



E-ISSN: 2278-4136

P-ISSN: 2349-8234

www.phytojournal.com

JPP 2020; Sp 9(4): 395-399

Received: 10-05-2020

Accepted: 12-06-2020

Kavita BhaduPh.D. Scholar, College of
Agriculture, RVSKVV, Gwalior,
Madhya Pradesh, India**Praveen Bhardwaj**Assistant Professor, Jagannath
University, Jaipur, Rajasthan,
India**Nikki Bhardwaj**Ph.D. Scholar, College of
Agriculture, RVSKVV, Gwalior,
Madhya Pradesh, India**Neha Singh Kirar**Ph.D. Scholar, College of
Agriculture, RVSKVV, Gwalior,
Madhya Pradesh, India**Corresponding Author:****Kavita Bhadu**Ph.D. Scholar, College of
Agriculture, RVSKVV, Gwalior,
Madhya Pradesh, India

Role of pulses in doubling farmer's income: A review

Kavita Bhadu, Praveen Bhardwaj, Nikki Bhardwaj and Neha Singh Kirar

Abstract

Agriculture is the main source of farmer's income in India. The target of doubling farmer's income in a short period requires identification of sources of income growth and enabling conditions for harnessing their growth potential. The pathway for doubling of farmer's income encompasses several dimensions, from production to post-harvest management. Chickpea, pigeonpea, urdbean, mungbean, lentil, fieldpea, cowpea and lathyrus are the major pulse crops grown in the country. Pulses contributes immensely towards doubling farmer's income through diminishing cost of production, scaling per unit productivity, efficient marketing networks, increased minimum support price and post harvest value addition.

Keywords: Farmer's income, pulses, sustainability, MSP, value addition

Introduction

All the nations facing problems of poverty, hunger and malnutrition will need to accelerate their agricultural growth for achieving sustainable development goals (SDGs), especially while aiming at no poverty, zero hunger and safe environment for all (Paroda, 2017)^[12]. The targeted period to double the farmer's income in real terms has been fixed as seven years i.e. from 2015 to 2022. Hence, considering the past trend, it will require a minimum annual growth rate of 10.4%. The target of doubling farmer's income in a short period requires identification of sources of income growth and enabling conditions for harnessing their growth potential. The pathway for doubling of farmers' income encompasses several dimensions, from production to post-harvest management. These include: bridging yield gap, crop diversification, improvements in total factor productivity and proper management of irrigation (GoI, 2007; Evenson *et al.*, 1999; Chand *et al.*, 2011; BIRTHAL *et al.*, 2007)^[8, 6, 3, 1, 2] along with the availability of market and institutional support for efficient post-harvest management (Saxena and Chand, 2017; Government of India, 2015)^[5, 9].

Legume crops have a potentially important role to play in doubling farmer's income, pulses reduces cost of inputs by increasing indigenous nitrogen production, besides meeting human demands for protein. Some legumes have the ability to solubilize unavailable phosphate by excreting organic acids from their roots, in addition to improving soil fertility. Legumes also help to restore soil organic matter and reduce pest and disease problems when used in rotation with non-leguminous crops. Thereby contributing to improvement in the overall system productivity. Inclusion of pulses in crop rotations reduces the risks of soil erosion and depletion. In this paper we review the concept of farmer's income, constraints in agriculture and approaches for doubling farmer's income by 2022-23 giving focus on pulse crops.

Why Double Farmer's Income

Today, around 138 million Indian farmer's main concern is about declining farm income on the one hand and the increasing cost of inputs on the other. A recent study by the National Institute of Agricultural Economics and Policy Research (NIAP) has shown that around 70% farmers in the country have annual per capita income less than INR15,000 (around USD 250). BIRTHAL *et al.* (2017)^[1, 2] have further analyzed the situation and found that their geographical distribution is widespread, but mostly concentrated in Uttar Pradesh (27.4%), Bihar (11.4%), West Bengal (9.9%), Odisha (6.3%), Rajasthan (5.8%), Madhya Pradesh (5.3%), Maharashtra (4.9%), Assam (3.9%) and Jharkhand (3.2%). Most of these states lack the required infrastructure for agricultural income growth. Moreover, around 70% farmers are marginal (owning less than one hectare), and 77% of them earn even a meager income of INR 6,067 per capita a year. The Hon'ble Prime Minister, considering this as a national priority, rightly called for doubling the farmers' income by 2022. The average land holding is around 1.1 ha, whereas many have much less than even 1.0 ha which is not sustainable for a farm family. To make farming profitable, these farmers do require both new technologies that can save cost on

agricultural inputs, while increasing productivity, and the policy support for getting credit at low interest and also higher income by linking them directly to the markets.

Doubling Farmers Income

According to NITI Aayog Policy Paper (March 2017), doubling real income of farmers by 2022 would require annual growth of 10.41 percent in farmer's income, which is significantly higher than the on-going and earlier growth rates achieved in farm income. Therefore, in order to double the income of farmers it is necessary to encourage allied agricultural sectors like apiculture, livestock, fisheries, horticulture, organic farming, agro-forestry etc. as well as non-farm sector. Following measures can be adopted to increase farmer's income:

- a) Improve productivity through provision of timely and quality inputs and services
- b) Reducing cost of production through rational utilisation of inputs like irrigation water, fertilizers and soil health management
- c) Remunerative prices to producers
- d) Increase in cropping intensity through irrigation development and improving water use efficiency by promoting micro-irrigation
- e) Integrated Farming System (IFS) based on agro-climatic regional planning
- f) Skill development of farmers

Major constraints in agriculture

1. Yield gap

In most of the pulses, there is large gap between the potential yield and the realized yield in the field condition. The actual productivity of different pulses is considerably lower than their potential yield as well as that realized on farm demonstrations of improved technologies. (Table 1).

Pushing of pulse to the poor and marginalized areas with low resource conditions is one of the most important reasons behind poor productivity in pulses in the country. Besides poor seed replacement rates, low adoption of improved production technologies add to the poor productivity of pulses at farmers level.

2. Insufficient and costly inputs

Inputs like seed, fertilizers, manures, agrochemicals, irrigation water and labour are either insufficient or unavailable at right time, in some cases if inputs are available then the cost of inputs are very high.

Irrigation is considered as the leading input in boosting agricultural production and productivity but the net irrigated area in the country is 47% while the remaining falls under rainfed ecology. The pulses under irrigation are cultivated in about 37% of the area while 63% of pulses are grown under rainfed conditions.

3. Lack of infrastructures for post harvest handling

Effective post-harvest management will help farmers realize remunerative prices for their produce. It is more important for highly perishable commodities. Jha *et al.* (2015) ^[11] estimated that output worth Rs. 92651 crores is lost due to poor post-harvest management. Table 2 shows post-harvest losses in different agronomic commodities.

lack of required infrastructure for post harvest handling of produce is main constraint in agriculture. Poor post harvest handling is responsible for wastage of huge produce every

year, so there is need to develop required infrastructures to save that produce.

4. Lack of knowledge about value addition

Most of the farmer community don't have knowledge about value addition of their produce. There is need to develop skill regarding value addition which would be helpful in doubling farmer's income.

5. Farmers Income Trend

Chand (2017) ^[5] have provided estimates of the total income and per cultivator farm income (not farmer's income). According to them, the farm income was reported to be inadequate for 53% of the farm households who operated on less than 0.63 ha of landholdings to escape poverty. As per estimates, between 1993-94 and 2015-16 (almost 20 years), the real farm income had just doubled (Table 3)

and farm income per cultivator received slightly higher increase mainly due to a decline in the number of cultivators after 2004-05, since the young generation seemed to have opted out of agriculture and shifted for the employment to urban areas.

The targeted period to double the farmers' income in real terms has been fixed as seven years i.e. from 2015 to 2022. Hence, considering the past trend, it will require a minimum annual growth rate of 10.4%. Again, it is important to know what is to be doubled. As stated above, is it the income of farmers, or the output or the income of the sector or the value added or GDP of agriculture sector? If the technology, input prices, wages and labour used could result in per unit cost savings then farmers' income would possibly rise at a faster rate than the output. In this context, the doubling of farmers' income has to be viewed differently than the doubling of farm output.

Contribution of pulses in doubling farmers' income

Pulses contributes immensely towards doubling farmers' income through diminishing cost of production (by nitrogen fixation and smothering effect on weeds), scaling per unit productivity (intercropping effect), efficient marketing networks (market demand and MSP), post harvest handling and value addition. On this account, the following important aspects could reinforce our efforts in doubling farmers income by 2022A.D.

1. Diminishing cost of production

Pulses play an important role in improving soil health and balancing the nutrient availability of soil through biological nitrogen fixation. Pulses also provide other ecosystem services as pulses have the lowest carbon and water footprints. Pulses are basic for a sustainable crop production system. These crops not only fix the atmospheric nitrogen for their growth and thereby reducing the dependence on external nitrogen source, but also contribute towards increasing the availability of nitrogen for subsequent crop (through residual effect). They are rightly termed as mini nitrogen-factories.

Integration of pulse crop in crop rotation helps in sustainably enhancing overall productivity and profitability of the cropping system. Introduction of pulses in the system also favours the growth of soil microbes, decreasing the risk of plant diseases and use of pesticides. Their integration in the crop rotation with cereals also helps in breaking the pest cycles and have smothering effect on weeds, thereby contributing to improvement in the overall system productivity. Fred *et al.* [1932]) noting "Legumes should be

planted in light soils, not so much for their own crops as for the good they do to subsequent crops.”

2. Scaling per unit productivity

2.1 Cropping system intensification through inter-/mixed-crop:

Promotion of pulses as an intercrop or mixed crop viz., short duration thermo-insensitive varieties of mungbean/ urdbean with spring sugarcane, pre-rabi chickpea with mustard/linseed, pigeonpea with groundnut/soybean/ millets, long duration paired row planted pigeonpea with *jowar/bajra*/ urdbean and soybean with pigeonpea/urdbean (in Central zone) offer further scope for additional production/income as well as nutritional security to farmers from the cultivated holdings. Some of these systems involving pulses are recommended for different states (Table 4).

Pulses cultivation being less resource intensive and easily fit into cropping systems, it could contribute adequately towards improving farm income of small-and marginal-farm households. Promotion of pulses, like chickpea, lentil and lathyrus in rice fallows in eastern and central regions of country could have immense potential in enhancing production/ availability of pulses in the country as well augmenting the economic returns for involved farm families.

Presently, chickpea alone shares about 45% of the total pulses production of the country followed by pigeonpea, mungbean, uradbean and other pulses. However, irrigated pulses comprising greengram, blackgram and field pea can largely compensate the projected yield gap. There is an ample scope of horizontal expansion of greengram and blackgram in Indo-Gangetic plains during spring/summer season as well in rice fallows of southern India. Recently developed short duration varieties of pulses enabled extensive cultivation of chickpea in central and south India, and summer mungbean in Rajasthan and western Uttar Pradesh. The geographical shift in pulses to Southern and Central India is an indication of their potentialities to adapt to diverse climatic conditions (favouring their production) thus enabling their future expansion in new niches. High production of pulses during last few years could also be made possible due to factors like availability of quality seeds and proven technological back up.

2.2 Cropping system intensification through short duration spring/summer pulse crop

Harnessing the short crop window of about two months or so in between major *rabi* and *kharif* crops in cropping sequence through inclusion of spring/summer mungbean / urdbean offers a viable opportunity for generation of additional income to the farmer. Growing these crops could intensify the existing system besides other benefits of reduction in the use of fertilizers for subsequent crops due to residual fertility, leaf fall and residue retention.

3. Market demand

Kabuli chickpea and *rajmash* are high value pulses that cater to a special market segment in domestic market. These could be explored by farmers for enhancing their income further. Large-scale promotion of kabuli chickpea in irrigated tracts of central India, and *rajmash* in higher elevations especially hills offers new opportunities for tapping the untapped potential of these commodities through demand in international markets.

Another un-reach destination is organic food production, and its market in India which is estimated to grow at 25 to 30%

although the awareness about it is still low. Organic pulse production in selected ecologies in India needs to be promoted for harnessing the demand of organic pulses in national as well as international markets for augmenting farm returns further.

4. Government Supporting the Farmers with MSP

Increase in minimum support price (MSP) and bonus on pulse production encouraging farmers for pulses cultivation. Giving a major boost for the farmer's income, the Cabinet Committee on Economic Affairs chaired by Prime Minister Shri Narendra Modi has approved the increase in the Minimum Support Prices (MSPs) for all *kharif* and *Rabi* crops for 2018-19 season. The Budget for 2018-19 had indicated that a paradigm shift in the agricultural policies is needed to achieve the objective of doubling farmers' income by 2022 through greater emphasis on generating higher incomes of farmers.

The Minimum Support Prices (MSPs) for all *kharif* and *Rabi* Legumes of 2018-19 season have been increased as table 5: The increase in the MSPs of Moong by Rs.1400 per quintal, arhar (tur) by Rs 225 per quintal, urad by Rs 200 per quintal, gram by Rs 4620 per quintal and for masur MSP is Rs 4475 per quintal. Promoting cultivation of pulses can help India to overcome nutrition insecurity, improve soil fertility by nitrogen fixation and provide income support to farmers. Thus, increased MSPs for pulses will give a price signal to farmers to increase acreage.

5. Post-harvest processing and Value-addition

Processing of pulses accounts for biggest share in the overall marketing cost. Encouraging processing of pulses at village level, with strong support from the stakeholders in terms of *in situ* processing technologies as well market intelligence for identification of appropriate markets to sale, would contribute in improving the farmers' share in actual consumer's price and its realization. In India, more than three-fourths of pulses produced are processed into *dhal*. Processing of pulses into *dhal* or other varieties of products adds higher value to the farmers. However, losses and wastage due to processing are estimated to be as high as 10 to 15%, reducing these losses with efficient processing units can add to additional returns to the pulse producers. Therefore, it is suggested to create community-based small-scale pulse efficient milling units especially at the village level which would not only lead to reduction in processing losses, but also in promoting off-farm employment as well as additional income to pulses growers.

For holistic development of agriculture sector it is essential to encourage forward and backward linkages in food processing sector. In order to reduce post-harvest losses and increase value addition, the Ministry of Food Processing industries has accorded approval to 42 Mega Food Parks and 236 Integrated Cold Chains for creation of modern infrastructure for food processing along the value chain from the farm to market.

6. Schemes of Government for irrigation facilities

Irrigation is considered as the leading input in boosting agricultural production and productivity but only less than half of gross cropped area is irrigated in the country. In order to increase area under assured irrigation, improve water use efficiency and promote sustainable conservation practices, Government of India has launched Pradhan Mantri Krishi Sinchai Yojana (PMKSY) with an outlay of Rs. 50000 crore for a period of five years (2015-16 to 2019-20). One of the main components of the PMKSY 'Har Khet Ko Pani' aims at creating new water sources through minor irrigation, repair,

restoration and renovation of water bodies and command area development. Under More Crop per Drop efficient water conveyance and precision water application devices like drip,

sprinkler, etc. are being promoted. For 2017-18, an outlay of ₹2500 crore has been made for micro-irrigation.

Table 1: Yield gap in different pulse crops

S.no.	Crop	Improved practice (kg/ha)	Farmers' practice (kg/ha)	Increase (%)
1.	Chickpea	1,435	1,129	32.2
2.	Pigeonpea	1,433	1,084	27.02
3.	Mungbean (kharif)	804	634	26.9
4.	Urdbean	955	702	36.17
5.	Lentil	1,047	816	28.37
6.	Field pea	1,394	1,101	26.63
7.	Rajmash	1,368	1,051	30.15

Source: FLD data 2007-2013, IIPR, Kanpur

Table 2: Extent of post-harvest losses in India

Commodity groups	Monetary losses (Production of 2012-13 and prices at 2014, in ₹ crore)	Major crops/segments in term of monetary losses for the given category
Cereals	20698	Paddy (50), wheat (38), other cereals (12)
Pulses	3877	Chickpea (63), pigeonpea (25), other pulses (12)
Oilseeds	8278	Soybean (65), mustard (18), other oilseeds (16)

Source: Jha *et al.* (2015) ^[11], Figures in parentheses indicate percentage to the category total.

Table 3: Trend of farmers' income in India (1993-94 to 2015-16)

Year	Total real farm income of all farmers (INR crores)	Real farm income per cultivator (INR)
1993-94	3,03,814	21,110
1999-00	3,72,923	26,875
2004-05	4,34,160	26,146
2011-12	6,32,514	43,258
2012-13	5,96,695	41,553
2013-14	6,02,922	42,760
2014-15	5,97,020	43,106
2015-16	5,98,764	44,027

(Source: Chand *et al.*, 2015) ^[4]

Table 4: Intercropping systems capable of large scale promotion and adoption

Intercropping systems	States
Soybean + pigeonpea/urdbean	Madhya Pradesh, Maharashtra
Pearl millet/sorghum + pigeonpea	Karnataka, Andhra Pradesh, Gujarat, Maharashtra
Groundnut + pigeonpea	Gujarat
Groundnut/sorghum/pearl millet + urd bean/ mung bean/ cowpea	Bihar, Maharashtra, Madhya Pradesh, Karnataka, Gujarat, Uttar Pradesh, Rajasthan
Sugarcane + cowpea/mungbean/urdbean	Uttar Pradesh, Maharashtra, Karnataka, Andhra Pradesh, Tamil Nadu
Cotton + urdbean/mungbean/cowpea	Punjab, Haryana, Madhya Pradesh, Gujarat, Andhra Pradesh, Maharashtra

Table 5: The Minimum Support Prices (MSPs) for all *kharif* and *Rabi* Legumes of 2018-19 season

Commodity	MSP For 2017-18 Season (Rs/quintal)	Approved MSP For 2018-19 Season (Rs/quintal)	Absolute Increase	Percentage Increase	Return over cost in percent
Arhar(Tur)	5450	5675	225	4.13	65.36
Moong	5575	6975	1400	25.11	50.00
Urad	5400	5600	200	3.70	62.89
Groundnut	4450	4890	440	9.89	50.00
Soyabean	3050	3399	349	11.44	50.01
Gram	4400	4620	220	5.0	75.2
Masur (Lentil)	4250	4475	225	5.3	76.7

Source: Ministry of Agriculture & Farmers Welfare, Government of India.

Conclusion

First of all it is important to know what is to be doubled. Is it the income of farmers, or the output or the income of the sector or the value added or GDP of agriculture sector? If the technology, input prices, wages and labour used could result in per unit cost savings then farmers' income would possibly rise at a faster rate than the output. In presence of newer and continuous challenges such as growing population with high demand for protein, shrinking agricultural land, unfavorable

climate change coupled with increasing incidence of biotic and abiotic stresses, pulse crops could contribute immensely towards doubling farmers income through effective efforts oriented towards diminishing cost of production through efficient input utilization, site specific management of agro-inputs and smoothing effect act as resource saving measures. Enhancing income of farmers with scaling productivity through quality seed/input availability. Possible horizontal expansion in pulses through acquiring new niches and

cropping system intensification can also significantly enhance the income level of farmers of targeted area. Reducing the cost of cultivation, scaling per unit productivity, efficient marketing networks and successful technology delivery mechanisms with due emphasis on sustainable intensification, post-harvest management, small-scale processing and value addition in pulses can contribute immensely towards doubling the farmers income.

The present Government has taken many new initiatives for increasing the farmers' income such as: i) "per drop, more crop", ii) availability of quality seeds, iii) soil test based nutrient management- distribution of soil health cards, iv) post-harvest crop losses- large investments in warehousing and cold chains, v) value addition by the farmers, vi) creation of a national agricultural market, by removing distortions and having e-markets to link farmers to market, vii) Pradhan Mantri Fasal Bima Yojana, viii) high priority to diversification towards high value activities – horticulture, dairying, food processing, poultry, sericulture, bee keeping and fisheries, etc. Effective coordination between centre and states is important in mainstreaming and channelizing policies and investment to achieve the target of doubling farmers' income.

References

1. Birthal PS, Joshi PK, Roy D, Thorat A. Diversification in Indian Agriculture towards High-Value Crops: The Role of Smallholders. IFPRI Discussion Paper 00727, International Food Policy Research Institute, Washington, D.C, 2007.
2. Birthal PS, Negi DS, Roy D. Enhancing Farmers' Income: Who to Target and How?, Policy Paper No.30, ICAR-National Institute of Agricultural Economics and Policy Research, New Delhi, 2017; xiv+38.
3. Chand R, Kumar P, Kumar S. Total Factor Productivity and Contribution of Research Investment to Agricultural Growth in India. Policy Paper 25. National Centre for Agricultural Economics and Policy Research, New Delhi, 2011.
4. Chand R, Saxena R, Rana S. Estimates and analysis of farm income in India: 1983-84 to 2011-12, Economic and Political Weekly, 2015; 22:139-145.
5. Chand, Ramesh. Doubling Farmers' Income: Rationale, Strategy, Prospects and Action Plan, NITI Policy Paper No. 1/2017, NITI AAYOG, Government of India, New Delhi, 2017, 34.
6. Evenson RE, Pray C, Rosegrant MW. Agricultural Research and Productivity Growth in India. Research Report No. 109. International Food Policy Research Institute, Washington, D.C, 1999
7. Fred EB, Baldwin IL, McCoy E. Root nodule bacteria and leguminous plants. University of Wisconsin Press, Madison, 1932.
8. GoI (Government of India) Agriculture Strategy for Eleventh Plan: Some Critical Issues. Planning Commission, New Delhi, 2007
9. Government of India Volatility in Onion Prices can be managed through Appropriate Mechanisms and Interventions. Press Information Bureau, New Delhi, 2015.
10. Government of India Ministry of Agriculture & Farmers Welfare, MSP report *kharif* and *rabi* 2018-19 Press Information Bureau, New Delhi, 2018
11. Jha SN, Vishwakarma RK, Ahmad T, Rai A, Dixit AK. Assessment of Quantitative Harvest and Post-Harvest

Losses of Major Crops and Commodity in India. ICAR—All-India Coordinated Research Project on Post-Harvest Technology, ICAR-CIPHET, Ludhiana, Punjab, 2015

12. Paroda RS. Strategy paper on "Indian Agriculture for Achieving Sustainable Development Goals". Trust for Advancement of Agricultural Sciences, New Delhi, 2017, 28.
13. Saxena R, Chand R. Understanding the Recurring Onion Price Crisis: Revelations from Production-Trade-Price Linkages. Policy Paper (Forthcoming) ICAR-National Institute of Agricultural Economics and Policy Research (NIAP), New Delhi, 2017.