JOURNAL OF AGRICULTURE & SOCIAL SCIENCES
1813–2235/2006/02–4–238–241
http://www.fspublishers.org

Factors Responsible for Imbalanced Use of Fertilizers for Various Crops in the Central Punjab

IFTIKHAR NABI, AMNA AFZAAL†, MAZHAR ABBAS AND M. ASHFAQ KHAN[1]†
Technology Transfer Institute (PARC) AARI, Faisalabad
†*Department of Rural Sociology, University of Agriculture, Faisalabad–38040, Pakistan*
[1]Corresponding author's e-mail: ashfaq_khan79@hotmail.com

ABSTRACT

The study was carried out to investigate the factors limiting the recommended use of fertilizer for various crops in the central Punjab for this purpose, 100 farmers were taken as study respondents. Wheat, cotton, rice, sugarcane and maize occupied 38%, 11%, 15%, 16.5% and 8% of the total cropped area, respectively in study area. Majority of both small (82%) and large farming communities (84%) self purchased fertilizers. Both small and large farming communities (59% and 55%) applied self fertilizers technology in light of their past experience. Only 42.5% respondents could not use of fertilizers due to lack of funds. The small farming community applied Nitrogen (116.09 kg/ha) and Phosphorous (64.22 kg/ha) to wheat crop and obtained about 3.95 tones/ha. Whereas, large farming community applied Nitrogen (121.03 kg/ha) and Phosphorous (66.69 kg/ha) to wheat and obtained 3.85 tones/hayield. Small farming community applied Nitrogen (79.04 kg/ha) and Phosphorous (1976 kg/ha) to cotton crop and obtained 1.40 tones/ha. Whereas, large farming community applied Nitrogen (91.36 kg/ha) and Phosphorous (14.82 kg/ha) and obtained 1.42 tones/ha. Small farming community applied Nitrogen (793.86 kg/ha) and Phosphorous (34.56 kg/ha) to rice crop and obtained 3.09 tones/ha. Whereas, large farming community applied Nitrogen (111.15 kg/ha) and Phosphorous (41.99 kg/ha) and obtained 3.19 tones/ha. Better fertilizer application by larg farming community harvested better yields.

Key Words: Factors; Fertilizers; Crops and farmers

INTRODUCTION

Pakistan is predominantly an agricultural country. A major proportion of the population (67.5%) lives in the rural areas and is directly or indirectly dependent upon agriculture. It provides employment to 48.4% of labour force and contributes 24% to the GDP (Government of Pakistan, 2003).

However, the crops yield per hectare in Pakistan is far below than that of other countries of the world (FAO, 2000). The decline in crops production may mainly be attributed to shortage of irrigation water, delayed planting, poor plant protection, imbalanced fertilizer use, inappropriate soil management and poor land preparation. Low crops productivity is primarily, the result of outdated technology prevalent on farm sector particularity among the farmers. The modern technology, which comprises of new varieties, use of fertilizers, pesticides and farm machinery are not properly diffused and widely adopted by the farmers (Khan, 2000).

Imbalanced fertilizer use has resulted not only in the reduction of crops production but also productivity of soil decelerated (Saleem, 1992).

Now a days, the farmers of the Punjab province are using improved agricultural techniques, fertilizers etc. up to some extent. This is due to lack of farmers'resouces (Abbas, 1988).

Research and experience of advanced countries have shown that key to increase per hectare yield lies in the proper use of fertilizers by the farmers.

Therefore, a need exists to investigate the factors responsible for imbalanced use of fertilizer for various crops in the central Punjab.

MATERIALS AND METHODS

A farm level survey was conducted during June, 2003 in 19 villages of four districts (central Punjab) of Pakistan, namely, Faisalabad, Jhang, Sargodha and Toba Tek Singh. From each district, 5 - 6 villages were selected and from each village, 5 - 6 farmers were also selected randomly. Thus total, 19 villages and 100 farmers were taken as study area at random as study respondents. A stratified random sampling technique was adopted to achieve a representative sample. The data were collected through farmers' interviews using a well-structured questionnaire. The data thus obtained were analyzed using simple percentages to estimate the various responses to draw conclusions. The distribution of the sample farmers is presented in Table I.

Thus, further analysis of the data the farmers were classified into small farming community and large farming community according to size of their operational land holding. The farmers operating a farm less than 5 ha were termed as small farming community and farmers with an

operational land holding above 5 ha were placed under large farming community. Total 50 numbers of small farmers and 50 large farmers were interviewed from the respective four districts of the province. The distribution of the sample farmers is presented in Table II.

RESULTS AND DISCUSSIONS

Cropping pattern of the study area. The wheat, cotton, rice, sugarcane and maize occupied 38%, 11%, 15%, 16.5% and 8% of the total cropped area, respectively in the study area (Table III). Whereas, kharif and rabi fodders occupied 6.5% and 5% of the total cropped area, respectively in study area. These results are in line with those of Bashir *at al*. (2003), who reported that cotton was the most important crop of kharif season covering about 52% of the total cropped area.

Farmers' sources of loan for purchasing fertilizers in the study area. The overwhelming majority of both small (82%) and large farming communities (84%) self purchased fertilizers, whereas 6% and 6% respondents had borrowed money from the banks and shopkeepers to purchase fertilizers, respectively in the study area. Only 4% respondents took money from milkmen to purchase fertilizers for their crops. Only, 2% respondents approached to commission agents for loaning to purchase fertilizers in the study area (Table IV).

Farmers' information sources of fertilizer application technology. Both the small and large farming communities (59% and 55%) applied self fertilizers technology in light of their past experience, respectively and 20% respondents gathered information about fertilizers technology through extension agents. These results are in line with those of Ali (1993), Majeed (1994) and Malik *et al*. (1994), who concluded that a majority of the respondents got information from the Department of Agriculture.

The Table V also reveals that 9% and 9% respondents collected information through fertilizer agents and radio/television, respectively in the study area.

Fertilizer prices prevailed in study area. The respondents informed about the prices of fertilizers, prevailing in the study area that DAP and urea were available @ Rs. 702 and Rs. 336/bag, respectively. While Nitro Phosphate (NP) was available @ Rs. 480/bag. The Ammonium Nitrate (AN) and SSP were available @ Rs. 255 and Rs. 256/bag, respectively. Whereas, TSP and Gypsum were available @ Rs. 450 and Rs. 27/bag, respectively (Table VI).

The socio-economic constraints to use of fertilizers. The Table VII reflects that 42.5% respondents of study area could not use of fertilizers to their crops due to lack of funds. Whereas, 42% respondents were of the view that due to high prices of fertilizers, the purchasing power was very low in study area. Only 15.5% respondents pointed out that fertilizers were not available or short at the proper time in market of the study area.

Farmers' financial constraints to purchase fertilizers. 50% of the respondents pointed out that they had low purchasing power for fertilizers due to their poverty. 17.50% respondents opined that due to smallholding of farm size, they were not in a position to approach the institutional credit to purchase the fertilizes. Whereas, 12.50% respondents pointed out that institutional credit i.e., banks were far away, due to this reason they could not borrow the loan these institutional credit and could not purchase the fertilizers. While 20% respondents pointed out that the interest of the donors agencies was too high and the respondents could not get loan for purchasing fertilizers in the study area.

Table I. Distribution of sample villages and farmers of the central Punjab

Sr. No	District	No. of Villages surveyed	No. of Farmers interviewed
1	Faisalabad	5	25
2	Jhang	4	25
3	T.T. Singh	6	25
4	Sargodha	4	25
	Total:	19	100

Table II. Distribution of sample farmers according to farming community

Sr. No	Districts	Small Farming Community	Large Farming Community	Total
1.	Faisalabad	15	10	25
2.	Jhang	10	15	25
3.	T.T.Singh	12	13	25
4.	Sargodha	13	12	25
	Total:	50	50	100

Table III. Cropping pattern of the study area (Percent)

Sr. No	Crops	Small Farming Community	Large Farming Community	Average
1.	Wheat	35	39	38
2.	Cotton	12	10.50	11
3.	Rice	12	15	15
4.	Sugarcane	16	16.50	16.50
5.	Maize	6.50	8	8
6.	Rabi fodder	8	5	5
7.	Kharif fodder	10.50	6	6.50
8.	Total	100	100	100

Table IV. Farmers' sources of loan for purchasing fertilizers in the study area (Percent Farmers)

Sr. No	Farmers' sources of loan for purchasing fertilizers	Small Farming Community	Large Farming Community	Average
1	Self purchasing	80	84	82
2.	Banks	4	8	6
5.	Shop keepers	8	4	6
6.	Commission agents	-	4	2
7.	Milkmen	8	-	4
	Total:	100	100	100

Table V. Farmers' information sources of fertilizer technology (Percent Farmers)

Sr. No	Farmers' Information Sources	Small Farming Community	Large Farming Community	Average
1	Fertilizer dealers	10	8	9
2	Extension Agents	20	19	20
3	Radio/T.V	7	10	9
5	Research Peoples	4	2	3
7	Fellow farmers	0	6	3
8	Past Experience	59	55	56
	Total:	100	100	100

Table VI. Fertilizer prices prevailed in study area

Sr. No	Fertilizer	Price/Bag (Rs.)
1	DAP	702
2	Urea	336
3	Nitro phosphate (NP)	480
4	Ammonium Nitrate (AN)	255
5	SSP	256
7	TSP	450
8	Gypsum	27

Table VII. Socio-economic constraints to use of fertilizer in study area (Percent Farmers)

Sr. No	Farmers constraints	Small Farming Community	Large Farming Community	Total
1	Fertilizer timely not available	9.5	6	15.5
2	High Fertilizer prices	21	21	42
3	Lack of funds	20.5	22	42.5
	Total:	51	49	100

Table VIII. Farmers' financial constraints to purchase fertilizer (Percent Farmers)

Sr. No	Farmers' financial constraints	Small Farming Community	Large Farming Community	Average
1	Low purchase power	44	60	50
2	Credit not available	20	19	17.50
3	Inst. credit (Banks) far away	20	-	12.50
4	High interest rate	16	27	20
	Total:	100	100	100

Fertilizers' application and crops' yield in the study area. The small farming community applied Nitrogen (116.09 kg/ha) and Phosphorous (64.22 kg ha^{-1}) to wheat crop and obtained about 3.95 kg ha^{-1}. Whereas, large farming community applied Nitrogen (121.03 kg ha^{-1}) and Phosphorous (66.69 kg ha^{-1}) and obtained 3.85 kg ha^{-1} to wheat crop (Table IX, X).

The small farming community applied Nitrogen (79.04 kg ha^{-1}) and Phosphorous (1976 kg ha^{-1}) to cotton crop and obtained 1.40 kg ha^{-1}. Whereas, large farming community applied Nitrogen (91.36 kg ha^{-1}) and Phosphorous (14.82 kg ha^{-1}) and obtained 1.42 kg ha^{-1} to cotton crop.

The small farming community applied Nitrogen (793.86 kg ha^{-1}) and Phosphorous (34.56 kg ha^{-1}) to rice crop and obtained 3.09 kg ha^{-1}. Whereas, large farming community applied Nitrogen (111.15 kg ha^{-1}) and Phosphorous (41.99 kg ha^{-1}) and obtained 3.19 tones/hectare to rice crop.

The Tables IX and X reflect that small farming community applied Nitrogen (91.36 kg ha^{-1}) and Phosphorous (51.87 kg ha^{-1}) to sugarcane crop and obtained 55.26 kg ha^{-1}. Whereas, large farming community applied Nitrogen (96.33 kg ha^{-1}) and Phosphorous (56.81 kg ha^{-1}) and obtained 61.16 kg ha^{-1} to sugarcane crop.

The Tables IX and X reflect that small farming community applied Nitrogen (69.16 kg ha^{-1}) and Phosphorous (27.17 kg ha^{-1}) to maize crop and obtained 2.63 kg ha^{-1}. Whereas, large farming community applied Nitrogen (88.92 kg ha^{-1}) and Phosphorous (32.11 kg ha^{-1}) and obtained 2.77 kg ha^{-1} to maize crop.

The Tables IX and X reflect that small farming community applied Nitrogen (39.52 kg ha^{-1}) and Phosphorous (7.41 kg ha^{-1}) to rabi fodder crop and obtained 56.09 tones/hectare. Whereas, large farming community applied Nitrogen (44.46 kg ha^{-1}) and Phosphorous (7.41 kg ha^{-1}) and obtained 57.30 kg ha^{-1} to rabi fodder crop.

The Tables IX and X reflect that small farming community applied Nitrogen (39.52 kg ha^{-1}) and Phosphorous (4.94 kg ha^{-1}) to kharif fodder crop and obtained 52.31 kg ha^{-1}. Whereas, large farming community applied Nitrogen (41.90 kg ha^{-1}) and Phosphorous (4.94 kg ha^{-1}) and obtained 53.75 kg ha^{-1} to rabi fodder crop.

Table IX. Fertilizer application to crops by small farm community in the survey area

Sr. No	Crop	Fertilizer application/hectare Nitrogen	Phosphorous	Total	Average Yield (tones/hectare)
1	Wheat	116.09	64.22	180.31	3.94
2	Cotton	79.04	19.76	98.8	1.40
3	Rice	93.86	34.58	128.44	3.09
4	Sugarcane	91.36	51.87	143.23	55.26
5	Maize	69.16	27.17	96.33	2.63
6	Rabi fodder	39.52	7.41	46.93	56.09
7	Kharif fodder	39.52	4.94	44.46	52.31

Table X. Fertilizer application to crops by large farm community in the survey area

Sr. No	Crop	Fertilizer application/hectare Nitrogen	Phosphorous	Total	Average Yield (tones/hectare)
1	Wheat	121.03	66.69	187.72	4.05
2	Cotton	91.36	14.82	106.18	1.42
3	Rice	111.15	41.99	153.14	3.19
4	Sugarcane	96.33	56.81	153.14	61.16
5	Maize	88.92	32.11	121.03	2.77
6	Rabi fodder	44.46	7.41	51.87	57.30
7	Kharif fodder	41.9	4.94	46.93	53.75

CONCLUSIONS

❖ A farm level survey was conducted in four districts (central Punjab) namely, Faisalabad, Jhang, Sargodha and Toba Tek Singh, 100 farmers were taken as study area at random as study respondents.

❖ Wheat, cotton, rice, sugarcane and maize occupied 38%, 11%, 15%, 16.5% and 8% of the total cropped area, respectively in the study area.

❖ The overwhelming majority of both small (82%) and large farming communities (84%) self purchased fertilizers.

❖ Both small and large farming communities 59% and 55% applied self fertilizers technology in light of their past experience, respectively.

❖ Only 42.5% respondents of study area could not use of fertilizers to their crops due to lack of funds.

❖ Only 50% respondents pointed out that they had low purchasing power for fertilizers due to their poverty.

❖ Small farming community applied Nitrogen (116.09 kg ha^{-1}) and Phosphorous (64.22 kg ha^{-1}) to wheat crop and obtained about 3.95 kg ha^{-1}. Whereas, large farming community applied Nitrogen (121.03 kg ha^{-1}) and Phosphorous (66.69 kg ha^{-1}) and obtained 3.85 kg ha^{-1} to wheat crop.

❖ Small farming community applied Nitrogen (79.04 kg ha^{-1}) and Phosphorous (1976 kg ha^{-1}) to cotton crop and obtained 1.40 kg ha^{-1} Whereas, large farming community applied Nitrogen (91.36 kg ha^{-1}) and Phosphorous (14.82 kg ha^{-1}) and obtained 1.42 kg ha^{-1} to cotton crop.

❖ Small farming community applied Nitrogen (793.86 kg ha^{-1}) and Phosphorous (34.56 kg ha^{-1}) to rice crop and obtained 3.09 kg ha^{-1}. Whereas, large farming community applied Nitrogen (111.15 kg ha^{-1}) and Phosphorous (41.99 kg ha^{-1}) and obtained 3.19 kg ha^{-1} to rice crop.

❖ Small farming community applied Nitrogen (91.36 kg ha^{-1}) and Phosphorous (51.87 kg ha^{-1}) to sugarcane crop and obtained 55.26 kg ha^{-1}. Whereas, large farming community applied Nitrogen (96.33 kg ha^{-1}) and Phosphorous (56.81 kg ha^{-1}) and obtained 61.16 kg ha^{-1} to sugarcane crop.

REFERENCES

Abbass, M.M., 1988. A sociological study into the factors affecting the adoption of improved technology with special reference to rice crop in Sheikhupura Tehsil. *M.Sc. Thesis*, Department of Rural Sociology, University of Agriculture, Faisalabad, Pakistan

Ali, M.I., 1993. Factors affecting the adoption of recommended insecticides and pesticides against rice crop insects and pests by the farmers of tehsil Sheikhupura. *M.Sc. Thesis*, **Department of Rural Sociology**, University of Agriculture, Faisalabad, Pakistan

Bashir, A. and A.D. Sheikh, 2003. Socioeconomic Research Study. *In*: Waqar, M., A. Khalid Mahmood and S. Muhammad (eds.), *Directorate General of Technology Transfer*. PARC ,Islamabad

F.A.O., 2000. *Year Book Annual Production*, Vol. 54

Government of Pakistan, 2003. *Economic Survey of Pakistan.* Economic Advisor's Wing, Finance Division, Islamabad, Pakistan

Khan, S.U., 2000. Impact of Agricultural Credit on the Socio-economic Status of Farmers in District Faisalabad. Un-published *M.Sc. Thesis*, Department of Rural Sociology, Faculty of Agricultural Economics and Rural Sociology, University of Agriculture, Faisalabad, Pakistan

Majeed, A.A., 1994. A study into the factors affecting adoption of recommended weedicides for the wheat crop by the farmers of tehsil Faisalbad. *M.Sc. Thesis*, Department of Rural Sociology, University of Agriculture, Faisalabad, Pakistan

Malik, N.H., S.A. Khan, T. Ali and N. Zehri, 1994. Determination of the effectiveness of agricultural extension field staff in the diffusion of agricultural information among the farmers. *Pakistan J. Agric. Sci*., 31: 133–6

Saleem, M.T., 1992. *An Overview of Phosphatic Fertilizer in Pakistan*. Proceeding of Symposium on role of Phosphorous in crop production. Government of Pakistan, P and D, National Fertilizer Development Centre. Proceeding Report, 12/92

(Received 07 August 2006; Accepted 25 September 2006)