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Research Review Articles

Issues, challenges and strategies for doubling the farmers' income in India – A review

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ABSTRACT

The Government of India in its annual budget 2016-17 set a policy target of doubling farmers' income by 2022. Agriculture sustains livelihood for more than half of the India's total population. Doubling farmers' income in such a short period is an overwhelming task for decision makers, scientists and policy makers. Doubling farmers' income is possible through increasing total output and better price realization in market, reduction in production costs, diversification of product, efficient post-harvest management, value addition, etc. In this paper, efforts have been made to detail issues, challenges and strategies to achieve the target of doubling farmer's income. Specific strategies suggested for achieving the target of doubling farmers' income were market management, agricultural input management, risk management and agricultural extension strategies.

Key words: Agricultural input management, Doubling farmers' income, Extension strategies, Market management, PPME model, Risk management

The agriculture and allied sector is irrefutably the potential harbinger of prosperity of rural India due to its high share in employment and livelihood establishment. Not only does it meet the food and nutritional requirements of 1. 3 billion Indians, but also 54. 6% of the population is engaged in agriculture and allied activities (Census 2011) and it contributes 17% to the country's Gross Value Added (Annual Report 2016-17, MoAFW). Further, Indian agricultural growth rate and the productivity remains low due to factors like declining of natural resource base, increasing fragmentation of holdings, frequent climatic variations, rising input costs and post-harvest losses. Declining farm productivity and income of farmers have serious implications on rural prosperity and overall growth of economy. The agrarian distress in recent years is the result of a complex interplay of these factors. These factors act as hindrance in the growth of Indian agriculture to achieve sustainable development. This agrarian distress cannot be tackled until and unless farmers' income increases substantially (Chand 2016a). So here, more important question that arise is what about the welfare of the farmers? Government of India is aiming to double the farmers' income by 2022 when the country completes 75 years of its independence. Finance Minister in 2016-17 budget proposed "doubling farmers' income in five years" as one of nine distinct pillars aiming farmers' welfare.

Now, Question is whether it is real or nominal income that the government is aiming to increase? After the announcement of proposal, experts have different views on doubling the income of farmers by 2022. Dr M S Swaminathan (2016) argued that the net income of farmers' can be doubled because of the prevailing large gap between potential and actual yield per ha and income. Chand (2016b) and Satyasai and Bharti (2016) claimed that doubling of farmers' income is possible through increasing total output and better price realization in market, reduction in production costs, diversification of product and efficient post-harvest management and value addition etc. The goal of doubling farmers' income by 2022 is impossible and unrealistic as doubling of real incomes in six years would be a miracle of miracles, as it would imply a compound growth rate of 12% per annum (Gulati 2016). Waghmare (2016) reported that due to rising input cost, irrelevance minimum support price and absence of market infrastructure farmers' income will double only nominally and real income in 2022 after inflation adjustment will be close to 2016. There were no signs of doubling farmers' income in the next five years as it requires 12% annual growth in incomes; which is unprecedented globally (Sharma 2016, Desai 2016 and Jakhar 2016).

Trends and dynamics in farmers' income

About 85% of India's agricultural sector is dominated

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by marginal and small farm holdings. The average size of operational holdings was 1.84 ha in 1980-81, which declined to 1.41 ha in 1995-96, and then to 1.16 ha in 2010-11 (Agricultural Census 2011). Indian agricultural sector doesn't have exact data sources that can give clear cut information about the income of farmers from all sources through different time series basis.

Different component wise income result showed that the average annual farm household income is highest from cultivation which was ₹ 36972 in 2012-13. Income from wages and salary is the second highest source with the average earning of farm households ₹ 24852. Besides, the income from livestock has grown at a high compound annual growth rate (23.69%) during the period from 2002-03 to 2012-13. Average total annual income per farm holding has increased from ₹ 25380 in 2002-03 to ₹ 77112 during 2012-13. This indicates compound annual growth rate of 11.75% in nominal terms and this growth rate will take 6.24 years for doubling farm income. But, when we calculate the real compound annual growth rate during period from 2002-03 to 2012-13, it was 5.24% and it will take 13.57 years for doubling farm income.

Specific strategies for doubling farmers' income

Market management: In India, farmers are facing severe problems related to agricultural marketing. Farmers' are not fetching remunerative price for their produce in the states in which no procurement is done by the public agencies at the minimum support price (MSP), farmers' lack the guarantee offered by the MSP (NITI Aayog 2015). Small scale farmers do not get the benefits of updated information on market knowledge like fluctuations, demand and supply concepts which are the core of economy (Rajendran and Karthikesan 2014). In developing countries like India, agricultural markets comprise of poor infrastructure, poor transport and communication, limited rule of law, limited access to finance, etc. and ultimately this leads to market failure (Shakeel *et al.* 2012). According to Reardon *et al.* (2011), small farmers should be assured of a fair price for their produce, failing which they may lose the incentive to increase agricultural production. So, there is a need of improvement in marketing system structure by making it an integral part of policy and strategy level framework for agricultural development. Bihari *et al.* (2018) suggested that successful and sustainable localized marketing mechanism should be promoted in remote areas to enhance the farmers' income.

Agricultural price policy: In India farmers are facing volatility in price of agricultural produce. Price uncertainty needs to be given due priority. There are 24 commodities for which minimum support prices (MSPs) are announced by the Government of India. It is a form of market intervention by the Government of India to ensure agricultural producers against any sharp fall in farm prices. MSP helps to incentivize the farmers' and thus ensures adequate food grains production in the country. So, for doubling farmers' income, it is essential that more number of agricultural products should be brought under this price policy.

National Agriculture Market (e-NAM): NAM is a "virtual" market with a physical market (*mandi*) at the back end. NAM creates a unified market through online trading platform both, at State and National level and promotes uniformity. The NAM portal provides a single window service for all APMC (Agricultural Produce Marketing Committee) related information and services. Currently, APMC regulated market yards limit the scope of trading in agricultural commodities at the first point of sale (i. e. when farmers offer produce after the harvest) in the local *mandi,* typically at the level of *Taluka/Tahsil* or at best the district. Even one state does not have a unified agricultural market and there are transaction costs on moving produce from one market area to another within the same State. Multiple licenses are necessary to trade in different market areas in same state. All this has led to a highly fragmented and high-cost agricultural economy, which prevents seamless movement of agri goods across district and state borders.

Amendment of the APMC Act: Under this regulation, no exporter or processor could buy directly from farmers. It discouraged processing and exporting of agricultural products. Also under this act, the state Government could only set up markets, thus preventing private players from setting up markets and investing in marketing infrastructure. The fragmentation of markets within the State hinders the free flow of agro-commodities from one market area to another and multiple handling of agri-produce and multiple levels of *mandi* charges end up escalating the prices for the consumers without commensurate benefit to the farmer. So, there is a need to revise APMC act by all the respective states to encourage competitive marketing environment and participation in NAM.

Contract farming: There is a need to encourage the states for contract farming under which the buyer can provide the farmer access to modern technology, quality inputs, other support and a guaranteed price. It had been given much importance in the model APMC Act, 2003. A good experiment of contract farming is being practised in Punjab by tomato growers tied up with Pepsico food processing company.

Farmer Producer Organization: Most of the farmers in India have small and marginal holdings. This affects scale economies which are an important factor in the marketing of agricultural produce. Only uneconomical sizes may raise transportation and other related costs. So, through this, cooperative farmers' can enhance their bargaining power and fetch good price of agricultural produce.

Establishment of terminal market: Terminal Market is a central site (often in a metropolitan area) that serves as an assembly and trading place for commodities. The main purpose of a terminal market is to link the farmers to the markets by shortening the supply chain of perishables and enhance their efficiency, and thus, increase farmers' income and bring transparency in the market transactions and price fixation for agricultural produce and through provision of backward linkages to enable the farmers to realise higher

price and thus higher income to the farmers.

Post-harvest management: Alexandratos and Bruinsma (2012) reported that food supplies would need to increase by 60% in order to meet the food demand in 2050. While the number of food insecure population remains unacceptably high each year, worldwide massive quantities of food are lost due to spoilage and infestations on the journey to consumers (FAO 2011, Stuart 2009). India is self-sufficient in food production but post-harvest losses are around 20-30% and only 2-3% agricultural commodities are processed (Nanda *et al.* 2012). By reducing post-harvest losses, we can substantially increase the income of farmers.

Direct marketing: Marketing food products directly to consumers is a viable option to add value in a farming produce. It also helps in reducing the role of middle men in the marketing chain and thus improving the income of farmers. Some of successful initiatives such as *Apni Mandi* in Punjab, *Uzhavar Sandai* in Tamil Nadu, *Rythu* Markets in Andhra Pradesh, VFPCK (Vegetable and Fruits Promotion Council, Kerala) in Kerala,etc. need to be encouraged with suitable modifications, and must be replicated across the country.

Agricultural input management

Availability of improved quality seed: Quality seed is defined as the seed which is varietally pure with a high germination percentage, free from disease and disease causing organisms, and has a proper moisture content and weight (Santos 2007). Quality seed plays an important role in maximizing the production and productivity of field crops. It results in the better germination, vigorous seedling growth, better quality of produce and higher crop yield (Verma *et al.* 2007, Singh *et al.* 2011). So, there is an urgent need of availability and accessibility of improved quality seeds to the farmers on the right time at their door steps.

Soil test based nutrient management: After green revolution, Indian agriculture has seen a stagnating or declining agricultural productivity, in spite of increased fertilizer use over the years. This declining factor productivity is largely due to imbalanced fertilizer use (Kumar *et al.* 2007). This problem can be overcome by judicious use of nutrients at the farm level by the farmers. Soil health card scheme is a good initiative taken by Government of India. The Soil health card helps the farmers get an idea about accurate amount of nutrients for the soil from the experts. It will also help to maintain soil health and crop wise requirements of nutrient and fertilizers. In this way, it will help achieve optimum crop yield by the farmers.

Water management: Sustainable development and efficient management of water is an increasingly complex challenge in India. To achieve sustainable management of water sources integrated water use policy is essential in agriculture sector. Drip and sprinkler irrigation system is crucial in agricultural sector for increasing water use efficiency. In rainfed areas, Participatory Watershed Development Programmes should be introduced so that resource-poor farmers can harness benefit of irrigation and this will help increase the yield.

Risk management: Presently, Indian agricultural sector is facing plethora of risks, ranging from climate change, frequent natural disasters, uncertainties in yield of crops and market prices, poor market infrastructure, poor storage facilities and non-availability of timely credit facilities to the small and marginal farmers. All of the above said factors are directly responsible for threatening livelihood of farmers and also undermine the viability of the farming sector as a business. So, there is a need of suitable risk mitigation mechanism to address all of the above challenges.

Climate smart agriculture: The effect of climate change is real and there is an urgent need to develop a climate smart agriculture. According to IPCC (2007), increase in average temperature will adversely affect crops, especially in semi-arid regions, where already heat is a restrictive factor for production. Similarly, accumulated increase in minimum temperatures increases maintenance respiration requirement of the crops, and thus, further reduces net growth and productivity (Aggarwal 2003). Climate-smart agriculture (CSA) helps transform and reorient agricultural systems to effectively support development and ensure food security in a changing climate along with sustainable increase of agricultural productivity and incomes.

Integrated farming system: Integration of various agricultural enterprises, viz. cropping, animal husbandry, fishery, forestry etc. has great potential in the agricultural economy. The IFS approach stabilizes income through natural resource management and livelihood diversification. It will also help in increasing the family labour employment. It involves use of outputs of one enterprise component as inputs for other related enterprises wherever feasible, for example, cattle dung mixed with crop residues and farm waste can be converted in to nutrient-rich vermi-compost.

Crop insurance: In India, agriculture sector is frequently subjected to high variability of production risk. These risks are climatic vagaries, viz. drought, floods, cyclones and large scale losses caused by pests and disease attacks on crops. Farmers suffer due to adverse climatic events during harvesting or threshing of crops resulting in considerable yield losses. So under all these circumstances crop insurance is a good measure to protect farmers, against the uncertainties of crop production, due to natural factors beyond farmer's control. Presently, Pradhan Mantri Fasal Bima Yojaga (PMFBY) scheme is a good initiative which covers yield losses, post-harvest losses and localized calamities due to weather.

Diversification of agriculture: Agricultural diversification involves movement of resources from low value commodity mix to high value commodity mix. It focuses mainly on horticulture, dairy, poultry and fisheries sector. Small and marginal holdings account for around 80% of the total operational holdings in the country. Diversification towards high value cash crops will help in improving the income of farmers by enhancing resource use efficiency.

Enhancing income by improving yield of crops: Crop yield is a crucial part of farming and it helps the farmers

to know profitability of their business. Adoption of latest technologies and improved varieties of crops has potential to increase crop yield. By enhancing crop yield in a sustainable way we can improve income of farmers.

Increase in agricultural productivity: Agricultural productivity is the degree to which the economic, cultural, technical and organizational variables are able to exploit the biotic resources of the area for agricultural production (Singh 1972). To meet the increasing demand for food, increased production per unit area is an essential step. Globally, India lags behind in productivity of crops and it is of utmost importance that the productivity per ha is raised urgently to pull out farmers from poverty. Adoption of soil health card, superior cultivars, latest technology and better access to irrigation will improve the production and productivity.

Increase in cropping intensity: According to Kalaiselvi and Sundar (2011), there are only two ways to satisfy the increasing food and other agricultural demands of the country's rising population: either expanding the net area under cultivation or intensifying cropping over the existing area. The farmers must be encouraged to grow multiple crops during all the cropping seasons and cultivate the agricultural land available. Farmers should be encouraged to use more of innovative cropping system technique, viz. inter-cropping, multi-storey cropping, border cropping for increasing their farm cropping intensity as these systems of crops enable intensive use of farm land and farmers time without risk of competition between crops for use of resources.

Bridging yield gap: Several yields and related yield gaps are possible for a given crop in different varietal, environmental and management circumstances (Evenson *et al.* 1996). In India, yield gap is very high as compared to other countries yield in different crops ranging up to 60% (Mondal 2011). Extension agencies need to develop and disseminate location specific package of practices of different crops and need to ensure adequate quality and timely availability of inputs.

Use of biotechnology for enhancing yield: The introduction of Genetically Modified (GM) traits through biotechnology has led to increased yields independent of crop breeding. GM traits, such as insect and herbicide tolerance, help to increase yields by protecting the yield that would otherwise be lost due to insects or weeds. In India, insect resistant cotton (Bt cotton) has led to 24% increase in cotton yield through reduced pest damage and a 50% gain in cotton profit among smallholders (Kathage and Qaim 2012). In same way, we can harness the potential of biotechnology for other crops in Indian agriculture for enhancing farmers'profitability.

Specific agricultural extension strategy for yield improvement

Use of ICT in agriculture: Agriculture is facing new and severe challenges in its own right. With rising food prices that have pushed over 40 million people into poverty since 2010, which needs more effective interventions are essential in agriculture (World Bank 2008). To satisfy the needs of 9. 2 billion people in 2050, overall food production will have to increase by about 70 percent and production in the developing countries will virtually need to double (FAO 2011). Given the challenges, the arrival of information and communication technology (ICT) in agriculture is well timed. ICTs can directly support farmer's access to timely and relevant information, as well as empower the farming community through creation and sharing of knowledge. Access to ICT can have a tremendous positive impact on sustainable development and poverty reduction (Torero and Braun 2006). ICT plays an important role in adoption of technologies that are in an early stage of adoption like no tillage and the GM technology revolution (Fischer *et al.* 2009). ICT can also provide critical micro-climate, weather information in order to plan farming operations and it also plays a major role in price discovery. So, promotion of ICT in agriculture will be a catalyst in doubling the income of farmers.

Public private partnership in agriculture: Insufficient human and financial resources, bureaucratic nature of extension workers and huge load of administrative responsibilities on field level workers have rendered the public extension services as supply driven rather than demand driven (Sulaiman 2005). According to Ragasa *et al.* (2013), the extension worker to farmer ratio is very wide in India, i. e. 1:5000 (estimated 60 thousand extension workers) which is far wider than Ethiopia (1:476) and China (1:625). In order to double farmers' income in five years, there is a need to create public private partnership in agriculture. The rationale behind the partnership approach to development is that multi-faceted problems require more proficiency and assets than can be provided by a single sector (World Bank 1999).

Promotion of farmers' organization: Farmers' Organizations (FOs) are essential institutions for empowerment, poverty alleviation and advancement of farmers and the rural poor population (Marsh 2003). Individual small farmers are weak players in the market. By organizing into larger groups and FOs, they can increase their bargaining power, reduce their transaction costs for accessing inputs and transportation, facilitate processing and marketing of agricultural products, thereby enhancing their earnings (Birchall 2004). So, there is a need to involve FOs in the planning, designing and implementation of agricultural and rural development policies for enhancing the income of small and marginal farmers.

Agripreneurship development: For establishment of agri-enterprise, support system and capacity building initiatives are required to facilitate the transformation of farmers from agriculture to agripreneurship. Extension functionaries should create awareness among farmers about post-harvest management, value addition and effective marketing. Also extension functionaries should sensitize farmers about off-farm and non-farm income generating activities, so that farmers can earn additional income. Agricultural extension education and training should be given to the farmers for inculcating technical, managerial,

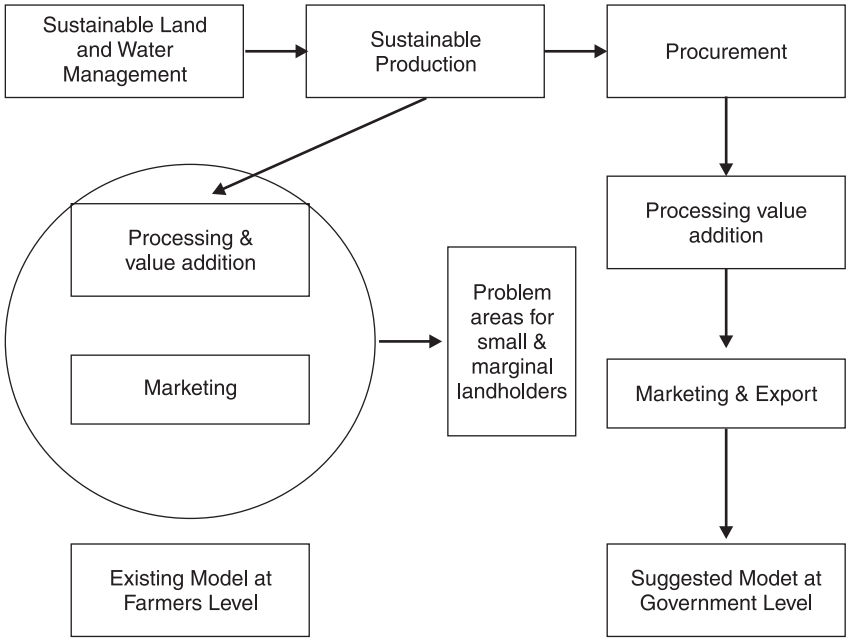

Fig 1 Flow diagram of Existing PPM Model at Farmers level and recommended PPME Model at Government level for doubling farmers' income.

entrepreneurial and interpersonal skills for management of agriculture sector in a profitable way.

PPME Model for doubling farmers' income at small and marginal landholders level

While developing strategies for doubling farmers' income through individual efforts at small and marginal landholders level, socio-psychological issues should also be taken care off. In agriculture, production oriented thinking rarely matches the business oriented thinking. Thus, there is a dire need to modify the present model of Production, Processing and Marketing (PPM) at farmer's level to the Procurement, Processing, Marketing and Export (PPME) model (Fig 1) at the Government level, where government agencies should be given responsibility of procuring the farm produce and making the business out of it. By doing so, farmers will get good prices without much hassle and will be motivated to grow more quality produce for gaining higher prices and income enhancement.

Existing model at the farmers' level has not been able to create significant impact on the farmers' income, rather it has been impacting negatively as the farmers have been either burning the standing crops in the field itself or have been throwing the farm produce on the road to protest the low market price that does not even meet out the input cost. This scenario makes the farmers' condition even more tragic. To avoid such situations model suggested should be adopted at government level.

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