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To Assess the Efficiency of Seed Minikits of Pulses Program in Rajasthan, India

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A B S T R A C T

The present study is proposed to examine the need, application, pertinence and efficiency in distribution of seed minikits in Rajasthan. The primary data were collected from the state of Rajasthan. For the selection of sample two districts were selected, one irrigated (Bundi) and one dryland (Naguar) based on highest seed minikits distributed during the reference period of 2017-18 and 2018-19 were selected and out of 225 sample household, 145 seed minikit beneficiary farmers and 80 control group pulse growing farmers were selected using random sampling method and comparative analysis the cost of cultivation and returns of selected pulse crops by seed minikit beneficiary and non-beneficiary farmers. The value of output, cost and net returns by the farm size of selected households indicate that production per acre of all crops on average was reported to be the highest in case of marginal farmers and the lowest yield rate was realized by large farmer group. While among rainfed and irrigated condition crop production, marginal farmers have realized highest crop yield, however, large farmers group recorded highest yield under rainfed condition. The kharif pulse crops cultivation found to be more profitable for beneficiary farmers than non-beneficiary farmers. The major problems faced by farmers in availing the seed minikit were less supply of seed minikit was the major problem faced by the selected farmers. In order to overcome these problems, by more supply of seed, suitable variety suitable to local condition and seed should be given to all farmers.

***Key words*:** Dryland, Irrigated, Pulses, Seed minikits, Productivity

India plays a very important role by its contribution in world food production. Pulses are an important commodity group of crops that provide high quality protein complementing cereal proteins for pre-dominantly substantial vegetarian population of the country [1]. Probably no other country as like India produces and costumes as varied array of pulses. India is global leader in terms of production and consumption of pulses. India is leading importer of pulses because production of pulse/ legume crops has been stagnant over the years although situation has slightly changed in the recent past. The state of Rajasthan holds second position after Madhya Pradesh and accounts for 13.4 per cent in total national pulses stock having 17.8 per cent of national area under pulses (5.33 mha), while lower area under coverage (21 per cent) resulted in low level of productivity of pulses of 635 kg/ha as compared to 841 kg/ha at national level. The improvement in productivity of pulses in India was mainly on account of higher adoption of improved varieties by farmers, production of breeder seed, demonstration of pulses production technology, and policy support [2]. The sluggish performance of pulses production in the country has resulted in increasing deficit, on the one hand and depletion of foreign-currency reserves by soaring import bills, unpredictable price rise and lower net profit compared to competing crops, on the other hand [3-4]. The production of pulses in India has been caught in the vicious cycle of low and uncertain yields, low per hectare returns resulting in farmers' least preference to grow pulses on irrigated and fertile parcel of land (farmers preferred to grow pulses on marginal lands with no use of production inputs), thereby leading to unstable and low yields [5]. Seed Mini-kits are meant for introduction and popularization of latest released /pre released varieties /hybrids not older than 10 years among the farmers free of cost. As the programme is under progress for last three to four years, it is required to see the various aspects of implementation of this programme. How efficiently the distribution of seeds is taking place? We need to check whether the scheme is relevant and useful from the view point of farmers. It is also important to examine whether seed minikits have any significant impact on productivity and how much area is being cropped under such seeds. Therefore, keeping the importance in mind, the present study was undertaken to examine the need,

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application, pertinence and efficiency in distribution of seed minikits.

MATERIALS AND METHODS

The primary data were collected from the state of Rajasthan. For the selection of sample two districts were selected, one irrigated (Bundi) and one dryland (Naguar) based on highest seed minikits distributed during the reference period of 2017-18 and 2018-19 were selected. From selected district, a sample of 145 seed minikit beneficiary farmers and 80 control group pulse growing farmers were selected using random sampling method. Lentil seed minikits beneficiaries were selected from Bundi district and Mung beneficiaries were selected from Naguar district. The first section gathered information on household characteristics and other demographics, while the second section collected cost and return data associated with Seed Minikit of pulses production during the 2018/2019 cropping year. The cost and returns analysis was carried out different variable like land preparation, seed, fertilizer AND manure, irrigation, pesticides, harvesting, labour, main product and by-product.

RESULTS AND DISCUSSION

Socio-economic Characteristics of the beneficiary Farmers

The socio-economic characteristics of selected sample households are presented in (Table 1). It can be seen from this table that the average size of the household was estimated to be 6 persons, while marginal land group households found to be the smallest (5.63) and the large group land holders had the largest family size (6.68). As per the specification and selection of beneficiary of the scheme (women criteria), three forth of the total respondents were women. The age range of more than 80 per cent of total selected household respondent was 30-60 years while around 9 per cent were from young group (less than 30 years) and rest were from above 60 age group (11%), while across the groups, near about same trend was observed.

Table 1 Demographic Profile of the Selected Farmers (% of households)

Characteristics		Marginal	Small	Medium	Large	Total
No. of HH		48	63	77	37	225
Share of HH in Total HH (%)		21.33	28.00	34.22	16.44	100.00
Household size (av. numbers)		5.63	6.12	6.16	6.68	6.06
Share of beneficiary/ non-beneficiary	Beneficiary	18.22	21.33	19.56	5.33	64.44
hh (%)	Non-beneficiary	3.11	6.67	14.67	11.11	35.56
Gender of beneficiary (%)	Male	0.00	0.00	0.00	0.00	0.00
	Female	100.0	100.0	100.0	100.0	100.0
Gender of respondents – all (%)	Male	15.22	20.99	41.86	12.20	24.00
	Female	84.78	79.01	58.14	87.80	76.00
Age of the respondent (%)	<30	10.87	13.58	3.49	4.88	8.67
	30-60	79.35	77.78	87.21	75.61	80.67
	>60	9.78	8.64	9.30	19.51	10.67
Education status of respondent,	Illiterate	65.22	60.49	48.84	46.34	56.67
number of years of education (%)	Up to primary (5)	14.13	24.69	24.42	17.07	20.33
	Up to middle (8)	10.87	7.41	11.63	9.76	10.00
	Up to matric (10)	3.26	6.17	4.65	14.63	6.00
	Up to + 2	3.26	1.23	6.98	4.88	4.00
	Up to graduate	3.26	0.00	3.49	7.32	3.00
	Above graduate	0.00	0.00	0.00	0.00	0.00
Family doing farming	Av numbers	3.43	3.64	3.65	3.63	3.58
Farming experience	Av in years	22.58	22.46	26.23	27.49	24.26
Caste (% of households)	SC	58.70	39.51	27.91	7.32	37.67
	ST	9.78	12.35	10.47	2.44	9.67
	OBC	27.17	44.44	59.30	82.93	48.67
	General	4.35	3.70	2.33	7.32	4.00
Av. annual income (Rs.)	Agriculture and allied	71413	93864	130023	247805	118383
	Non-agril. sources	25543	34432	31512	69024	35597

Marginal farmer: 0-2.5 acres; Small farmers: 2.51-5.00 acres
Medium: 5.01-10.00 acres; Large >10 acres

In case of education status, majority of the respondents were found to be to be illiterate (56.67%). Around one third of the total household respondents were educated mostly up to the SSC level. This indicates the lower education status of the respondents in Rajasthan in general, women in particular. Around 60 percent of total family members were engaged in farming and average farming experience was estimated to be about 25 years. Thus, selected households had quite a long and rich experience of farming. As per the scheme guidelines, the minikits are distributed to farmers on the basis of priority to Scheduled caste, Schedule tribe, small, marginal and below poverty line farmers, selected sample households confirmed the same. At overall level, about 49 per cent households were from other backward classes group followed by about 38 per cent from SC, about 10 percent from ST and rest were from open category. Among the selected marginal land holders' group, about 69 per cent households together belonged to SC and ST category. Majority of households have agriculture as a main occupation while agriculture labour and allied was subsidiary occupation. The average income from agriculture and allied activities is estimated to be Rs. 118383/- while same was Rs. 35597/- from non-agricultural sources.

Productivity comparison between beneficiary and non-beneficiary

The details on productivity and net returns from selected pulse crops with and without seed-minikits are presented in (Table 2). It can be seen from the table that kharif pulse crops cultivation found to be more profitable for beneficiary farmers than non-beneficiary farmers. Despite of the fact that quality seed was provided through seed minikits program, not much improvement in productivity level of these selected crops is reported by beneficiary farmers. Purchase of the green gram by the government at minimum support prices in Naguar district has helped the farmers to recover the cost of production and profit margin on crop cultivation. During survey also observed 12 percent of total lentil beneficiary farmers had reported crop failure (with level of production less than 1 quintal/acre), of which largest share was of marginal lentil farmers whose income was severally affected.

The per quintal cost of production of kharif crops (mung) was estimated lower in case of beneficiary farmers (Rs. 3382 per quintal) than non-beneficiary farmers while opposite picture was estimated in case of rabi crops (lentil). The net price received (for main produce in market/village) by the farmers across the group of farmers was almost same in all crops, which ranges from Rs. 3400-5000 per quintal in lentil and Rs. 4000-6975 per quintal in case of mung. Thus, on an average, selected farmers have realized the net return of Rs. 9000-10000 per acre in cultivation of pulse crops. However, not much effect of seed minikit was reported as supplied quantity was much less than requirement and thus, farmers had to procured seed from the market or other sources.

Table 2 Productivity and net returns from pulses with and without seed-minikits

Farm size	Area under pulses (acre)		Value of output (Rs/acre)		Cost of cultivation (Rs/acre)		Net returns (Rs/acre)		Net price obtained (Rs/quintal)	
	SMK	Without	SMK	Without	SMK	Without	SMK	Without	SMK	Without
					Lentil					
Marginal	0.67	0.55	10061	29563	7737	13920	2325	15643	3995	3964
Small	0.74	0.74	23681	22081	11552	13291	12129	8790	4079	3966
Medium	0.68	0.96	21248	24659	11032	12977	10217	11682	4083	3923
Large	0.40	0.92	47532	30701	12262	12172	35270	18529	4000	4000
Total	0.69	0.83	17634	25261	9838	13067	7796	12194	4058	3947
					Green gram					
Marginal	1.75	1.98	19084	20100	8509	8495	10575	11605	6337	5346
Small	2.46	2.03	15214	19141	7726	8985	7488	10156	5876	5756
Medium	4.71	5.83	17201	14396	8322	8602	8878	5793	5928	5738
Large	7.84	11.38	17627	16468	8824	9237	8802	7231	6432	5797
Total	3.78	7.94	16990	15949	8326	9035	8664	6914	6081	5774

cf- crop failure

Table 3 Item-wise cost details of green gram

Activity	SMK/Without	Cost details - Green gram (%)				
		Marginal	Small	Medium	Large	Total
Land preparation	SMK	29.04	31.49	29.02	27.34	29.10
	Without SMK	29.76	26.42	28.99	26.33	27.12
Seed	SMK	3.55	4.95	5.96	6.77	5.77
	Without SMK	5.95	5.28	5.60	6.00	5.87
FYM, Organic/Bio- fertilizer	SMK	0.00	0.00	0.19	0.00	0.08
	Without SMK	0.00	0.00	0.00	0.62	0.43
Fertilizer	SMK	4.96	6.34	5.89	5.77	5.88
	Without SMK	7.14	4.94	6.00	5.16	5.41
Irrigation charges	SMK	0.00	0.00	0.00	0.00	0.00
	Without SMK	0.00	0.00	0.00	0.43	0.30
Plant protection chemicals	SMK	4.62	4.70	4.77	4.11	4.56
	Without SMK	7.44	6.31	5.14	6.16	5.89
Labour charges*	SMK	22.34	24.83	21.58	21.13	22.23
	Without SMK	21.43	19.29	15.05	15.54	15.54
Harvesting and threshing	SMK	32.89	25.23	29.51	28.04	28.44
	Without SMK	28.27	36.65	38.03	37.05	37.23
Bagging, transportation and marketing cost	SMK	2.37	2.22	2.61	5.26	3.23
	Without SMK	0.00	1.10	1.03	1.78	1.53
Others	SMK	0.22	0.25	0.47	1.58	0.70
	Without SMK	0.00	0.00	0.16	0.93	0.68
Total cost (Rs. per acre)	SMK	8509	7726	8322	8824	8326
	Without SMK	8495	8985	8602	9237	9035

*Includes all labour charges (such as weeding and plant protection measures, etc.)

Production cost comparison between beneficiary and non-beneficiary

The item-wise share in total cost of cultivation of all four selected pulse crops are presented in (Table 3-4). It can be seen from the tables that three operations together (harvesting and threshing, labor and land preparation) accounts for around 78 per cent of total cost of cultivation of green gram, while in case of lentil, corresponding figure was 70-72 percent. Higher seed share in cost of cultivation was reported by non-beneficiary households than its counterpart. The labour use of pattern of the selected sample households indicates that the major labour using activities were weeding, sowing, application of plant protection, fertilizer and manures, and bagging, which accounted for the major share in labour use, which was relatively higher in case of non-beneficiary households than beneficiary households (Table 5). As labour operations like land preparation, harvesting and threshing were done by using machine labour and therefore human labour use was reported to be lower. While all the sowing was done by adopting line sowing method.

Efficiency in distribution and usage of seed minikits

The size of minikits was 8 kg seed of lentil and 4 kg each for moong. This quantity is sufficient to plant 0.2 ha. While area covered under particular pulse crop was reported to be more than same which indicate farmers have used the home grown retained or seed purchased from market or from villagers. Thus, seed provided under programme was inadequate and therefore need to scale up the quantity of seed. Some farmers have retained the seeds for next sowing season.

Table 4 Item-wise cost details of lentil

Activity	SMK/Without	Cost details - lentil (%)				
		Marginal	Small	Medium	Large	Total
Land preparation	SMK	23.72	21.52	22.06	20.62	22.37
	Without SMK	18.16	19.02	19.48	20.77	19.35
Seed	SMK	5.77	5.33	4.97	1.03	5.33
	Without SMK	8.04	8.24	8.57	10.09	8.59
FYM, Organic/Bio- fertilizer	SMK	0.00	0.00	0.00	0.00	0.00
	Without SMK	0.00	0.00	0.00	0.00	0.00
Fertilizer	SMK	6.66	4.69	5.37	5.15	5.52
	Without SMK	4.51	4.76	4.70	5.19	4.74
Irrigation charges	SMK	4.48	8.75	5.83	8.25	6.58
	Without SMK	7.27	7.61	7.79	8.31	7.74
Plant protection chemicals	SMK	7.21	7.18	7.88	5.15	7.35
	Without SMK	5.32	4.95	4.67	7.42	5.10
Labour charges*	SMK	23.87	21.76	23.11	32.99	22.94
	Without SMK	28.41	26.63	24.98	18.55	25.12
Harvesting and threshing	SMK	27.04	29.22	29.36	26.8	28.51
	Without SMK	26.98	26.51	27.79	25.22	27.12
Bagging, transportation and marketing cost	SMK	1.18	1.54	1.43	0.00	1.38
	Without SMK	1.30	2.28	2.01	4.45	2.24
Others	SMK	0.07	0.00	0.00	0.00	0.02
	Without SMK	0.00	0.00	0.00	0.00	0.00
Total cost (Rs. per acre)	SMK	7737	11552	11032	12262	9838
	Without SMK	13920	13291	12977	12172	13067

*Includes all labour charges (such as weeding and plant protection measures, etc.)

Table 5 Use of human labour by activities (man days per ha)

Activity	Green gram		Lentil	
	Seed minikit	Without seed minikit	Seed minikit	Without seed minikit
Land preparation*	0	0	0	0
Sowing	0.36	0.31	0.7	0.92
Manure and FYM	0.37	0.3	1.38	1.2
Major and minor nutrients	0	0	0	0
Irrigation	0	0	1.72	2.29
Inter cultural operations	0	0	0	0
Plant protection	0.98	0.5	2.17	2.17
Weeding and plant protection measures	3.32	2.61	2.03	3.85
Harvesting and threshing*	0	0	0	0
Bagging (HL) and transporting*	1.38	1.07	2.13	2.37
Total	6.49	4.85	10.14	12.8
Activity	17.67	20.65	23.37	24.8
Total	24.16	25.5	33.51	37.6

*Activities are completed by hiring machine 3; Multiple responses

Farmers' perceptions about seed minikits

During the survey, selected farmers were asked to give their opinion regarding distribution of seed minikit which are tabulated and presented in (Table 6). All sample household opined that seed distribution programme is advantageous and noted the yield and quality difference in

same. However, all of them were also opined that seed distributed was insufficient and at least seed should cover 0.32 ha (0.79 acre) area compared to 0.2 ha (0.49 acre) under present scheme. Also, most of the selected households were satisfied with the quality of seed provided to them and timely distribution of same.

Table 6 Farmers opinion regarding distribution of seed minikit for reference year (%)

Opinion		Marginal	Small	Medium	Large	Total
1. Is seed minikit distribution advantageous	Yes	100	100	100	100	100
	No	0	0	0	0	0
a. Yield difference		100	100	100	100	100
b. Quality difference		100	100	100	100	100
c. More profitable		0	0	0	0	0
d. Short duration of crop		0	0	0	0	0
e. Other		0	0	0	0	0
2. Sufficient in quantity (%)	1. Yes	0	0	0	0	0
	2. No	100	100	100	100	100
Opinion –how much quantity in kgs should be distributed	Green gram	8	8	8	8	8
	Lentil	16	16	16	16	16
Timely distribution of kit (%)	1. Yes	89.3	96.8	100.0	100.0	95.0
	2. No	10.7	3.2	0.0	0.0	5.0

Note: farmers required minimum seed of minikits for 2 Bigha or 0.32 ha or 0.79 acre area

Policy recommendation

The policy implications emerged out of the study is as follows:

- The government should ensure timely availability of adequate quantity of quality seed by taking into account the actual requirement of seed in particular area.
- Bottom-up approach should be used in implementation of the scheme.
- Demonstration should be given before distributing the Seed minikit
- State Agriculture Universities should try to develop the seed varieties suitable to local conditions.
- The awareness level about the scheme and need of Seed Replacement Rate needs to increased/raised through agricultural extensions programmes.

CONCLUSION

The cost of cultivation per acre of beneficiary households was estimated to be lower than the non-beneficiary households, must be because of lower cost of seed to some extent (due to partial share of seed minikit). While net returns per acre was reported higher in beneficiary group in cultivation of green gram only. Higher seed share in cost of cultivation was reported by non- beneficiary households than its counterpart. All sample household opined that seed distribution programme is advantageous and noted the yield and quality difference in same. The major problems faced by farmers in availing the seed minikit were less supply of seed minikit was the major problem faced by the selected farmers.

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