JUST AGRICULTURE
multidisciplinary e-Newsletter

Improving Groundnut Productivity through Farmer Participatory Variety Selection and Dissemination

Dr. Bineeta Satpathy
Associate Professor (Agril. Extension Education), RPCAU, Pusa, Bihar
ARTICLE ID: 073

Abstract

The oilseed scenario both in India and Odisha has undergone a dramatic change after commissioning of the Technology Mission on Oilseeds (TMO).Groundnut (*Arachis hypogaea* L) is an annual legume crop grown in semi-arid regions of the world. It is the world's fourth most important source of edible oil and third most important source of vegetable protein.

Introduction

In India, groundnut is the principal oilseed crop. Groundnut (Arachis hypogaea L.) is an important oilseed crop in India which occupies first position in terms of area and second position in terms of production. China is the largest producer as well as consumer of groundnut in the world with 171.50 lakh tonnes in 2017-18 followed by India (91.79 lakh tonnes), United States (32.81 lakh tonnes), Nigeria (24.20 lakh tonnes) and Sudan (16.41 lakh tonnes)It is also one of the important oilseed crops grown in Odisha state of India which accounts for 35 per cent of the total oilseed crop area in the state. According to the all India rabi crop coverage report, Government of India, as on 30th January 2020, groundnut was sown in around 4.75 lakh hectares as compared to last year (4.59 lakh ha). Among the states, Telangana stood first in area coverage with 1.16 lakh ha followed by Karnataka (1.07 lakh ha), Tamilnadu (0.99 lakh ha), Andhra Pradesh (0.66 lakh ha), and Odisha (0.70 lakh ha).

The crop is mainly grown under three situations, viz. kharif, rabi and in summer under residual moisture conditions on riverbeds. There are many technologies that have contributed significantly to increase the production and productivity of groundnut crops. In spite of that, there is no remarkable change in the socioeconomic status and income level of groundnut farmers especially those who are marginal.

In Odisha, the overall crop productivity is very low and 47.5 per cent of the population belongs to the 'Below Poverty Line' (BPL) category (Planning Commission, 1999**).** Although groundnut is an important oilseed crop, its productivity level is very low

JUST AGRICULTURE
multidisciplinary e-Newsletter

(10.95 q/ha) due to non-adoption of improved practices. The non-adoption of improved groundnut technologies by small and resource poor farmers is mainly due to non-availability of quality seeds, high seed cost (Nigam *et al.*, 2004), poor knowledge and inappropriateness of the technologies in different farming situations.

The technology adoption by small and marginal farmers is being improved by involving the farmers in Frontline Demonstration (FLD) in a participatory mode of action. The current study is a part of mandatory activity undertaken by Krishi Vigyan Kendra (KVK) under FLD (Oilseed) demonstration in which farmers were provided improved seeds, required fertlilizers based on soil analysis report, need-based plant protection chemicals, training, related literature with an attempt to increase income level of the beneficiaries.

Methodology

The Odisha state was purposively selected owing to the importance of oilseed crop, population of marginal farmers and potential enhancing groundnut production. The Angul district was purposively selected based on the project site and crop improvement programme by Indian Council of Agricultural Research (ICAR). Angul block was selected owing to highest area under groundnut next to sesamum amongst oilseed crops. The majority of farmers in the study area were marginal and resource-poor with low risk-bearing ability. Four villages, randomly selected for implementing the demonstration activities**.** Before initiation of the demonstration, problems of the farmers were identified and prioritized through Participatory Rural Appraisal (PRA) method.

Sixty front line demonstrations were conducted in the farmers' fields selected by proportionate random sampling from the four villages. A sample survey was conducted with 60 farming households participating Farmers were drawn randomly from a stratified sample where caste, land-holding size and access to irrigation water and cattle holding sizes were used as criteria for stratification. Rained field investigators canvassed a structured questionnaire to the respondents, which included both men and women. The sample represents 10% of the households. The farmers' inclusion in the programme was exclusively based on their interest for improved groundnut cultivation. In the light of the findings of the survey, focus group discussions were held mainly with farmers practising rainfed agriculture from the three sample villages to elicit relevant options for improving livestock- and fodder-related livelihoods. Percentage analysis and economic indicators like net return, cost of

JUST AGRICULTURE
multidisciplinary e-Newsletter

production, and benefit cost ratio (BCR) were used to elicit the economic impact of groundnut technology intervention.

Results & Discussions:

The results of different interventions are stated below. In general, farmers in the study area were unaware about the improved groundnut varieties and for the past several years they have been growing low yielding, age-old degenerated varieties.

To make farmers aware of the new high yielding variety and evaluate the benefits of the new variety, front line demonstrations were conducted in the farmer's field. This was also a means of participatory technology development. Among the five varieties, ICGV 91114 gave highest yield (20.6 q/ha), followed by Smruti (16.7 q/ha) and TMV 2 (17.5 q/ha) (Table 1). Though all the varieties were superior over the local variety, the feedback revealed that 78 per cent of farmers preferred ICGV 91114 for its high yield and better crop and 23 per cent preferred Smruti (OG 52-1) due to its bold kernel and attractive red testa colour.

Table 1. Yield and farmers' preference of improved varieties during *kharif* season

N=60

Improved variety	Yield(q/ha)	Yield increase due to improved practices (%)	Farmers preferences(No.)
AK 12 24(Control)	**13.4**	**27.4**	**-**
Smruti	**16.7**	**31.2**	**23 (22)**
ICGV 91114	**20.6**	**37.6**	**37 (78)**
TMV 2	**17.5**	**30.5**	**-**
Sample size (N)			**60 (100)**

Note: Figures within the parentheses represent percentage of farmer's preference for a particular variety. An increase in cost of cultivation by adopting, modern technologies was due to incurred due to recommended dose of fertilizer, gypsum, bio fertilizer and PP chemicals. There is an increase of Rs 10,170/- per ha in net return over the farmers practice with B:C ratio of 2.06.

TABLE 2: Economics of improved practices over farmer's practices.

Economic Indicators	Improved practices (Rs.)	Farmers practices (Rs.)
Cost of cultivation Rs./ha	34,100/-	29,000/-
Gross return Rs./ha	75,100/-	59,830/-

JUST AGRICULTURE
multidisciplinary e-Newsletter

Net Return Rs./ha	41,000/-	30,830/-
B:C Ratio	2.20	2.06

Technology Adoption:

Agricultural technology has been a primary factor contributing to increase in farm productivity and include all kinds of improved techniques and practices which affect the growth of agricultural output. In the present study, there is a blend of many technologies, and it is revealed that in most of the cases 40-50 percent of the trainees have adopted the technology at various stages.

TABLE 3: Impact of groundnut training on farmers

Blocks	**No. of farmers trained about the technology**	**No. of persons implementing the technology**
B1	25	13
B2	30	18
B3	25	09
B4	25	20

Horizontal Spread of improved variety

The survey conducted after three years of front line demonstration in the KVK -adopted and Neighbouring villages revealed a big jump in area under improved groundnut varieties cultivation, from 32 ha to 65 ha in the adopted villages and from 18 ha to 27 ha in the neighbouring villages. The increase in area under improved groundnut variety in the adopted villages was 68.75 per cent in the second year over the first year, and 20.37 per cent in the third year over second.(Table 4)

TABLE 4: Horizontal spread in groundnut areas in the district

Area	**1st Year**	**2nd Year**	**3rd Year**	**Increase over 1st year (%)**	**Increase over 2nd year(%)**
FLD implemented villages	32 (86)	54(100)	65(126)	68.75	20.37

JUST AGRICULTURE
multidisciplinary e-Newsletter

Non adopted neighbouring villages	-	18(45)	27(70)	-	50.00

Note:Figures within the parentheses depict the number of farmers who cultivated improved groundnut varieties over the years

Conclusion:

In the current study, the farmers after being exposed to improved cultivation methods by FLD selected the best-suited variety according to their local climatic conditions in their locality, individual farmer's resource availability and preference and accordigly, farmers preferred ICGV 91114 and Smruti (OG-52-1) for the kharif season. This implies that though many improved varieties were supplied and made available to the farmers, they preferred only a few varieties. Hence, to make technology adoption wider and sustainable, the farmers' participation should be ensured in all stages like problem identification, technology selection, implementation and revalidation. It will help increase productivity levels of crops and income of farmers. The seed and input supply system implemented through front line demonstrations has been found very successful in the technology dissemination process.

The change in the learning approach from farmer participatory varietal selection and a farmer-biased survey to a multi-stakeholder perspective is instructive. The learning approach has important implications for scale-up of the improved groundnut technology on the one hand and on the research process per on the other. The spread of innovation from farmer to farmer, community to community, from village to village is referred to as scaling up of a variety. The concept has geographical and spatial implications. However, it pertains to the institutional expansion from grassroots organisations to policy makers, donors, development institutions, and other stakeholders and arrangements, which are key to supporting and building an enabling environment for change. Appreciating farmers' adaptations in the light of associated processes is also required to be supportive of farmers and to create an enabling environment.

Hence, this participatory model may be replicated in other areas for by adoption by small and marginal farmers. It will also help in achieving self-sufficiency in improved varieties of groundnut.