Constraints and Techniques for Improving Pulses Production in Tamil Nadu, India

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Abstract

Production of pulses and its consumption are important in maintaining food and nutritional security. Pulses contain higher protein compared to any other grains and vegetables. This paper analyses the status and constraints of pulses production and the techniques including role of extension services for improving production in the areas under study in Tuticorin, Tirunelveli and Madurai district of Tamil Nadu. In 2010, a total of 648 respondents were selected using stratified random sampling from different categories of farming community. Statistical analytical tools like standard error, standard deviation, trend analysis, variance, chi-square tests, t-tests, Cramer's V test, etc. were used for interpretation of data. The reasons of low production and productivity, according to farmers' perceptions, were due to use of poor quality seed, low area coverage, poor management, inadequate irrigation facilities, low investment, etc. Use of improved seed, adoption of optimum cropping pattern, maintenance of quality germ plasm, application of nutrients in the soil through micro-nutrient, bio-fertilizer, organic manures, adoption of crop protection measures, etc. are some of the important points which need immediate attention. Provision of appropriate marketing infrastructures and facilities is another important area for increasing production.

1. Introduction

Production of pulses and its consumption are important in maintaining food security. They occupy an important place in human diet. Pulses contain higher level of vegetable protein compared to any other grains and vegetables. People of different income groups in both rural and urban areas consume pulses at varying levels to fulfill their nutrition requirements. Pulses are very popular and important cash crops growing successfully throughout the year in India. Cultivation of pulses helps to maintain soil fertility through nitrogen fixation. Pulses are also a profitable crop for the farmers. They are cultivated in many parts and consumed in all parts of the world.

Pulses are grown in approximately 23 mha area with an annual production of 13-15 mt. India accounts for 33% of the world area and 22% of the world production (Maheswari, 1996). During 2009, India imported 4.32 mt of pulses, especially from the countries like China, Canada, Australia and Myanmar. India is also one of the exporters of pulses. Now, Indian government banned the export of pulses to meet the growing domestic demand. This paper analyses the status and constraints of pulses production, farmers' perceptions and the techniques including extension services for improving pulses production in Tamil Nadu.

2. Materials and Methods

The present study is based on both primary and secondary data. An interview schedule was designed, pilot tested and used for data collection. Primary data have been collected in structured schedule by interview method covering six months period in the year 2010. List of the pulses cultivators was prepared from the village records. The sample collected for the research was based on stratified random sampling from different income categories of farmers. A total of 648 respondents of small, medium and large farmers from three districts of Tamil Nadu, viz. Tuticorin, Tirunelveli and Madurai were selected. The secondary data were also consulted from various government organizations, published and unpublished reports, books and journals, etc. Simple statistical analyses like percentage analysis, averages, standard error, standard deviation, trend analysis, variance, chi-square tests, t-tests, Cramer's V, etc. were applied for interpretation of primary data.

3. Results and Discussion

Total number of pulses cultivating farmers in three districts was 12,483. From the 12,483 farmers, 648 respondents

(5.19%) were selected for the study. There was close relationship between farm size and pulses production. If size of farm increases pulse production also increases and vice versa. Table 1 shows the distribution of selected farmers' categories for different zones.

Among the farmers interviewed, 35% operated small farms of 1-2 ha in size, and 38% operated medium farms. Only 27% operated farms of 4 ha or larger, and no farmers operated as much as 10 ha in the study area. Farmers in Madurai had generally larger farm size (72%) compared to farmers of the other two districts.

Table 1: Distribution of farm size according to selected categories (% of farmers)

District	Small (< 2 ha)	Medium (2-4 ha)	Large (> 4 ha)	Total
Tuticorin	64 (43)	53 (36)	31 (21)	148 (100)
Tirunelveli	16 (53)	6 (20)	8 (27)	30 (100)
Madurai	145 (31)	188 (40)	137 (29)	470 (100)
Total	225 (35)	247 (38)	176 (27)	648 (100)

Source: Primary data; Figures in the parentheses indicate percentages

3.1. Reasons for low productivity

Even with the best efforts, pulses production and productivity have remained stagnant. Due to low input nature leading to the low productivity, pulses are grown as residual/alternate crops on marginal lands after taking care of food/income needs from high input and high productivity crops like paddy and groundnut by most farmers. Also, they grow as rain-fed crops with little or no modern yield enhancing inputs. The low priority accorded to pulse crops may be related to their relatively low status in the cropping system. As a crop of secondary importance, in many of these systems, pulse crops rarely draw much managerial attention from the farmers. In addition, these crops are adversely affected by a number of biotic and abiotic stresses, which pose much impact to a large extent for the instability and low yield as well. Table 2 demonstrates some of the reasons for low productivity of pulse crops.

The very common reason for low productivity is due to low area coverage (41%). Non-adoption of DAP spraying and excessive weed growth were also reported for low productivity by equal number (18%) of respondents. Use of poor quality seeds (farmer-owned seed) was the problem of 9% of the sampled farmers for the low productivity. Only 1% farmers expressed that giving secondary importance to this crop, i.e. cultivated as mixed, inter, and border crops in marginal lands and grown as rain-fed crops, contributed to low productivity. Further, 8% of them stated lacking of adoption of crop protection techniques. The remaining 4% of the respondents reported that sowing is not done at appropriate time due to late release of water/non-availability of irrigation facilities which was substantiated by significant difference (Estimated mean=30.857; Standard error=6.61034; p=0.00032; t-statistic=4.66801).

Table 2: Reasons for low productivity of pulse crops as perceived by the cultivators

Reasons	Small	Medium	Large	Total
Use of poor quality seeds	25 (11)	16 (6)	19 (11)	60 (9)
Lack of adoption of crop protection techniques	18 (8)	12 (5)	23 (13)	53 (8)
Sowing is not done at appropriate time	13 (6)	8 (3)	4 (2)	25 (4)
Non-adoption of DAP spraying	31 (14)	39 (16)	50 (28)	120 (18)
Excessive weed growth	40 (18)	49 (20)	27 (15)	116 (18)
Giving secondary importance	1 (0.4)	3 (1)	5 (3)	9 (1)
Low area coverage	97 (43)	120 (49)	48 (27)	265 (41)
Total	225 (100)	247 (100)	176 (100)	648 (100)

Source: Primary data; Figures in the parentheses indicate percentages; Estimated mean=30.857; Standard error=6.61034; p=0.00032; t-statistic=4.66801

3.2. Problems faced by the farmers

Pulses production in India is characterized by a very high degree of diversity as indicated both by the number of crops, and their spatial distribution into varied agro-climatic conditions. Most of these crops are region-specific in the sense that a single state or a cluster of few states accounts for the bulk of the area and production of a specific pulse crop. Post-harvest losses account for 9.5% of total pulses production. Among post-harvest operations, inadequate storage is responsible for the maximum loss (7.5%). Processing, threshing and transport occupy 1%, 0.5% and 0.5% losses, respectively. Among storage losses, pulses are also most susceptible to damage due to insects (5%) compared to wheat (2.5%), paddy (2%) and maize (3.5%). Appropriate storage structures (metal storage bins) need to be manufactured and popularized. Table 3 shows the problems in pulses marketing as perceived by the farmers.

As could be seen from the data, the price fluctuation was reported by 42% of the sampled farmers. This indicated the

magnitude of this problem faced by the farmers. Inadequate transport facilities and the high cost of transport were stated to be the problem by 17% of the sampled farmers. Collusion among traders and reduction of prices by the traders were also reported as a problem (16%). About 14% of the respondents attributed the lack of storage and processing facilities to be another important problem. Finally, existence of large number of intermediaries was reported to be a problem of market as reported by 11% of the respondents. These findings indicated the need for an organized system of marketing and processing of pulses in the study area.

Table 3: Perceptions of the farmers regarding marketing of pulse crops

Problems faced	Small	Medium	Large	Total
Large number of middlemen	33 (15)	26 (10)	16 (9)	75 (11)
Fluctuating prices	89 (39)	110 (45)	71 (40)	270 (42)
Collusion among traders in reducing prices	62 (28)	19 (8)	22 (13)	103 (16)
Transport cost	18 (8)	39 (16)	53 (30)	110 (17)
Lack of storage and processing facilities	23 (10)	53 (21)	14 (8)	90 (14)
Total	225 (100)	247 (100)	176 (100)	648 (100)

Source: Primary data; Figures in the parentheses indicate percentages; $\chi 2$=80.42, p=<0.0001, df=8, Cramer's V=0.2491, Standard error=0.0466

3.3. Techniques for improving pulses production

Experience of on-farm research at ICRISAT in Thadnapally district of Andhra Pradesh showed that with adequate institutional support, easy supply of inputs and necessary credit facilities ensured by different government agencies, the improved technology can be effectively transferred with substantial gains in productivity of rain-fed crops. For any crop, generally an increase in production and productivity is brought about by the wider availability and adoption of improved varieties of seeds. Nearly 400 improved varieties of different pulse crops have been released for cultivation since the inception of coordinated pulses improvement program in 1967. But at present, only 124 varieties remain in the production chain. Among them, about a dozen of the varieties are found popular among farmers. Wide gap between the requirement of certified/quality seeds and its distribution in India is a matter of great concern. Farmers have been applying sub-optimal doses of fertilizers, pesticides and number of irrigations for pulses after meeting the requirements of paddy and vegetable crops.

However, on the basis of information gathered from the respondents, some areas were identified in respect of use of inputs and application of technologies which need an appropriate intervention. Table 4 shows some of the important aspects.

For improving the pulses production, the important technique adopted by the sampled farmers was maintenance and evaluation of germ plasm (23%). Usage of quality seeds, and use of organic, inorganic and bio-fertilizers were also stated by 21 and 18% farmers, respectively.

Table 4: Techniques for improving pulses production as perceived by the farmers

Techniques	Small	Medium	Large	Total
Usage of quality seeds	50 (20)	39 (22)	46 (20)	135 (21)
Use of organic, inorganic and bio-fertilizers	63 (25)	14 (8)	39 (17)	116 (18)
Identification of varieties to suit rice-fallow, dry land and inter crop conditions	39 (16)	22 (13)	27 (12)	88 (14)
Use of optimal cropping pattern	41 (17)	12 (7)	31 (14)	84 (13)
Maintenance and evaluation of germ plasm	35 (14)	59 (33)	58 (26)	152 (23)
Application of micro nutrient management	14 (6)	27 (15)	15 (7)	56 (8)
Development of integrated insect, pest and disease management	5 (2)	3 (2)	9 (4)	17 (3)
Total	225 (100)	247 (100)	176 (100)	648 (100)

Source: Primary data; Figures in the parentheses indicate percentages; Estimated mean=30.857; Standard error=3.9888; p=0.00025; t-statistic=7.73586

Further, 14% of them reported that identification of varieties to suit rice-fallow condition, dry land condition, and inter-crop conditions was adopted by the sampled farmers. Only 3% of

sampled farmers expressed necessity for development of integrated insect-pest and disease management. Use of optimal cropping pattern for improving the production was stated by 13% farmers. The remaining 8% of the respondents opined application of micro nutrient management to be effective which showed significant difference (Estimated mean=30.857; Standard error=3.9888; p=0.00025; t-statistic=7.73586).

3.4. Policy implications to increase pulses supply

Based on the findings of the present study followings are recommended for immediate intervention for augmenting the pulses production in the study area.

- First, fertility of soil has to be improved. Besides, judicious application of both manure and fertilizer, rotation of crops, mix cropping, etc. are very useful. Using advanced technologies like ICT (information communication technology) may be more effective.
- Second, use of quality seeds for cultivation. In the study area, farmers were usually using their own seeds. Before selling, they keep small quantity of the crops as seeds. Use of seed technology measure is totally absent. Facilities for supplying improved seed are very much essential.
- Third, plowing is most important. Only manual labor is not sufficient for improved cultivation. Scientific equipments are used for larger area only. This facility may be extended to other categories of farmers also. Besides, introduction of high yielding hybrid varieties is also essential. Evolving suitable agronomical practices are also necessary to tackle the situations occurred due to global climate change.
- Fourth, the crop faces the problem of recurrent market gluts leading to fluctuation of prices resulting in instability of income and risk. There is an urgent need for marketing intelligence, infrastructure, planning and effective price support mechanism which invite government involvement and intervention.
- Fifth, increase in production and productivity of pulses also depends upon farmers' knowledge and awareness which may be obtained through effective extension services.
- Sixth, the farmers could utilize crop loan facilities to meet up the ever increasing input costs and the burden of loss due to natural calamities. Provision of crop insurance may be used as a safety-net measure in this direction.
- Seventh, there is an urgent need to adopt cost effective and eco-friendly technological up-gradation by all categories of respondents.
- Lastly, in a nutshell this study has shown that the collective efforts like farmers' organization, cooperatives, club, etc. may tackle many of the problems as faced by the pulses cultivators.

4. Conclusion

Thus use of improved seed, adoption of optimum cropping pattern, maintenance of quality germ plasm, application of nutrients in the soil through micro-nutrient, bio-fertilizer, organic manures, adoption of crop protection measures, etc. are some of the important points which need immediate attention by the policy makers and NGOs. Provision of appropriate marketing infrastructures and facilities is another important area for giving encouragement of the pulse farmers to adopt better management practices. Organization of farmers' associations has also been suggested to highlight the problems as faced by the pulse farmers and thereby to take necessary action accordingly.

5. References

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