

Input use Pattern in Rainfed '*Kandi*' Area of Jammu Region in Jammu and Kashmir

P. KUMAR*, S. K. KHER, P. S. SLATHIA, G. KUMARI

ABSTRACT

The present study conducted in the subtropical rain fed '*Kandi*' belt of Jammu region aimed to find out the input use pattern and the adoption gap in seed and fertilizers. The results revealed that more than eighty percent of the respondents used urea in maize and wheat crops respectively. Only 14.1 percent of the respondents used Urea in Bajra. The extent of fertilizer use for different crops also reveals that there was no use of MOP in case of marginal farmers. In case of small farmers, MOP was used by only 15.5 percent of the respondents in maize crop only, whereas in case of semi medium farmers MOP was used by 50 percent of respondents in maize and 46.1 percent of respondents in Wheat. An adoption gap existed in seed rate as well as fertilizer dose. The average adoption gap in case of maize crop was 8.5 kg/ha which was less than the recommendation. Similarly the seed rate in case of til, moong and lentil was less than the recommended. The crops where the seed rate (kg/ha) was more than the recommended were wheat (+3.1), bajra (+2.7), mustard (+0.71), mash (+ 1.7) and cowpea (+2.6). The fertilizer application (kg/ha) was also far less than the recommendations. It was 47.8 for DAP followed by Urea (20.4) and MOP (9.3). The adoption gap for Wheat was 16.7 kg /ha for urea and 22.3 kg/ha for DAP.

Keywords: Seed, Fertilizers, Adoption gap-recommended

INTRODUCTION

Growth in production per unit of area is central to development of agriculture. Fertilizer and seed constitute two vital inputs in the agricultural production process. The green revolution of the sixties which transformed India from a 'begging bowl' to 'bread basket' was due to the use of high yielding varieties of seeds and adequate fertilizers. Studies have shown that around 50 to 60 percent of the enhanced food grains production during 1960-77 could be attributed to fertilizers (Planning Commission 2007)

In Jammu and Kashmir, 58.03 percent of the area is rain fed (Anonymous 2008), which is locally called '*Kandi*' belt. The sub mountain tract of the outer Himalayas in Jammu division of Jammu and Kashmir that arises gradually from Punjab plains with a gentle slope of 3° comprising mostly of Shivalik system of rocks is locally known as *Kandi* (Kumar 2004). It is characterized by water scarcity and undulating topography. Economically, the farmers of this area are poor with small holdings.

Moreover the adoption of scientific technologies in the crop production is low because of low literacy, lack of awareness regarding the mode of adoption of modern technologies resulting in low and unstable income since agriculture is mostly in rain fed conditions, the use of inputs is very crucial for making the farming economically viable in these areas. The focus of agriculture research has to be field oriented so as to ensure efficient use of resources along with introduction of new varieties of seeds and modern technology (Mukherjee 2012). The present study was thus conducted with the objective to find out the input use pattern among the farmers of *Kandi* region and to find out the adoption gap in inputs i.e. seed and fertilizers.

MATERIALS AND METHODS

The present investigation was carried in subtropical *Kandi* belt of Jammu region comprising four districts of Jammu, Kathua, Udhampur and Rajouri. From each district two blocks were

selected and from each block two Panchayats were selected. From each Panchayat two villages were selected. Fifteen respondents were selected from each Panchayat. Thus from each block thirty respondents were selected and from each district sixty respondents were selected, taking the final sample size to 240.

RESULTS AND DISCUSSION

The cropping pattern of the study area was studied under three seasons. The crops grown in kharif season were maize both as pure as well as mixed crop with cowpea. The other crops grown in kharif season were bajra, mash, til and moong whereas in rabi season the crops grown were wheat both as a pure as well as a mixed crop with mustard. The other crops grown in rabi season were toria and lentil. Mash was also grown as a zaid season crop.

Input use pattern

In the present study an attempt was made to study the input use pattern of seed and fertilizers of the respondents and the results are presented as follows

Type of seed used by farmers

It is evident from table 1 that farmers mostly use local varieties of seeds. In maize, 72.08 percent and in wheat, 67.5 percent of the respondents used seeds of local varieties. This trend continued in case of pulses and oilseed crops also. In case of mustard 47.83 percent of the respondents used high yielding

Table 1: Type of seed used by the farmers

Crop	Number of farmers	Local seeds (%)	Hybrid seeds (%)
Maize	240	72.08	27.92
Wheat	240	67.50	32.50
Bajra	240	59.58	40.42
Mustard	23	52.17	47.83
Toria	19	73.69	23.31
Mash	21	66.67	33.33
Til	17	64.70	35.30
Cowpea	23	60.87	39.13
Moong	32	68.75	31.25
Lentil	15	66.67	33.33

varieties followed by cowpea (39.13%), til (35.30%), mash and lentil (33.33% each), moong (31.25%) and toria (23.31%).

Extent of adoption of seed

The data in the table 2 reveals that the adoption of seed rate in case of maize was 25.8, 29.4 and 31.6 kg/ha for marginal, small and semi medium categories of farmers, respectively. For wheat the seed rate was 105.60, 117.80 and 123.60 kg/ha for marginal, small and semi-medium category, respectively. Similarly in case of bajra the seed rate was 14.2, 11.04 and 12.85 for marginal, small and semi-medium category, for mustard it was 6.34, 6.45, and 7.34, for mash it was 17.42, 19.60 and 20.80, for til the seed rate was 6.14, 6.21 and 6.87, for cowpea as a mix crop with maize the seed rate was 12.42, 11.80 and 13.60 for marginal, small and semi-medium farmers respectively.

Table 2: Average seed rate used by different categories of farmers (n=240)

Name of Crop	Number	Average Seed rate used(kg/ha)		
		Marginal	Small	Semi medium
Maize	240	25.80	29.40	31.60
Wheat	240	105.60	117.8	123.60
Bajra	240	14.20	11.04	12.85
Mustard	23	6.34	6.45	7.34
Toria	19	6.37	6.48	7.23
Mash	21	17.42	19.60	20.80
Til	17	6.14	6.21	6.87
Cowpea (Mix crop with Maize)	23	12.42	11.80	13.60
Moong	32	17.35	18.32	23.45
Lentil	15	34.75	35.75	37.85

Adoption gap

The adoption gap in seed rate depicted in table 3 divulges that the average adoption gap in case of maize crop was (8.57 kg/ha) which was less than the recommended. Similarly the seed rate in case of til, moong and lentil was less than the recommended. The crops where the seed rate (kg/ha) was more than the recommended were wheat (+3.17), bajra (+2.70), mustard (+0.71), mash (+1.77) and cowpea (+2.60).

Table 3: Average adoption gap in seed rate for all categories of farmers

Name of Crop	Number of farmers	Average seed rate used (kg/ha)	Average recommended seed rate (kg/ha)	Adoption Gap (kg/ha)
Maize	240	28.93	37.50	-8.57
Wheat	240	115.67	112.50	+3.17
Bajra	240	12.70	10.00	+2.70
Mustard	23	6.71	6.00	+0.71
Toria	19	6.69	6.00	+0.69
Mash	21	19.27	17.50	+1.77
Til	17	6.40	7.00	-0.60
Cowpea (as Mixed crop)	23	12.60	10.00	+2.60
Moong	32	19.70	20.00	-0.30
Lentil	15	36.11	40.00	-3.89

Extent of fertilizer use

The data in the table 4 shows that 86.20 and 59.77 percent of the respondents from the marginal category used urea and DAP in maize, respectively. For wheat crop, urea and DAP fertilizers were used by 83.90 percent and 59.77 percent of the respondents, whereas in case of bajra only urea was used by 6.50 percent of the respondents. It is here interesting to note that none from the marginal category farmers used MOP.

Table 4: Extent of fertilizer use by different categories of farmers for different crops (n=240)

Category of farmer	Percentage of farmers using		
	Urea	DAP	MOP
Marginal (n=174)			
Maize	86.20	59.77	00.00
Wheat	83.90	59.77	00.00
Bajra	6.50	00.00	00.00
Small (n=45)			
Maize	84.44	77.78	15.55
Wheat	82.22	88.10	15.55
Bajra	13.33	00.00	00.00
Semi Medium(n=21)			
Maize	100	100.00	52.38
Wheat	100	100.00	47.61
Bajra	65.38	00.00	00.00

In case of small farmers 84.44 percent used Urea and 77.78 percent used DAP in maize, In wheat 82.22 percent used Urea and 88.10 percent used DAP, only 13.33 percent of the respondents used Urea in case of bajra. MOP was used by 15.55 percent of the respondents each in case of maize and wheat respectively. Further it was also observed

that from the semi-medium category all the respondents used Urea and DAP in maize and wheat crop and 65.38 percent used Urea in bajra. MOP was used by 52.38 percent in maize crop and 47.61 percent in wheat (47.61%).

Overall distribution of respondents according to fertilizer use

Table 5 reveals that a very high percentage of respondents used Urea in maize and wheat and a very low percentage used urea in bajra.. Similarly use of DAP was quiet high by the respondents in maize and in wheat. DAP was not used by respondents in bajra. MOP was used by very less respondents both in case of maize as well as wheat.

Table5: Overall distribution of respondents according to fertilizer use

Crop	%age	%age	%age
Maize (n=240)	87.08	66.67	7.50
Wheat (n=240)	85.41	67.50	7.08
Bajra (n=240)	14.17	00.00	00.00

Category wise use of average fertilizer dose

The data in the table 6 shows the average fertilizer dose (kg/ha) used by different categories of farmers. In case of marginal category the average fertilizer dose in Kg/ha used in maize was Urea (77.60) and DAP (42.60). In case of wheat it was Urea (82.40), DAP (43.40) and for bajra only urea was used at the rate of 42.40 kg/ha.

Table 6: Average fertilizer dose used by different categories of farmers for different crops

Crop	Marginal (n= 174) (kg/ha)			Small (n=45) (kg/ha)			Semi medium (n=21) (kg/ha)		
	Urea	DAP	MOP	Urea	DAP	MOP	Urea	DAP	MOP
Maize	77.60	42.60	00.00	78.40	41.60	24.20	82.60	42.40	23.20
Wheat	82.40	43.40	00.00	83.20	43.80	22.80	84.20	43.80	25.40
Bajra	42.40	00.00	00.00	41.20	00.00	00.00	42.00	00.00	00.00

As is evident from the table the average fertilizer dose (kg/ha) of Urea used by small farmers followed by DAP and least by MOP. In case of wheat it was highest for Urea, followed by DAP and MOP. In case of bajra only urea was used at a rate of 41.20 kg/ha. Similarly for semi medium farmers the average fertilizer dose (kg/ha) for maize was urea (84.20), DAP (43.80) and MOP (23.20). For wheat the corresponding rates were 84.20, 43.80 and 25.40 kg/ha for urea, DAP and MOP respectively. In bajra only urea was applied at a rate of 42 kg/ha.

Adoption gap in fertilizer dose

The adoption gap was calculated on the basis of package of practice recommended by Sher-e-Kashmir University of Agricultural Sciences and Technology of Jammu. The data in the table 7 reveals that for almost all the fertilizers there existed an adoption gap. In case of Maize the adoption gap was highest. The fertilizer application (kg/ha) was far less than the recommendations. It was highest for DAP followed by Urea and least for MOP. Similarly, the adoption gap for Wheat was highest in case of DAP followed by Urea and then by MOP. In case of Bajra where only Urea was used, the dose was more than the recommended.

Table 7: Average adoption gap in fertilizer dose for all categories of farmers

Fertilizer dose kg/ha	Maize	Wheat	Bajra
Urea			
Used	79.53	83.27	41.87
Recommended	100	100	35
Gap	-20.47	-16.73	+6.87
DAP			
Used	42.20	43.67	0.0
Recommended	90	66	33
Gap	-47.80	-22.33	-33
MOP			
Used	23.70	24.10	0.0
Recommended	33	35	25
Gap	-9.30	-10.90	-25

The extent of fertilizer use in the study area is high in case of maize and wheat. More than 80 percent of the respondents used urea and more than 60 percent of the respondents used DAP in maize and wheat crops, respectively. In bajra the use of fertilizers was quiet low. Only 14.17 percent of the respondents used urea in bajra. Similarly the use of MOP was dismal. One of the reasons for its low use is the non availability of MOP in the market at the time of sowing as reported by 92.50 percent of respondents in the study area

The extent of fertilizer use for different crops also reveals that there was no use of MOP in case of marginal farmers. In case of small farmers, MOP was used by only 15.55 percent of the respondents in maize crop only whereas in case of semi-medium farmers MOP was used by 50 percent of respondents in case of maize and 46.15 percent of respondents in case of wheat. The negligible use of MOP might be due to unawareness and non availability of the fertilizer at the time of sowing of crops.

The seed rate used by the respondents in the study area is not as per the recommended package of practices developed by SKUAST-J for *Kandi* area. In case of maize and wheat the seed rate used is less than the recommended where as in case of bajra, pulse crops and oilseed crops it is more than the recommended rate.

An adoption gap existed in seed rate as well as fertilizer dose. The average adoption gap in case of maize crop was (8.57 kg/ha) which was less than the recommendation. Similarly the seed rate in case of til, moong and lentil was less than the recommended. The crops where the seed rate (kg/ha) was more than the recommended were wheat (+3.17), bajra (+2.70), mustard (+0.71), mash (+1.77) and cowpea (+2.60).

The fertilizer application (kg/ha) was also far less than the recommendations. It was 47.80 for DAP followed by urea (20.47) and MOP (9.30). Similarly the adoption gap for wheat was 16.73 kg/

ha and 22.33 kg/ha for urea and DAP respectively. In case of bajra where only urea was used, the dose exceeded the recommendations by 6.87 kg/ha.

farm mechanization to reduce the production costs to make the sector more profitable.

CONCLUSIONS

As rain fed belt is vital for achieving food security both at the state as well as the national level, strenuous efforts are needed to boost the agriculture production in this region. With the efforts of state agricultural department, the seed replacement rate has gone up over the last four years from 10 % to 24.78 % in Paddy and from 10.79% to 29.77% in wheat (Mir 2013). Similar strategy needs to be planned for increasing the seed replacement rate in case of maize also to achieve the national level benchmark of 33 percent. Farmers should be educated about the optimum dose of seed as well as fertilizer application. Also, thrust should be given to introduction of latest technology and

REFERENCES

- Anonymous (2008). Digest of Statistics 2007-08. Directorate of Economics and Statistics, Government of Jammu and Kashmir
- Kumar V (2004). Land use mapping of Kandi belt of Jammu region. Cited at link.springer.com/content/pdf/10.1007/BF03030857.pdf
- Mir GH (2013). Multipronged strategy to promote agriculture and allied sectors. Daily Excelsior, March 16
- Mukherjee D (2012). Second green revolution: Eastern states to lead the way. Kurukshetra 60(6): 23-28
- Report of working group on Fertilizers in the context of the Eleventh Five Year Plan (2007-2012), Cited at http://planningcommission.nic.in/aboutus/committee/.../wg11_fertiliser.doc