E-ISSN: 2618-0618
P-ISSN: 2618-060X

www.agronomyjournals.com
2024; SP-7(7): 240-243
Received: 03-05-2024
Accepted: 09-06-2024

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Constraints in adoption of improved cultivation practices in Greengram and Black Gram

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DOI: https://doi.org/10.33545/2618060X.2024.v7.i7Sd.1032

Abstract
The present investigation was carried out in Khammam district of Telangana. Samples of 60 respondents spread over 24 villages of 12 mandals were selected for the survey. The present studies revealed that majority of respondents were found to have medium level adoption of improved cultivation practices in black gram and greengram. The study indicates that farmers had high adoption level of practices *viz*., soils, variety, seed treatment and medium adoption practices *viz*., spacing, nutrient management, seed rate, pest management, disease management and low adoption practices *viz*., the irrigation management and sowing time, weed management, use of bio fertilizers and foliar nutrition intercropping and improved varieties. So there is need to adopt recommended package of practices for increasing of productivity. The black gram and greengram growers perceived constraints during cultivation of greengram and blackgram production technology in cotton and paddy fallow conditions, weed management, bio fertilizer and foliar nutrition, intercropping and cropping system, untimely heavy rains, sucking pest infestation, YMV incidence, lack of marketing facilities and Post-harvest technology, non-availability of improved seed, lack of technical advice for crop cultivation, absence of regulated market and non-availability of fertilizers, etc.. The constraints expressed for non-adoption of recommended package of practices should be taken care by the researchers and state agricultural departments, to orient their infrastructure for higher adoption of recommended practices by black gram and greengram growers to increase their production.

Keywords: Greengram cultivation, pulse crops, adoption constraints

Introduction
Adoption of improved agricultural practices among the farmers is one of the most critical factors increasing the production and productivity in agricultural crop for overall development of the country. Adoption of improved agricultural practices is a dynamic and complex process. Scientists, extension workers and various other agencies contribute to accelerating the adoption of improved agricultural practices. Each of them has a distinct role in promoting the adoption of improved agricultural practices. Nevertheless, it is the farmers who occupy central position in this scheme because it is they who take the decision to adopt or reject. The farmers do not adopt new agricultural practices without giving thought to the matter, or on merely being told to do so. Several factors influence them in adoption of improved agricultural practices.

India grows a variety of pulse crops under a wide range of agro-climatic conditions and has a pride of being the world's largest producer of pulses. It is important source of protein especially for vegetarian and is also referred as poor man's meat. The major pulse crops grown in India are black gram, green gram, chickpea, pigeon pea, lentil and field pea, in which India produces 70 per cent of worlds' black gram and green gram production and accounts for 10 per cent of country's total pulse production (Gowda *et al.,* 2013) [2]. Black gram is also known as *Urd* or Black lentil. It is one of the most important pulse crops grown throughout the country in very diverse agro-climatic conditions. According to annual report of Ministry of Agriculture, 2014 [7] black gram and green gram produces 22.10 Kg of Nitrogen/ha, which is equivalent to 59 thousand tons of urea annually. Furthermore, it helps in fixing atmospheric nitrogen in symbiotic association with the rhizobium bacteria that is present on the root nodules and hence maintains the soil fertility. Black gram and green gram supplements the cereal-based diet and contains

about 26 per cent vegetable protein, which is three times that of cereals. It is well known that a diet deficient in protein intake can cause Protein Energy Malnutrition.

The leading states producing black gram in India are Maharashtra, Uttar Pradesh, Andhra Pradesh, Rajasthan, Madhya Pradesh and Karnataka. These states contribute 80 per cent of total pulse production as reported by the Directorate of Economics and Statistics, Department of Agriculture and Cooperation, 2020-21. In Telangana State black gram is grown in 37460 ha. area with a production of 50,226 tonnes, with average yield of 1335 kg/ha. Agriculture is main occupation of majority of the population in the rural area of Khammam district. According to the Commissionerate of Agriculture, Govt. of Telangana (2020-21) the average yield of black gram is only 1335 kg/ha. as against the recommended average yield of the crop is 15-20 quintals/ha (Panda, 2012) [8].

Green gram (*Vigna radiate* L.) commonly known as "mung" or "mung bean" is a native of India and central Asia and it was grown in these regions since prehistoric times. It is broadly cultivated throughout the Asia, including India, Pakistan, Bangladesh, Sri Lanka and South China. India contributes 33.00 per cent of global area with 22.00 per cent of global production of green gram. Among pulse crops, greengram is the third important crop grown in nearly 16.00 per cent of the total pulse area of the country (45.17 lakh hectares) produces 25.32 lakh tonnes with the productivity of 548 kg/ha (Anon., 2021) [1]. In India, major green gram growing states are Maharashtra (23.05%), Andhra Pradesh (17.39%), Karnataka (17.46%), Bihar (14.69%) and Tamil Nadu (7.25%) (Anon., 2021) [1]. Reported by the Directorate of Economics and Statistics, Department of Agriculture and Cooperation, 2020-21 in Telangana State Greengram gram is grown in 74083 ha. area with a production of 38068 tonnes, with average yield of 515 kg/ha.

The low production of black gram may be due to the non-adoption or poor adoption of improved cultivation practices of black gram and green gram by the farm women and they may be facing some constraints in its adoption at their own farm. Hence this is a challenging task for the scientist and farmers. Under such condition it is quite imperative that reasons for the technological gap in black gram and greengram should be identified and studied critically in order to face the existing challenge of low productivity. In this context the present study was undertaken to study the adoption of improved cultivation practices of black gram and greengram to identify the constraints as perceived by black gram and greengram growers.

Materials and Methods

The study was carried out in Khammam district of Telangana to know the adoption of improved cultivation practices in black Gram and greengram by farmers and to identify the constraint perceived by them in its adoption at their own farm. A sample of 60 black gram and greengram growers was selected randomly from 24 villages of 12 mandal having highest area under black gram and greengram cultivation and from each village 3 growers selected as respondents. The data were calculated with the help of well-structured interview schedule. Respondents were categorized as high, medium and low adoption groups. The practice wise adoption of improved cultivation practices was ranked based on mean percent score (MPS) values. The constraints perceived by black gram/green gram growers in adoption of improved practices were tabulated based on frequencies and percentage. The mean percent scores were calculated with the help of following formula.

MPS= Sum of scores obtained by respondents in an item/Maximum obtainable scores *100

Results and Discussion

Adoption of improved black gram cultivation practices

It is clear from Table 1 that the majority of respondents possessed medium level adoptions of improved black gram cultivation practices as indicated by the overall mean percent adoption scores (60.0).The study indicates that farmers had high adoption level of practices *viz*., soils (93.3%), variety (83.33%), seed treatment (80%) and medium adoption practices *viz*., spacing (76.66%) nutrient management (70%), seed rate (70%), pest management (66.6%), disease management (60%) and low adoption practices *viz*., the irrigation management (53.33%) and sowing time (63.3%), weed management (46.6%), bio fertilizer and foliar nutrition intercropping and improved varieties. So there is need to adopt which practices mention there package of practices for increasing of productivity. This clearly indicates there in a need to put more efforts by scientists and extension functionaries to convince the farmers about improved cultivation practices of black gram. The results are in conformity with finding of Meena (2010) [6].

Table 2 indicated that the majority of respondents possessed medium level adoptions of improved green gram cultivation practices as indicated by the overall mean percent adoption scores (66.6).The study indicates that farmers had high adoption level of practices *viz*.,soils(96.6%),variety(90%), spacing(80%), spacing(83.33%) and medium adoption practices *viz*., sowing time (73.3%), seed treatment (73.3%),nutrient management (760%), seed rate (70%), the irrigation management (63.33%), pest management (60%), and low adoption practices *viz*., weed management (40%), disease Management (50%),bio fertilizer and foliar nutrition intercropping and improved varieties. So there is need sensitize the farming community to adopt package of practices for increasing of productivity. This clearly indicates there in a need to put more efforts by scientist's extension functionaries to convince the farmers about improved cultivation practices of black gram. The results are in conformity with finding of Meena (2010) [6].

Overall mean per cent adoption score

In black gram the overall adoption was concerned, it is evident from table 3, that majority of the respondents (60%) were having medium,23.33% for low and 16.66% for high level of adoption of improved cultivation practices.

Where in green gram (Table 4) that majority (66.6%) of the respondents were having medium level of adoption of improved cultivation practices of greengram and 20.00 per cent as well as13.3 per cent were found in low and high category, respectively.

Constraints perceived by respondents in black gram and green gram cultivation practices

The constraints perceived by black gram growers were categorized into eight parts and data regarding these constraints are presented in table 5. The black gram growers perceived constraints like production technology in cotton and paddy fallow condition (93.33%), weed management (96.6%), Bio fertilizer and foliar nutrition (86.6%), intercropping and cropping system (80%), Untimely heavy rains (73.3%), sucking pest infestation (66.6%), YMV incidence (60%), lack of marketing facilities and post-harvest technology (53.3%) non-availability of improved seed, lack of technical advice for crop

cultivation, absence of regulated market and non-availability of fertilizers, etc.

The constraints perceived by green gram growers were categorized into eight parts and data regarding these constraints are presented in table 6. The green gram growers perceived constraints like production technology for cotton and paddy fallow condition(90%), weed management(93.3%), Bio fertilizer and foliar nutrition(83.3%), untimely heavy rains (73.3%) intercropping and cropping system(80%), sucking pest infestation(60%),YMV incidence(56.6%), lack of marketing facilities & Post-harvest technology(53.3%) non-availability of improved seed, lack of technical advice for crop cultivation, absence of regulated market and non-availability of fertilizers, etc,.

Table 1: Distribution of respondents according to their adoption of various black gram cultivation practices

S. No.	Different operations	Frequency	Percentage
1	Variety	25	83.33
2	Sowing time	19	63.33
3	Soils	28	93.33
4	Seed rate	21	70.00
5	Spacing	23	76.66
6	Seed treatment	25	83.33
7	Irrigation	16	53.33
8	Nutrient Management	21	70.00
9	Weed Management	14	46.66
10	Pest Management	20	66.66
11	Disease Management	18	60.0

Table 2: Distribution of respondents according to their adoption of various green gram cultivation practices

S. No.	Different operations	Frequency	Percentage
1	Variety	27	90.0
2	Sowing time	22	73.33
3	Soils	28	96.66
4	Seed rate	24	80.00
5	Spacing	25	83.33
6	Seed treatment	22	73.33
7	Irrigation	19	63.33
8	Nutrient Management	18	60.00
9	Weed Management	12	40.00
10	Pest Management	18	60.0
11	Disease Management	15	50.0

Table 3: Distribution of respondents according to their overall adoption of improved black gram cultivation practices

S. No.	Categories	Frequency	Percentage
1	Low	7	23.33
2	Medium	18	60.0
3	High	5	16.66

Table 4: Distribution of respondents according to their overall adoption of improved green gram cultivation practices

S. No.	Categories	Frequency	Percentage
1	Low	6	20.0
2	Medium	20	66.66
3	High	5	13.33

Table 5: Constraints perceived by respondents in adoption of improve black gram cultivation practices

S. No.	Constraints	Frequency	Percentage
1	Weed management	29	96.66
2	Production technology for Cotton and paddy fallow condition	28	93.33
3	Bio fertilizer and foliar nutrition	26	86.66
4	Intercropping and cropping system	24	80.00
5	Untimely heavy rains	22	73.33
6	More sucking Pest incidence	20	66.66
7	YMV incidence	18	60.00
8	Lack of marketing facilities & Post-harvest technology	16	53.33

Table 6: Constraints perceived by respondents in adoption of improve green gram cultivation practices

S. No.	Constraints	Frequency	Percentage
1	Weed management	28	93.33
2	Production technology for Cotton and paddy fallow condition	27	90.0
3	Bio fertilizer and foliar nutrition	25	83.33
4	Intercropping and cropping system	24	80.00
5	Untimely heavy rains	22	73.33
6	More sucking Pest incidence	18	60.0
7	YMV incidence	17	56.66
8	Lack of marketing facilities&	16	53.33

The other problems as expressed by a majority of farmers were high cost of fertilizers, seeds, insecticide and pesticides, poor knowledge about high yielding varieties and adequate storage facilities and supply of inferior quality inputs by the input dealers, fluctuation in market price etc.

These finding clearly indicates the need to develop strong research based centers to tackle day to day problems and offer solution to black gram growers. To overcome the marketing constraints, there is need to develop networks of marketing co-operative basis. The findings are in line with the result of Mane (2012) [5] in their study on "Knowledge and adoption of recommended production technology of green gram and blackgram." reported that the major constraints faced by the respondents were supply of inferior quality inputs by input dealers and lack of training institutions for training of the farmers.

It may be concluded that a majority of farmers had medium adoption of improved black gram and green gram cultivation practices. The adoption was higher in the soil and land preparation, irrigation management and harvesting than the other adopted practices of black gram and green gram cultivation. On the other hand less adoption was found in intercropping, foliar application Weed management. improved seed variety, plant protection measures, *etc.* Hence it may be pointed out that it is

no use to adopt some of the improved practices only and neglecting some others one. It is necessary to use the complete package of the improved practices of black gram and green gram cultivation for reaching maximization in crop yields.

The major constraints perceived by black gram green and gram growers were lack of training institutions for training of the farmers about improved cultivation practices, non-availability of improved seeds and chemical fertilizers, weed management, lack of knowledge about rhizobium culture, plant protection measures and technical advice for crop cultivation, absence of regulated market and lower prices at harvesting time, *etc.* The constraints are appropriately addressed and overcome by providing technical knowledge about improved black gram and green gram cultivation practices.

Conclusion

The study shows that most farmers have a medium level of adoption of improved cultivation practices for black gram (60%) and green gram (66.6%). High adoption rates were seen for soil preparation, variety selection, and seed treatment, while lower rates were noted for irrigation, weed management, and biofertilizer use. Key constraints include production technology issues, high input costs, and market price fluctuations. Enhanced efforts by scientists and extension functionaries are needed to promote comprehensive adoption of improved practices. Establishing research centers, marketing cooperatives, and providing technical training are essential for maximizing yields and productivity.

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