that the extent of diesel subsidy was Rs. 390/-ha in paddy. 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 paddy crop due to

higher generator/ diesel engine use for irrigating the crop 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 all *kharif* crops grown on the selected farms. In aggregate diesel subsidy realized for all *kharif* crops 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.

Aggregate Subsidies (Direct and Indirect)

Direct subsidies

Direct subsidies are target group based and directly accrued by the respondents. Its benefits are realized by the beneficiaries by receiving farm inputs/ machinery at lower price. The direct subsidies

Economic Analysis of Input Subsidies

Table 6. Crop-wise total (direct + indirect) subsidies on sample farm households in Punjab. (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
Total indirect subsidy (B)*	5803	17698	42805	110273	263940	62246
Total (A+B)	6607	19390	44744	130853	270585	69320

* Taken together for all the crops

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. 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/ farm followed by large (Rs. 6645/-), semi-medium (Rs. 1939/-), small (Rs. 1692/-) and marginal (Rs. 804/-) farms (Table 5 & 6). 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.

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 subsidies 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.

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/-ha 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.

CONCLUSION

The quantum of direct subsidy facility provided by the government departments was majorly availed by medium, large farm category farmers

followed by farmers from other farm categories. This shows high disparity in distribution of direct subsidy among the farmers on selected farms. The higher chunk of subsidy benefit availed by large and medium farm categories vis-à-vis other farm category farmers due to larger land holding size. Also, due to withdrawal of subsidy, there will be nearly 13 per cent decline in net returns for paddy crop and about 11 per cent in case of wheat crop. Subsidy on fertilizers (per hectare basis) worked out to be Rs.4384/- on large farms followed by medium, semi-medium, small and marginal farms. Per farm total subsidy benefit declined with decrease in the farm size and was lowest on marginal farms. Thus, higher share of fertilizer subsidy benefit was enjoyed by large farmers and paddy and wheat crops together constituted nearly 70 per cent of fertilizer subsidy availed on sampled farms. Nearly 63 per cent of total power subsidy was used for irrigating paddy crop only. Obviously, the proportion of power subsidy benefit was more on large farms as compared to other farm categories. 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. It was noticed that indirect subsidies benefits were largely accrued by large and medium category farmers as compared to small and marginal farmers. Hence, it could be said that 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 restricted by putting a limit on its

disbursement among them. The resultant savings by way of partial withdrawal of direct subsidies to medium and large farmers, the benefit may be given to marginal and small farmers to improve their economic condition for their overall welfare. In case of indirect subsidies, especially fertilizer and power subsidies, these should be continued to marginal and small farmers but 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-wise gap and thereby reduce economic disparity in the agricultural sector.

REFERENCES

- Bumb B L, Johnson M E and 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 and 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 and Urey I (2004). A policy agenda for pro-poor agricultural growth. *World Development* **32**: 73–89.
- Jayne T S , Minot N and Rashid S (2009). Fertilizer marketing in eastern and southern Africa. Background document for Seminar: ‘Fertilizer Policy Symposium’, Livingstone, 15–19 June.
- Morris M, Kelly V A , Kopicki R and Byerlee D (2007). *Fertilizer Use in African Agriculture*. Washington DC: World Bank.
- Received on 9/7/2021* *Accepted on 5/11/2021*