

Cluster frontline demonstrations of Pulses

– A key initiative for national food security

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India has potential to achieve much higher pulses production. Though our population and demand for pulses steadily increased, production has more or less remained static. There are several constraints in production process which cause decline in production. To stabilize prices in the long run, it is needed to increase domestic production by eliminating the risks farmers experience in relation to growing pulses. Cluster frontline demonstration programme is an important step to popularize pulses cultivation. State Agricultural University, ICAR Institutes and KVK can play pro-active role to demonstrate latest technical know-how to farmers. This programme has effectively implemented in S.A.S Nagar, Punjab where progressive farmers are trained, fields are regularly monitored and feedback is taken about latest crop management technologies. CFLDs provide a unique opportunity to researchers and extension personnel for understanding the farmer's resources and requirement to fine tune and/or modify the technologies for easy adaptability at farmer's fields.

Keywords: CFLD, Crop management, Livestock, Pulses

PULSES are a major source of protein for a majority of Indians, particularly the vegetarian population, which accounts for about one third of the country's population. Pulses and pulse crop residues are also major sources of high-quality livestock feed. As India's middle class continues to grow, so does its demand for pulses and other proteins. According to the FAO, India is a global agricultural powerhouse being the largest producer (25% of global production), consumer (27% of world consumption) and importer (14%) of pulses in the world. India ranks first in terms of area and total production of pulses, yet it remains a net importer of pulses because of high and continuously growing consumption that exceeds domestic production, creating a growing supply-demand gap.

In order to meet the projected demand of 32 million tonnes of pulses by 2030, as per the Vision 2030 by the Indian Institute of Pulses

Research, Kanpur, a growth rate of 4.2% has to be ensured. As in the case of cereals, there is scope for a lot of enhancement in pulses productivity. This will, however, require a paradigm shift in research, technology generation and dissemination, popularization of improved crop management practices and commercialization along with capacity building of the stakeholders in frontier areas of research. Genetic enhancement for yield and quality seed would be a critical factor in productivity. To promote the pulses, government of India has implemented National Food Security Mission (NFSM) since 2007-08 which covers 644 districts in 29 States.

A special programme for demonstration of new varieties of pulses through Krishi Vigyan Kendra (KVKs) to increase availability of seeds of new varieties of pulses and promote adoption of new varieties was started. Cluster Frontline Demonstration (CFLD) is a form of

applied research through ICAR/SAUs system on latest notified/released varieties along with full package of practices on selected farmers' fields with a view to demonstrate the potentiality of the technologies to: (a) Participating farmers, (b) Neighbouring farmers and other agencies, (c) To analyze the production, and (d) Performance of the technologies for scientific feedback. Following the mission objective, ICAR-Agricultural Technology Application Research Institute, Ludhiana is implementing CFLD on pulses for demonstrating production potential of modern technologies through KVKs of Punjab. KVK S.A.S Nagar, Mohali is also involved in successful implementation of this programme. Major technologies disseminated by the KVK includes newly developed varieties, sowing methods, seed treatment, integrated nutrients management (INM), use of micro nutrients, bio fertilizers, integrated

pest and diseases management (IPDM) and intercropping etc. The main emphasis stress was given to reduce the gap between existing and potentiality to produce more pulses through available technology options, detailed planning, and monitoring of crops by the subject matter specialists at critical stages of ongoing CFLD programme.

Objectives of CFLD

- To demonstrate improved crop production technologies of pulses on the farmers' fields.
- To popularize the newly notified and improved varieties/technologies for varietal diversification and efficient management of resources.
- To bring synergy among planners, researchers, farmers and industry for parable interface through seminars/symposium on emerging themes of importance in the field of pulses production for deciding strategies for development of pulses.

Conduction of CFLD

Farmers were selected from all the blocks of S.A.S. Nagar district through survey, group meetings and conducted discussions with them. Selected farmers were guided about improved production technology recommended by Punjab Agricultural University, Ludhiana through training programmes, farm literature and personal contact method for conducting frontline demonstrations at their fields. Existing local cultivation practices were followed in case of check plots. Mungbean crop was grown after three previous crops i.e. wheat, potato and mustard crop. During the study period, sowing was done at optimum time with recommended row to row spacing. All N, P, and K were applied according to soil test results. Seed treatment was with fungicide captan (3 g/ kg seed) and biofertiliser (*Rhizobium* sp LSMR-1 and *Rhizobacterium* RB 3). Recommended weed control measure (pre emergence application of Pendimethaline @2.5 l/ha) was taken up and irrigation was given according to the requirement of the crop.

Gramoxone 24 SL was sprayed for synchronous maturity of pods, when 80% of pods mature, @ 2 l/ha, using 500 L of water. All the important farm operations were performed under the supervision of KVK scientists by regular visits. At front line demonstration site off-campus trainings were organized to extent the technology to other farmers of the area. Opinion of the farmers about technologies used under demonstration was collected for further improvement in research and extension activities. The extension activities like group meetings and field days were also organized at the demonstration sites as to provide opportunities for other farmers of the area to interact and to seek benefits from these demonstrations.

Results of demonstrations conducted under *kharif* pulses

Greengram varieties i.e. ML 2056 and MH 421 along with improved crop management technologies were demonstrated by KVK (Mohali) in 20 ha area. Total 50 FLDs was conducted during 2017-18. Results revealed that the yield of greengram was considerably more under demonstration plots as compared to local check. The productivity of ML 2056 variety ranged between 11.6-12.8 q/ha with a mean yield 12.2 q/ha, while that of MH 421 variety ranged between 12.7-14.1 q/ha with mean value of 13.4 q/ha in comparison to the productivity of 10.1 q/ha, respectively for local variety. The increase in the demonstration yield over farmer's practices was 20.8% (ML 2056) and 32.6% (MH 421). Net return and B:C ratio of demonstration plots were also higher than farmers practice.

Results of demonstrations conducted under *Rabi* pulses

Front Line Demonstrations (FLD) on chickpea and lentil using improved varieties PBG 7 and LL-931, respectively were conducted during *rabi* seasons in 2017-18 and 2018-19 respectively to show the higher production potentiality. The demonstrations of chickpea were carried out in 50 farmers' fields of 20 ha area and 56 farmer's fields of 20

ha area respectively in Mohali. Improved varieties along with improved technologies like seed treatment with captan, inoculation with suitable strain of *Rhizobium* biofertiliser, soil test based nutrient management, use of herbicide for weed control and plant protection chemicals based on economic threshold level of pests were demonstrated to farmers. Chickpea variety PBG 7 in demonstration plots recorded an average 15.8% higher yield and 27% increase in net returns over farmers practice plot. Similarly, during 2018-19, lentil variety LL-931 along with recommended technologies reported 11.35 q/ha, which was higher than farmers practice plot 9.5 q/ha.

Results of demonstrations conducted under Summer pulses (Summer moong)

Forty nine front line demonstrations in cluster approach were conducted during 2017-18 covering an area of 20.0 ha and 55 demonstrations were carried out in 30 ha area during 2018-19. Latest crop production and protection technologies including improved high yielding varieties (SML 668 AND SML 832, during 2017-18 and 2018-19, respectively), seed treatment with fungicide and biofertiliser, soil test based nutrient management, use of herbicide for weed control, gramaxone for synchronous maturity and plant protection chemicals based on economic threshold level of pests were demonstrated to farmers to show them productivity potential and profitability. The productivity and economic returns of summer moong in demonstrated plots were calculated and compared with the corresponding farmers' practices (local check). Results revealed that the improved technologies recorded mean yield of 13.00 q/ha, which was 18.3% higher grain yield in demonstration plots as compared to the farmer's practices, however SML 832 performed better than SML 668.

Constraints faced by farmers during CFLDs of pulses

- Extreme weather conditions such as sudden shifting of temperatures i.e.

low and high temperature beyond threshold level of tolerance caused flower abortion, hastened the reproductive period and lowered grain yield. Occurrence of mid-season cold waves and terminal heat during winter has caused losses to crop productivity during *rabi* pulses, high temperature adversely affects productivity of winter pulses like gram and lentil.

- During *kharif*, the edaphic factors play a major role. Pulses are most sensitive to water logging condition. In *kharif* season water logging situation results in poor aeration and failure of crop, especially *kharif* greengram.
- Insects and diseases is major challenge. Pod borers (*Helicoverpa armigera*), *Fusarium* wilt, root rots,

and *Ascochyta* blight caused 10-40% losses in chickpea. Similarly, pod borer, aphids, cutworm, powdery mildew, rust and wilt are the major pests and diseases affecting lentil production.

- Lower productivity and low yield potential, under pulses as compared to cereals besides allocation of poor, marginal lands and improper nutrition.
- *Neelgai* and other wild animals cause damage to pulse crop at night.

Conclusion

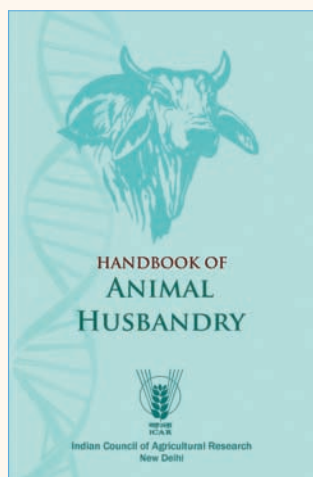
CFLD programme is an effective tool for increasing the production and productivity of pulses and changing the knowledge, attitude and skill of farmers. It can be a milestone programme for doubling farmers' income and bringing nutritional security.

Higher yield in demonstration plots over farmers practice created greater awareness and motivated other farmers to adopt the improved package of practices of pulses. These demonstrations also built the relationship and confidence between farmers and scientists. The beneficiary farmers of FLDs also play an important role as source of information and quality seeds for wider dissemination of the high yielding varieties of pulses for other nearby farmers.

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HANDBOOK OF ANIMAL HUSBANDRY

Livestock sector has created a significant impact on equity in terms of employment and poverty alleviation. After staple crops, livestock sector is the second most important contributor to the agricultural economy. The



producer prices of meat, eggs and milk, in India appear to be highly competitive as the domestic producer prices of these products are quite low compared to the ex-farm gate prices of major exporters in the world markets. A knowledge resource is essential to harness the potential of animal production. The Indian Council of Agricultural Research brought out first edition of *Handbook of Animal Husbandry* in 1962 for serving the end-users ranging from livestock owners to academicians. This is the Fourth revised and enlarged edition of *Handbook of Animal Husbandry* which includes 48 chapters under nine sections, such as Animal Genetics and Breeding; Animal Nutrition and Feed Technologies; Animal Management; Animal Reproduction; Animal Health Management; Animal Biotechnology; Animal Products, Technology and Machineries; Economics and Trade of Livestock and Poultry Enterprise; and Social Sciences. It has 19 new chapters like Impact of Biotechnology, Nanotechnology: Applications in Animal Sciences; Carbon Trading: Mechanisms and Opportunities in Livestock Sector; Intellectual Property Rights Regime;

Indigenous Technical Knowledge etc.; and old chapters were revised holistically. The fourth revised and enlarged edition of *Handbook of Animal Husbandry* will prove useful to the students, teachers, livestock/poultry farmers, and to especially those who visualize the economic growth of country with the support of livestock sector.

TECHNICAL SPECIFICATIONS

No. of pages : i-x + 1550 • Price : ₹ 1500 • Postage : Rs 100 • ISBN No. : 978-81-7164-086-7

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