



Evaluation of Mung bean Varieties and Production Technologies at Farmer's Fields in Western Rajasthan

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Received: March 2016

Abstract: Eighteen varietal trials accommodating eight varieties and ninety technology demonstrations of mung bean were conducted under rainfed as well as irrigated situations at farmer's fields during kharif-2015 in six districts of western Rajasthan viz. Jaisalmer, Bikaner, Churu, Jhunjhunu, Hanumangarh and Sriganganagar. The mean seed yield of mung bean varieties ranged between 292 to 515 kg ha⁻¹ under rainfed and 591 to 885 kg ha⁻¹ under irrigated situation. Among varieties, the maximum seed yield of 737 kg ha⁻¹ was produced by GM-4 followed by MH-421, SML-668, RMG-492 and IPM 02-3 with 691, 635, 634 and 618 kg ha⁻¹, respectively. Under technology demonstrations, seed yield of mung bean under rainfed situation varies 250 to 630 kg ha⁻¹ with mean yield of 409 kg ha⁻¹. However, the seed yield under irrigated situation varied from 435 to 1635 kg ha⁻¹ with mean of 981 kg ha⁻¹. The overall productivity of the mung bean demonstrations was found 38.4% higher over average productivity of the Rajasthan.

Key words: Farmer's field, mung bean, seed yield, technology demonstration, varietal trial.

Mung bean [*Vigna radiata* (L.) Wilczek] is an important pulse crop for the state of Rajasthan. It is drought tolerant and has ability to grow under harsh climate, low rainfall and poor to medium soil conditions. Rapid growth and early maturing characteristics; and ability to restore the soil fertility by fixing atmospheric nitrogen and enhance soil productivity (Sharar *et al.*, 2001) makes it valuable crop in various cropping systems. It is grown as sole crop or mixed/intercropped with cereals like pearl millet, sorghum, maize, etc. and also intercropped with woody perennials under agroforestry system (Sharma, 2010). The crop cover shields soil from solar heat, retain soil moisture and prevent losses of organic matter and retards soil erosion as well. Mung bean is primarily used for food purpose in the form of *Dal* and sprouts; and also in sweet and several confectionary items of day to day use (Sharma, 2014). It is a rich source of protein (24.3%), fats (0.67%) (Lee *et al.*, 1997) and essential amino acids especially lysine and can thus supplement cereal based human diet.

In Rajasthan, mung bean has occupied an area of 1038212 hectare (average of 2007-08 to 2011-12) with annual production of 426705 tonnes. It is grown in all parts of Rajasthan but major area has been covered by district

Nagaur, Pali, Jodhpur, Jalore, Ajmer, Jaipur and Tonk. The average productivity of mung bean in Rajasthan ranged between 194 kg in Barmer to 639 kg ha⁻¹ in Sriganganagar with the state average of 411 kg ha⁻¹ (Anonymous, 2012-13), which is much lower than the potential.

Large number of research experiments have shown that crop productivity may be enhanced considerably through improved varieties and crop management practices but their adoption at farmer's fields is poor because of weak research-extension linkage. Hence, present studies were conducted under farmer participatory action research with the objectives to evaluate the high yielding varieties and to demonstrate the production technologies of mung bean at farmer's fields in western Rajasthan.

Materials and Methods

Eighteen varietal trials and ninety technology demonstrations were conducted under rainfed and irrigated situations at farmer's fields during kharif-2015 in six districts of western Rajasthan (Table 1).

In varietal trials, eight varieties were uniformly evaluated in strips at each location. In technology demonstration, variety IPM 02-3 was used with seed rate @ 15 kg ha⁻¹ along with fertilizers dose of 20 kg nitrogen and 40

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Table 1. Varietal trials and technology demonstrations of mung bean conducted at farmer's fields in kharif-2015

Districts	No. of varietal trials			No. of technology demonstrations		
	Irrigated	Rainfed	Total	Irrigated	Rainfed	Total
Bikaner	0	2	2	0	3	3
Churu	3	0	3	1	2	3
Jaisalmer	1	2	3	10	16	26
Jhunjhunu	2	2	4	2	20	22
Hanumangarh	0	4	4	0	6	6
Sriganganagar	2	0	2	10	20	30
Total	8	10	18	23	67	90

kg phosphorus ha⁻¹ applied as basal followed by foliar spray of 1% NPK soluble (18:18:18) at 40-45 days after sowing. Seed was treated with carbandazim @ 2.5 g kg⁻¹ before sowing and foliar spray of imidacloprid 17.80 SL @ 150 ml ha⁻¹ applied at 35-40 days after sowing for disease and pest management. Each varietal trial and technology demonstration was laid out in 0.40 ha area. Most of the varietal trials and technology demonstrations were sown during 1st week of July and harvested during 2nd and 3rd week of September. Farmer-scientist interaction and field day programmes were also organized to create awareness among farmers regarding improved mung bean cultivation practices.

Results and Discussion

Performance of varieties

Out of eighteen varietal trials conducted under rainfed and irrigated situations in different parts of western Rajasthan, 15 trials

were successful (Table 2). The average seed yield of different varieties under rainfed situation ranged between 292 to 515 kg ha⁻¹, however, under irrigated situation it varied between 591 to 885 kg ha⁻¹ (Table 2). Among varieties, the overall maximum seed yield of 737 kg ha⁻¹ was recorded by variety GM-4 followed by MH-421, SML-668, RMG-492 and IPM 02-3 with 691, 635, 634 and 618 kg ha⁻¹, respectively. All these varieties performed better than the average therefore; these high yielding varieties may be promoted for cultivation to enhance the mung bean productivity in western Rajasthan.

Performance of technology demonstrations

Out of 90 demonstrations conducted under rainfed and irrigated situations at farmer's fields, 86 demonstrations were successful. Under rainfed situation, average seed yield of 63 mung bean demonstrations ranged between 250 to 630 kg ha⁻¹ with the overall average of 409 kg ha⁻¹. However, under irrigated situation,

Table 2. Seed yield of mung bean varieties under rainfed and irrigated situations at farmer's fields

Varieties	Seed yield (kg ha ⁻¹)				
	Rainfed situation (No. of demonstrations-6)		Irrigated situation (No. of demonstrations-9)		Overall performance (Total demonstrations-15)
	Average	Range	Average	Range	Average
Sweta	292	127-395	591	210-1040	471
IPM 02-3	393	195-540	768	390-1115	618
IPM 02-14	307	125-410	718	360-1040	554
GM-4	515	280-640	885	410-1340	737
MH-421	412	135-590	877	400-1520	691
RMG-492	388	250-438	797	370-1195	634
SML-668	406	225-491	788	380-1180	635
SML-832	348	120-452	698	250-1279	558
Range	292-515	120-640	591-885	210-1520	471-737
Mean	382.63	-	765.25	-	612

Table 3. Seed yield of mung bean demonstrations at farmer's fields

Agro-ecological situation	Total number of demonstrations	No. of successful demonstrations	Average seed yield (kg ha ⁻¹)	State average productivity (kg ha ⁻¹)	% increase over state average
Rainfed	67	63	409 (250-630)	-	-
Irrigated	23	23	981 (435-1635)	-	-
Overall	90	86	569	411	38.4%

Note: Values given in the parenthesis is the range of productivity received at farmer's fields.

seed yield of 23 demonstrations ranged between 435 to 1635 kg ha⁻¹ with the average of 981 kg ha⁻¹ (Table 3). The wide range of variation observed in mung bean productivity was mainly attributed by the erratic rainfall pattern and soil factors of the demonstration site.

The overall productivity of the mung bean demonstrations was found 569 kg ha⁻¹, which was 38.44% higher over average productivity of the Rajasthan. The yield enhancement observed under technology demonstration was mainly attributed due to the application of improved variety with recommended seed rate, basal and foliar fertilization, and plant protection measures. Similarly, Parihar *et al.* (2014) reported yield enhancement of 29% by the use of improved varieties and 19.01% by IPM technology in mung bean at farmer's fields in Rajasthan. Patil *et al.* (2015) and Sharma *et al.* (2013) have also reported yield enhancement in mung bean through technological interventions at farmer's field.

Acknowledgements

Financial support received from DAC, Ministry of Agriculture, GOI under NFSM project "Enhancing mothbean and mung bean productivity through high yielding varieties, nutrient management and IPM practices in western Rajasthan" for conducting varietal trials and demonstrations at farmer's fields is gratefully acknowledged. Help and cooperation received from farmers is also thankfully acknowledged.

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