

Improvement in Livelihood Security for Small and Marginal Farmers through Front Line Demonstrations on Oilseed and Pulse Crops in Central India

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ABSTRACT

A major farming community of India comes under small and marginal farming community, where the size of land holding is very low to achieve the standards of livelihood. India is a land of small farmers, with 650 million of its more than 1 billion people living on the land and 80 per cent farmers owning less than 2 ha of land. India, since over 700 million of India's population lives in villages and their principal source of livelihood is agriculture, comprising crop and animal husbandry, forestry, fisheries, agro-processing and agri-business. Therefore, accelerated progress in enhancing the productivity, profitability, stability, and sustainability of the major farming systems is the best safety net against hunger and poverty. To overcome this situation oilseed & pulses can play a vital role besides the cereal crops. Oilseed and pulses are the rich sources of proteins, quality nutrition and valuable cash also.. The objectives of Front Line Demonstration on oilseed and pulse crops are to demonstrate the superior productivity potentials of various location/region specific technologies to practicing farmers and test their implement ability and viability and obtain feed back from the end users and bring about necessary corrections to improve their acceptability and suitability in real farm situations vis-à-vis prevailing traditional farmers practices.. The results of Front Line Demonstrations on pulses shows that the highest percentage increase in yield was noted in green gram 46.05% followed by lentil (32.85%) and gram (31.57%). All the Front Line Demonstrations showed a significant increase in yield of demonstration over farmers' practices. The enhanced yield achieved through adoption of improved production technologies in oilseed and pulses increased the Livelihood security.

Keywords: *Livelihood security; Demonstrations; Agro-processing; Agri-business*

India with a geographical area spreading over 329 million hectares is endowed with a complex diversity of climate, soils, flora and fauna offering both a blessing and a challenge for agricultural development. The quality and richness of the country resource endowments is constantly threatened by the huge population and increasing population density and corresponding demand for arable lands and ensuring food security.

The green revolution in wheat and rice, white revolution in milk, yellow revolution in oilseed and the "blue revolution" in fisheries have augmented the food basket of the country. But many technological challenges remain. First, despite the shrinking share (23%) of the agricultural sector in the economy, the majority of the labour force (nearly 60%) continues to depend on agriculture. About 75% of India's poor people with low purchasing power live in rural areas and nearly 60% of the cultivated area is under rainfed farming.

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small and marginal farming community, where the size of land holding is very low to achieve the standards of livelihood. Agriculture is the mainstay of the Indian economy, as it constitutes the backbone of the rural livelihood security system. It is the core of planned economic development in India, as the trickle-down effect of agriculture is significant in reducing poverty and regional inequality in the country. Small and marginal farmers, whose land holdings are below 2 ha, constitute almost 80% of all Indian farmers, and more than 90% of them are dependant on rain for their crops. In traditional farming practices, their costs of cultivation and risks of crop failure are so high that often the farmers cannot recover even the money spent. India's 'National Commission on Farmers' recently reported: "40% of Indian farmers would like to leave farming if it is possible to do so". This summarizes the enormity of the present agricultural crisis and the challenge facing the nation: how to safeguard agricultural incomes or provide alternative livelihood

support to a quarter billion people who are potential future economic and ecological refugees – uprooted by mounting farm production costs and a rapidly degrading natural resource base.

Livelihood security, especially food security is the most important factor that determines the survival of human kind. Without food security, a nation cannot expect better life for its people. Famines in India are “a nightmare of the past”. The green revolution witnessed in late 1960s has contributed immensely over the years to cereal production in India and hence a substantial increase in the net per capita availability of food grains was registered. Even with present level of production, there is enough food in the country to meet energy and protein requirements of the current population, if the food were distributed equitably according to needs. But as we see, surplus production and widespread hunger coexist at the national level. At present, India alone accounts for one fourth of all world hunger. Inadequate or lack of purchasing power among the poor is the main cause of food insecurity in rural India. According to Rajendra Prasad (2003), the per capita consumption of most food items in rural India is far below the recommended dietary allowances. Though the per capita intake of cereals is closer to or above the standard requirements, the consumption of all other food items throughout the country is woefully lower than their respective dietary requirements as per ICMR (Indian Council of Medical Research) norms. In eastern-central India the per capita cereal, pulse, oilseed and vegetables consumption are 483.8, 20.5, 9.6 and 57.8 g/day respectively which are very lower as compared to the ICMR Norms except cereals. The Norms are 420.0, 40.0, 22.0 and 125 g/day respectively for daily requirement of cereal, pulse, oilseed and vegetables. A general low intake of pulses, vegetables, fruits, fats and oils, eggs, meat and fish is responsible for widespread occurrence of protein energy malnutrition (PEM) and chronic energy deficiency (CED). It was reported that 23 to 70 percent of the rural population in different parts of the country is suffering from protein energy malnutrition, while the chronic energy deficiency affected 17 to 54 percent of people. Child malnutrition rates in India are still very high. According to the UNDP, 53 percent of children under five in India were under-weight during the period 1990-97, the highest rate from any of the 174 developing countries listed. Prevalence of poverty and low and fluctuating income levels also limit the access to diversified diet and thus adversely affect balanced diet.

India is a land of small farmers, with 650 million of its more than 1 billion people living on the land and 80 per cent farmers owning less than 2 ha of land. In other words, the land provides livelihood security for 65 per cent of the people, and the small farmers provide food

security for 1 billion. The daily income of these farmers is not sufficient to get their daily needs. A majority of these farmers is suffering from poverty and unemployment, which results a failure to achieve necessary households makes a living over time. Progress in agricultural productivity and the economic and ecological well-being of farm families is inextricably linked to achieving the goal of a hunger-free India, since over 700 million of India's population lives in villages and their principal source of livelihood is agriculture, comprising crop and animal husbandry, forestry, fisheries, agro-processing and agri-business. Therefore, accelerated progress in enhancing the productivity, profitability, stability, and sustainability of the major farming systems is the best safety net against hunger and poverty.

Increasing productivity of crops ensure the livelihood security of the farmers because it depends upon the productivity of their fields. To overcome this situation oilseed & pulses can play a vital role besides the cereal crops. Oilseed and pulses are the rich sources of proteins, quality nutrition and valuable cash also. They are more beneficial to the farmers in terms of money as compared to cereals. Many oilseed and pulse crops are grown as a cash crop in the country. If the production of both these increases the income of farmers will certainly increase thereby their standard of living will be improved.

Front Line Demonstrations : In the wake of heavy import bill of around Rs.1000 crore per annum for importing edible oils and lower production of pulses during mid-Eighties, a Technology Mission on Oilseeds and Pulses (TMOP) was set up aiming of increasing production and reducing foreign exchange outgo. The TMOP developed an integrated policy framework involving four partners - farmers, consumers, processing industry and trade and strengthening the country's economy. The researchers also lacked the full confidence on the yield potentialities of the new technologies. They were also not enough equipped to provide feed back to the policy makers and extension personnel engaged in the promotional activities of oilseeds and pulses about the implementability, feasibility and viability of the technology in real farm situations which have originally been claimed based on data from experimental farm. Thus the newly released varieties, hybrids, remunerative and productive cropping systems, agro-production and protection technologies largely remained confined within the four walls of research laboratories. As a part of the strategies of TMOP, Front Line Demonstration (FLD) was considered to be an important component.

The terms progressiveness, innovativeness, venturesomeness, willingness have led to the emergence of progressive farmers strategy approach. In the context of dominance of small farm production systems in India,

appropriate study needs to be undertaken for understanding the intricacy of adoption of agricultural technology, which will facilitate working out more appropriate extension strategies for our country. Frontline Demonstrations (FLD) are also one of the methodologies to evaluate performance of technology under on-farm conditions, technology adoption by the participating farmers and its diffusion to non-participating farmers.

Scientific, Suitable and location specific crop production technology supply holds the key to improving the crop production and sustaining livelihood. Modern crop management practices have been developed, but in most of the cases farmers are not applying these technologies. There is certainly a gap between recommended and farmers' practices. This gap is responsible for the low productivity and lower returns. Small and marginal farmers have tremendous scope for increasing productivity because the natural capital - the soil, the water, the biodiversity, can be enhanced through conservation and rejuvenation. On large farms, natural resources are exploited and depleted. The soil loses fertility through chemical fertilizers; it is compacted by heavy machinery. Water is over exploited since chemical farming needs ten times more water than ecological farming. Biodiversity is eroded since industrial scale farming can only be practiced as a monoculture. And energy use is intensified, contributing to global warming. The small farms of India have the highest potential for increasing productivity. There are scientific reasons for this. A small farmer can intensify biodiversity and the higher the biodiversity, the higher the productivity and stability and sustainability of agriculture. A large farm has to intensify external inputs such as agrichemicals and fossil fuels, which lower the productivity, and lead to non-sustainability and economic and ecological vulnerability. When the industrial model of high external inputs is imposed on small farmers, the result is debt and suicides. The industrial model of farming is at the root of farmers' suicides. Yet, the disease is being offered as a cure. Small bio-diverse farms based on internal inputs are in fact the only promise for increasing agricultural productivity, whether productivity is defined in terms of biological productivity or in terms of financial returns, or in terms of energy. Large industrial farms use ten times more energy than they produce as food, most of the energy goes to pollute the atmosphere and destabilize the climate.

In Madhya Pradesh, the programme of Front Line Demonstration is being conducted successfully by Krishi Vigyan Kendras. Krishi Vigyan Kendra (KVK) is basically a mechanism to demonstrate the application of Science and Technology input for creating awareness and motivating farmers to learn and adopt latest production and management technological options of various agricultural enterprises through vocational training to

different segments of farming community in service training to functionaries, front and first line demonstrations and on farm testing on major crops and other land based activities with due consideration to location specific production systems and agro-ecological characterization. Front Line Demonstration is one major mandate of KVKs.

The Frontline Demonstration on oilseed and pulses had fabulous impact not only the farmers adopting but also on nearby farmers. In the year 2006-07, many crop production technologies on all the major crops of the zone -VII (comprising Madhya Pradesh, Chhattisgarh and Orissa) were demonstrated under the FLD programme. A number of front line demonstrations were carried out in the zone on oilseed and pulse crops. In the year 2006-07 a total number of 10452 FLD's were conducted on various crops and enterprises including oilseed and pulse crops covering the total area of 3015.6 ha in the Zone. The improved location specific production technologies of crop production pertaining to seed treatment, suitable varieties, seed rate, row spacing, sowing method, balanced nutrition, INM, IPM, IDM, weed control, water management etc were demonstrated.

Front line demonstration on oilseeds:

A total number of 1866 demonstrations were laid down covering an area of 664.04 ha including ongoing on various oilseed crops such as groundnut, soybean, mustard, niger, sunflower, toria etc. The results obtained from 1213 demonstrations shown in the following table 1. The table indicates that percentage increase in yield under demonstration on different crops over farmers practice. A total number of 286 demonstrations (127.4 ha area) were conducted in soybean crop followed by groundnut (276 demonstrations in 87.1 ha area), mustard (174 demonstrations in 73.4 ha area), Niger (107 demonstrations in 53.2 ha area), Linseed (106 demonstrations in 43 ha area), Sunflower (96 demonstrations in 37 ha area), Toria (97 demonstrations in 35 ha area) etc. A remarkable increase in yield was recorded in all the demonstrations. The increase in yield was ranges between 20.81 % (in soybean) and 117.24 % (in Niger).

Table 1. Details of front line demonstrations on oilseeds conducted in Zone VII

Crop	No. of Farmers	Area (ha)	Yield (kg/ha)		Increase (%)
			Demo.	Local Check	
Soybean	286	127.4	14.2	11.8	20.81
Groundnut	276	87.1	12.9	9.6	34.36
Mustard	174	73.4	10.9	9.3	16.13
Niger	107	53.2	3.2	1.5	117.24
Linseed	106	43.0	9.1	5.7	60.79
Sunflower	96	37.0	10.9	8.0	36.49
Toria	97	35.0	8.2	4.3	92.16
Sesame	56	21.0	25.4	17.8	42.44
Til	13	9.0	2.3	1.1	110.91
Safflower	2	5.0	36.7	27.6	32.73

Front Line Demonstration on Pulses: So far as the pulse crops are concern, during the year, 1708 demonstrations were conducted on various pulses like Arhar, black gram, green gram, gram, lentil etc. The details of the Front Line Demonstration on pulse crops are summarized in Table – 2.

Table 2. Details of the Front Line Demonstrations on Pulses conducted in zone - VII

Crop	No. of Farmers	Area (ha)	Yield (kg/ha)		Increase (%)
			Demo.	Local Check	
Gram	356	158.2	13.2	10.0	31.57
Arhar	285	141.0	9.1	8.1	12.12
Black gram	297	128	137.1	120.2	14.01
Green gram	205	83.5	6.5	4.5	46.05
Lentil	20	9.0	13.8	10.4	32.85

Being the major pulse crop, 356 demonstrations on 158.2 ha area were conducted on gram crop followed by Arhar, on which 285 demonstrations were conducted in 141 ha area. The results of Front Line Demonstrations shows that the highest percentage increase in yield was noted in green gram 46.05% followed by lentil (32.85%) and gram (31.57%).

RESULTS AND DISCUSSION

The Table 3 Shows crop wise thrust areas demonstrated and the performance of the demonstration in terms of yield increased over local check or farmers practice. All the Front Line Demonstrations showed a significant increase in yield of demonstration over farmers' practices, thus a higher income also. As discussed earlier, the increase in farmers income upshot improvement of his livelihood security. Productivity is output per unit input. Biological productivity is output per unit acre. Small bio-diverse farms have higher productivity than monocultures, which are a necessary aspect of industrial agriculture based on external inputs. Higher biological productivity translates into higher incomes for small farmers. Oilseed and pulses if included in cropping system, gave more income from the farm. It is also substantiate in Rajasthan where monocultures of pearl millet gave Rs. 2480 of net profit per acre, whereas a bio-diverse farm of pearl millet -moth bean-sesame gave Rs. 12045, a difference of nearly Rs. 10,000 per acre.

Improvement in Livelihood security :There are striking differences in the sources of livelihoods across the zone. Some farmers get their earning by wages or as labourers in others field, whereas some farmers have other livelihood options. About 70% of the landless poor in overall work as agriculture labour. The main reason that forced them to work as labourer is poverty. Lack of credit worthiness, confidence and know-how may be other reasons. In the villages, the landless poor obtain jobs during the crop season only. Approximately 40 percent

of the poor people migrate in search of work to other places, preferably to nearby city/towns. In the majority of cases only male members of the family migrate from the village and provide livelihood to other family members.

Table -3. Major technologies demonstrated on Oilseeds and Pulses in the Zone

Crop	Major thrust Areas	Increase in yield over local check (%)
<i>Oilseeds</i>		
Groundnut	Crop Management	38.66
Groundnut	Integrated Pest Management	8.33
Groundnut	Nutrient Management	31.43
Groundnut	Varietal Replacement	47.59
Linseed	Crop Management	69.13
Linseed	Improved Variety & INM	53.00
Linseed	Varietal Replacement	44.58
Mustard	Crop Management	54.05
Mustard	Integrated Pest Management	50.00
Mustard	Nutrient Management	37.50
Mustard	Varietal Replacement	59.79
Niger	Crop Management	111.11
Niger	Nutrient Management	100.00
Safflower	Varietal Replacement	63.36
Sesame	Crop Management	55.56
Sesame	Varietal Replacement	190.00
Soybean	Crop Management	46.94
Soybean	Cropping System	8.33
Soybean	Nutrient Management	37.59
Soybean	Varietal Replacement	43.09
Sunflower	Crop Management	34.48
Sunflower	Nutrient Management	9.09
Sunflower	Varietal Replacement	62.22
Til	Varietal Replacement	150.00
Toria	Crop Management	114.29
Toria	Improved Variety & INM	133.33
Toria	Varietal Replacement	50.00
<i>Pulses</i>		
Arhar	Crop Management	56.60
Arhar	Integrated Pest Management	53.75
Arhar	Varietal Replacement	40.77
Black Gram	Crop Management	49.30
Black Gram	Improved Variety & INM	65.85
Black Gram	Nutrient Management	25.00
Black Gram	Varietal Replacement	63.80
Gram	Crop Management	21.70
Gram	Cropping System	14.30
Gram	Improved Variety & INM	20.00
Gram	Integrated Disease Management	31.95
Gram	Integrated Pest Management	22.20
Gram	Nutrient Management	37.65
Gram	Seed Production	22.20
Gram	Varietal Replacement	64.05
Green gram	Crop Management	42.77
Green gram	Improved Variety & INM	19.55
Green gram	Seed Production	20.00
Green gram	Varietal Replacement	42.20
Lentil	Crop Management	33.30
Lentil	Varietal Replacement	31.30

The enhanced yield achieved through adoption of improved production technologies in oilseed and pulses increased the income of the farmers. The packages on integrated nutrient management and bio and cultural control measure of the pests and diseases has provided eco friendly way of cultivation of oilseed and pulse crops

and cropping systems based on these crops. This has cumulatively been able to raise living standard of the farmers. The raised income resulted into higher purchasing capacity of the small and marginal farmers. Farmers can expend their earnings to purchase the essentials of their living and also the luxurious things. They can avail good education and health to their family members. This increase in pecuniary returns definitely increases their living standards. Use of modern crop production technologies not only beneficial to the farmers engaged in farming but also the very small and marginal farmers and land less worker depend upon farm labour. This increase also supports the agro industries and workers associated with this.

Future possibilities and scope

Still, there is much scope in enhancing productivity of oilseed and pulse crops in the zone. There is a need to improve the efficiency of front line demonstration programme on oilseed and pulses. Farmers take up technologies step by step and need repeated approach. Along with front line demonstration programme personal contacts and motivation on large scale can conveniently enhance the productivity of the crop. Front line demonstrations should be concentrated on

- Ensuring availability of quality seed and maintaining high seed longevity at low cost
- Reducing the losses due to pod shattering and post harvest handling
- Management of biotic and abiotic stresses
- Use of low cost production technologies
- Use of bio-inputs for sustained productivity
- Integrated Farming Systems (IFS) approach needs to be encouraged for sustaining livelihood in rural areas particularly for small and marginal farmers.
- Timely arrangement of credit for inputs is a big problem for small and marginal farmers. Lack of fund and awareness is a major constraint for adoption of modern demonstrated technologies. Therefore emphasis should be given on low cost production technologies.
- There is a need of adoption in large scale through networking of developmental agencies for enhancement in production per unit area. Till now, technologies generated at the research stations were thrust upon the farmers in the technology

transfer programme without understanding their existing situation. It therefore, required a complete reversal of front line demonstration programme, where farmers are fully involved at all the stages of demonstration.

- Under the programme there is a in built mechanism of capacity building for technical and managerial empowerment of farmers like field days, training programme etc. farmers participation in various activities provide them opportunities for decision making and work participation.
- Training institutions (particularly those for crop production, processing and value addition) should organize training for the farmers and rural poor women in production technologies and its importance for income generation.
- Efforts should be made by both research and development institutions to link up the rural poor farmers/ farm women with funding agencies.

CONCLUSION

India's agricultural economy and food security depend vitally on the small holder farmers. In relation to their aggregate land holding, the holdings smaller than 1.0 ha contribute proportionately more. Despite this contribution, these farmers comprise almost three fifth of the nations hungry and poor. It is therefore incumbent upon the nation to assist the small and marginal farmers to increase their productivity and to augment their assets and entitlements.

Risk and vulnerability have been rediscovered as key features of rural livelihoods and poverty, and are currently a focus of policy attention. The small and marginal farmers themselves try to manage uncertainty using a variety of ex-ante and ex-post risk management strategies, and through diversified farming. Farmers should go for the oilseed and pulse crops as cash crops and they can get a good monetary return from the crop production, which make enable them to achieve the sustainable livelihood security.

In this way the livelihood security of the small and marginal farmers can be improved by increasing the productivity of oilseed and pulses crops. Their problem of malnutrition of food insecurity can be solved by obtaining production and money.

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