Farmer participatory approaches for improved production technologies in pigeon pea

V. KANTHARAJU, BASAVARAJA, RAJU G. TEGGELLI AND D.H. PATIL

See end of the article for authors' affiliations

Correspondence to :
V. KANTHARAJU
Krishi Vigyan Kendra,
UAS (R)
GULBARGA
(KARNATAKA)
INDIA
kantharaju74@gmail.com

ABSTRACT

Pigeon pea [*Cajanus cajan* (L.) Millsp.] is most important pulse crop of Karnataka. One of the major constraint of its low productivity is non- adoption of improved technologies. The front line demonstrations were conducted in Gulbarga district at 75 farmers fields, to demonstrate production potential and economic benefits of improved technologies comprising of seed treatment, Integrated Nutrient Management (INM), Integrated Disease Management (IDM) and Integrated Pest Management (IPM). The improved technologies recorded a mean yield of 12.2 q/ha which was 20.8 per cent higher than the farmer's practice (10.1 q/ha). The improved technologies resulted in higher income with a benefit cost ratio of 3.3 as compared to local practice with a benefit cost ratio of 2.73. The demonstrated technology also recorded less incidence of sterility mosaic and Fusarium wilt (<5%), Heliothis pod borer (5-10%) and pod fly (<8%) when compared to farmers practice. The technology was further disseminated horizontally through KVK extension approach / activities like training, print media, mass media, field day etc.,

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INTRODUCTION

Pigeonpea [*Cajanus cajan* (L.) Millsp.] is an important *Kharif* rainfed pulse crop of India. It is highly nutritious grain legume of tropical and sub-tropical regions of the world. In India, it is cultivated in an area of 34 lakh ha with the production of 23.70 lakh tones and productivity of 697 kg/ha. In Karnataka, it occupies 6.8 lakh ha area with the production of 4.78 lakh tonnes (Anonymous, 2010). Gulbarga district, the pulse bowl of Karnataka, contributes 48.31 per cent area and 51.09 per cent production of pigeonpea in the state.

In general, average productivity of pigeonpea continues to be lower (234-704 kg/ha) than the expected from improved technology for the last 25 years. The major constraints responsible for lower yield are inappropriate production technologies *viz.*, lack of seed treatment, use of local varieties, use of disease susceptible varieties, lack of INM, IDM and IPM.

Keeping this in view, front line demonstrations on pigeonpea were conducted to demonstrate the production potential and economic benefits of latest improved technologies in farmers fields.

METHODOLOGY

Participatory Rural Appraisal (PRA) method and group discussions were held by the team of Krishi Vigyan Kendra (KVK) scientists to identify the problems in growing healthy pigeonpea crop and recorded the various problems like use of local varieties / non-availability of improved varieties, lack of seed treatment, INM, IDM and IPM down at the field level. Finally, the problems were prioritized and improved production technologies were designed for under taking the participatory activity to solve these problems by involving farmers and scientists of KVK.

Front line demonstrations on improved production technologies in pigeonpea were conducted at 75 farmer's fields in Gulbarga district during *Kharif* season of 2009-10. There were two treatments, one is farmers practice and other one recommended practices comprising of seed treatment with *Rhizobium* @ 500gm/ha, *Trichoderma* @ 4 gm/kg seeds, application of zinc sulphate @ 15 kg/ha, growing

Fusarium wilt resistant variety, TS-3R, removal of sterility mosaic disease (SMD) infected plants and integrated pest management (IPM). IPM schedule included (i) ovicidal spray-i.e, Profenophos 50 EC @ 2 lit/ha (ii) Pheramone traps @ 5/ha (iii) Bird perches @ 10/ha (iv) Neem based insecticide @ 2 lit/ha (v) Ha. NPV @ 500 LE/ha (vi) contact insecticide @ 2 lit./ha.

Agronomic practices like weeding, fertilizer application etc., were done uniformly to all the fields. The per cent pest and disease incidence and yield were recorded.

To popularize the demonstrated technology, KVK in collaboration with developmental departments, NGO's and mass media organized the technology dissemination means like campus training at KVK, off campus training at village level, extension functionaries training, group discussions, farmers-scientist interaction, publication and distribution of literatures. Rapid rowing survey for pests and diseases, pest and disease forecast through All India Radio, Doordarshan and Print Media was also done.

RESULTS AND DISCUSSION

The results of yield and economics of pigeonpea (both farmers practice and technology demonstration) were recorded and presented in Table 1 and 2, respectively.

It is evident from Table 1 that the productivity of pigeonpea under improved production technologies ranged between 10.5 and 13.5 q/ha. with the mean yield of 12.2 q/ha. as against a yield ranged between 8.6 and 11.5 q/ha. with a mean of 10.1 q/ha. under farmers practice (Local check). The additional yield under improved technologies over local practice ranged from 1.8 to 2.5 q/ha. with a mean of 2.1 q/ha. In comparison to local practice, there was an increase of 20.8 per cent in yield of pigeonpea under improved technologies. This increased yield was mainly due to seed treatment, INM, IDM and IPM.

Seed treatment with PGPR and *Rhizobium* (Gundappagol *et al*., 2007), application of RDF + Zinc (Verma *et al*., 2004) and using of Fusarium wilt resistant variety, TS3-R and seed treatment with *Trichoderma* (Anonymous, 2008) helped in increasing the growth and yield parameters in pigeonpea. Tomar *et al*. (2009) reported that improved technologies like resistant variety, seed treatment, weeding etc. increased the yield and economics in black gram.

The economic viability of improved technologies over traditional farmer's practices was calculated depending on prevailing prices of inputs and output costs (Table 2). The cost of production of pigeonpea under improved technologies was Rs. 13550/ha. as against Rs.14400/ha. in local practice. The cultivation of pigeonpea under improved technologies gave higher net return of Rs. 31690/ha. as compared to local practice which recorded Rs.24990/ha. The improved technologies also gave higher benefit cost ratio of 3.33 as compared to 2.73 in local check.

The per cent sterility mosaic disease (<5 per cent), Fusarium wilt, Heliothis pod borer (5-10 per cent) and pod fly (<8%) incidence was less in demonstration plots when compared to farmers practice where in per cent sterility mosaic disease, Fusarium wilt, Heliothis pod borer and pod fly incidence was 5-15, 5-20, 15-20 and 12-15 per cent, respectively (Table 3)

Penchala Raju *et al*. (2005) reported that adoption of IPM in pigeonpea recorded highest yield, less pod damage by Heliothis pod borer and higher benefit cost ratio when compared to non-IPM plots under farmers fields.

In order to improve the knowledge of farmers

Table 1: Effect of improved practices on seed yield of pigeonpea in farmers field

Particulars	Area (ha.)	Demonstration (No.)	Yield (q/ha)			Additional yield (q/ha.) over local check	% increase in yield over local practice
			Maximum	Minimum	Average		
Farmers practice	30	75	11.5	8.6	10.1	-	-
Improved technology (Demonstration plots)			13.5	10.5	12.2	2.1	20.8

Table 2: Economics of improved technologies in pigeonpea

Particulars	Total cost of cultivation (Rs./ha.)	Gross returns (Rs./ha.)	Net return (Rs./ha.)	B.C. ratio
Famers practice plots	13500	45240	31690	1:3.33
Demonstration plots	14400	39390	24990	1:2.73

Rate of pigeonpea : Rs. 3900=00 /quintal.

Table 3: Effect of IPM practices on pest and disease incidence in pigeonpea

Sr.No.	Parameter	Demonstration plot (%)	Farmers practice plot (%)
1.	Sterility mosaic disease (SMD)	<5%	5-15%
2.	Fusarium wilt	<5%	5-20%
3.	Heliothis pod borer	5-<10%	15-20%
4.	Pod fly	<8%	12-15%

Table 4 : Extension programs / activities organised on improved technologies in pigeonpea

Sr. No.	Extension program/activity	No. of programs organized	No. of participants
1.	On campus training	02	156
2.	Off campus training	03	395
3.	Training to extension personnel	01	38
4.	Field day / Krishimela	02	5000+
5.	Group discussion / farmers – scientist interaction	04	105
6.	Rapid rowing survey of pests and diseases	Once in a every week (October to January)	-
7.	Doordarshan Programmes	02	-
8.	AIR Programme	02	-

regarding understanding of ICM practices, KVK conducted several extension activities which included training programmes *i.e.* On campus (02 Nos. involving 156 participants) and Off campus (03 Nos. involving 395 participants) and training to extension functionaries (01 no. involving 38 participants) belonging in to line departments and NGO's for horizontal spread to the technology and to develop effective linkages so as to create awareness about the technology (Table 4).

Periodic visit of KVK scientists to demonstration fields, farmers visit to KVK, phone calls, distribution of literature through leaflet, pamphlets etc., rapid rowing survey for pest and disease incidence and forecast through AIR, Doordarshan and Local print Media was done for horizontal spread of the technology which created awareness about the technology.

For mass interaction of farmers with scientists and farmers with farmers, a district level Krishmela and field day in the demonstration fields were organized where major emphasis was given to spread the technology.

The technology on improved production technologies in pigeonpea was stepwise and effective. Rajanna *et al*. (2009) reported that farmers-scientist participatory approach was the best one as compared to other methodologies in which education, knowledge about the farming practice, mass media use, participation in training programme, extension agency contract and extension participation had significant relation with attitudes of farmers.

The work is a part of growing experience in participatory research, farmers training and demonstration. Collaboration among farmer groups, Krishi Vigyan Kendra, and scientists on improved production technologies has provided opportunities to strengthen our bonds for emerging conviction that participatory approaches can facilitate changes in farmers knowledge, attitudes and practices with improved access to latest information and technology.

The results from the present study clearly brought out the potential of improved production technologies in enhancing pigeonpea production and economic gains in rainfed condition.

Authors' affiliations:
BASAVARAJA, RAJU G. TEGGELLI AND D.H. PATIL, Krishi Vigyan Kendra, UAS (R), GULBARGA (KARNATAKA) INDIA

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