



ISSN (E): 2277- 7695
ISSN (P): 2349-8242
NAAS Rating: 5.23
TPI 2021; SP-10(6): 430-436
© 2021 TPI
www.thepharmajournal.com
Received: 10-04-2021
Accepted: 12-05-2021

Ashok Kumar B
Assistant Professor, Department
of Agricultural Extension, MS
Swaminathan School of
Agriculture, Centurion
University of Technology and
Management, Paralakhemundi,
Odisha, India

Akkamaha Devi Naik
Assistant Professor, Department
of Agricultural Extension, MS
Swaminathan School of
Agriculture, Centurion
University of Technology and
Management, Paralakhemundi,
Odisha, India

Corresponding Author:
Ashok Kumar B
Assistant Professor, Department
of Agricultural Extension, MS
Swaminathan School of
Agriculture, Centurion
University of Technology and
Management, Paralakhemundi,
Odisha, India

Strategies for doubling farmers' income

Ashok Kumar B and Akkamah Devi Naik

Abstract

In India past many strategies for development of the agriculture has focused primarily on improving food security and raising output of agricultural. This strategy involves (a) an increase in productivity through improved technology and varieties and increases use of good quality seed, fertiliser, agro-chemicals and irrigation (b) incentive structure in the form of remunerative price for some crops and subsidies on farm input (c) public investments in and for agriculture and (d) facilitating institutions. The national policies with region specific recommendations are very much needed to achieve the income equality across the space and also across different social groups and class of farmers. Small and marginal farmers forms major part of the agricultural families in the country, hence there is a need to leverage the animal husbandry component in their farm business in order make their standard of living on par with rest of farming community. Post-harvest losses need to be reduced by creating the infrastructure accessible to all farmers and also by exploring the possibility of values addition in every crop. As the input cost forms major portion of cost of cultivation there is a need for reducing the external inputs without halting the production levels. In dry land areas water management interventions need to be given emphasis. Remunerative price through established markets for all major crops need to be assured across all the states. Measures should focus on increasing the real income of the farmers not the nominal income. Doubling the farmers' income is quite challenging but it is needed and is attainable, three prolonged strategies focused on Development Initiatives, Technology and Policy Reforms in agriculture is need to double farmers income. ICAR and SAUs should develop different models of farming system for different type of socio-economic and resource poor farmers.

Keywords: farmers' income, remunerative price, post-harvest, institutions, technology

Introduction

The country like India has seen food grain production growth from 51 million tonnes during 1947-48 to 291.95 million tonnes during 2019-20. Also similar development has been achieved in different section like oilseeds, sugarcane, cotton, fruits, vegetables and other crops. Many times we attribute this achievement to research and development during green revolution, fertilizers and pesticides, irrigation infrastructure, increase in cultivable area, political parties in ruling and few individuals. In India farmer is the pillar of the economy, more than 50 per cent of work force is engaged in agriculture and the share of agriculture in GDP increased to 19.9 per cent in 2020-21 from 17.8 per cent in 2019-20 (NSSO report). Every employee of organized sector will receive his higher wages on due date of wage revision or with arrears if not settled in time. Along with basic salary so many emoluments. But a farmer, who works restless with no wage hikes, with no additional benefits and with no leaves has no assured income since, he plays under risky situation i.e. either high monsoon or poor monsoon along with price crash during bumper crop season. So there is a need to identify and implement the region specific strategies for achieving multiple goals like doubling the farm income, reducing the risk and stabilizing the income in order to make farmers standard of living on par with rest of the economy.

Doubling farmers income has been a buzz word after the Prime Minister Narendra Modi stated that "it is his dream to see farmers double their income by 2022, when the country completes 75 years of its independence" while addressing a farmers rally in Bareilly, UP, on February 28, 2015. Swaminathan and Chand among others argued that the goal is realizable provided, the policy view is changed from patchy to sporadic. Total annual income of a farm household comprises of income from cultivation, livestock, wages, salary and nonfarm business (Chand 2016) ^[11]. Past strategies for development of the agriculture section in India has focused primarily on improving food security and raising agricultural output. This strategy involves (a) an increase in productivity through improved technology and varieties and increases use of quality seed, fertiliser, irrigation and agro-chemicals (b) incentive structure in the form of

remunerative price for some crops and subsidies on farm input (c) public investments in and for agriculture and (d) facilitating institutions.

Key findings (Acc. to NSSO)

The 45% increase in per person food production from last 50 years, Food production & population multiplied by 3.7 & 2.55 times in India, this made India food self-sufficient at aggregate level and also a net food exporting country.

Objectives of the study

1. To know the concept and views of doubling farmers' income
2. To understand the strategies for improving farmers' income
3. To review the case study and success story related to doubling farmers' income

Concept and views of doubling farmers' income

Farm income

It is a profits and losses in terms of money which incurred through the operation of a farm. A farm income (sometimes called a farm profit and loss statement) is a summary of income and expenses that occurred during a specified accounting period from all sources. The Indian Prime Minister Narendra Modi stated that "it is his dream to see farmers double their income by 2022, when the country completes 75 years of its independence".

The concept of doubling farmers' income

Current annual growth rate is 2% and annual growth rate of 10.40% required.

Doubling farmers' income-views

Indian agriculture will require annual growth of 14.86 per cent per year for five years to get farmers income doubled and pointed that this rate of growth has not been achieved not even once in the history (Ramesh Chand, 2016) ^[11]. "It 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 cent per annum" (Gulati, 2016) ^[4, 8]. "There is ambiguity on the number the centre is targeting i.e. which farm income needs to be doubled- Real or Nominal?" (Nirmala, 2017). "In my view, the net income of farmers can be doubled because of the prevailing large gap between potential and actual yield per hectare and income" (MS Swaminathan, 2016). "The goal is realizable provided the policy view is changed from patchy to sporadic" (Chand, 2016) ^[11].

Past trend in farmers income

The study shown that income from agriculture was not adequate to keep as many as 53 per cent from house hold out of poverty, who operated on less than 0.63 hectare of land holdings (NSSO 2005 and 2015).

Strategies for improving farmers' income (Ramesh Chand, 2017) ^[12]

1. Development initiatives

Some recent development initiatives of central government aiming to raise output and reduce cost and new programme and scheme helps farmers to maximize their farm income. The following are the initiatives.

A. Pradhan Mantri Krishi Sinchai Yojana (PMKSY)

Government of India is committed to give high priority irrigation sector for water conservation and its management. The vision of PMKSY is to extend the coverage of irrigation 'Har khet ko pani' and improving water use efficiency 'More crop per drop' in a focused manner specially for end to end solution on creation of source, distribution, management of field and irrigation, field application and extension activities. The vision of PMKSY is *Har khet ko pani, Jal sanchaya, Jal sinchan*.

The main Strategy of PMKSY is to increase gross irrigated area, bridging gap between irrigation potential & utilisation, water distribution network and enhance water use efficiency & management. The outcome of PMKSY is more crop per drop, enhanced farm productivity and rural prosperity.

B. Paramparagat Krishi Vikas Yojana

It is one of the elaborated components of Soil Health Management (SHM) of major project National Mission of Sustainable Agriculture (NMSA). Under PKVY Organic farming is focused and promoted through adoption of organic village by cluster approach and PGS (Participatory Guarantee System) certification. This scheme was initiated for implementation in the year 2015-16. The groups of farmers would be motivated to take up organic farming under this scheme (PKVY). The Scheme is to promotion of organic growers or production through PGS. Pesticide residue free Produce and will contribute to improved health of the consumer. Increased income of Farmers' and create potential market for traders. Motivating the farmers for natural resource mobilization for input production. It will help in building long-term trust with farming community.

C. Soil Health Card Scheme

It is a scheme launched by the Government of India in 2015. Under the scheme, the government plans to issue soil health cards to farmers which will carry crop-wise recommendations of nutrients and fertilisers required for the individual farms to help farmers to improve productivity through judicious use of inputs. All soil samples are to be tested in various soil testing labs across the country. Thereafter the experts will analyse the strength and weaknesses (micro-nutrients deficiency) of different soil and suggest measures to overcome from any micro nutrient deficiencies. The result and suggestion will be displayed in the cards. It is field-specific detailed report of soil fertility status and other important soil parameters that affect crop productivity. It provides customised crop specific recommendations for nutrient application.

D. Pradhan Mantri Fasal Bhima Yojana (PMFBY)

The new Crop Insurance Scheme is in line with *One Nation - One Scheme theme*. It incorporates and added the best features of all earlier schemes and at the same time, all previous shortcomings/weaknesses have been eliminated/removed. The PMFBY replaced the existing 2 schemes National Agricultural Insurance Scheme as well as the Modified NAIS. Objectives of this scheme is to provide coverage of insurance and financial support to the farmers, to stabilise the income of farmers to ensure their continuance in farming, to encourage farmers to adopt innovative and modern agricultural practices and to ensure flow of credit to the agriculture sector. Maximum farmers paying insurance fee and if any hazard happened to crop than claiming for any crop loss and getting benefited by government. In this scheme there will be 2% of

premium to be paid by farmers for Kharif crops and 1.5% for Rabi crops. For horticultural crops and commercial crops, 5% of premium to be paid by farmers. The premium rate is very low and remaining premium will be paid by the Government, this will help to provide full insured money (amount) to the farmers against crop loss which is happened by any natural calamities.

E. Suvarna Krishi Grama Yojana or Golden Agriculture Village Scheme

A new scheme has been launched by the state Government of Karnataka with an aim to increase the income of farmers' by 20% in one year. The scheme has been launched along with International Crops Research Institute for the Semi-Arid Tropics (ICRISAT). In this scheme State government will cover a total of 1000 village and bring science-led development to farmer's doorstep with technical support from premier institutions such as ICRISAT and state universities. In this scheme, short term loans up to Rs. 3 lakh at zero percent interest and long term loans of up to Rs. 10 lakh at interest rate of just 3% providing to farmers.

2. Technology and innovations

Sustainable growth in productivity and farmers requires a paradigm shift from input intensive technology. New technology and innovation increase crop productivity and production of livestock, diversification towards high value crops, improved price realization by farmers and shift of cultivators to non-farm jobs. Genetically modified crop, precision farming, organic farming, modern machinery like laser land leveller, precision seeder and planter and SRI, directed seeded rice, zero tillage, raised bed plantation and ridge plantation these all place important role to increase the yield and income of the farmers.

3. Policies

Central government brought a series of reforms in the agriculture sector to overcome from many problems facing by farmers in farming. Opening up agriculture and removal of various restrictions on marketing, land lease and rising of forest species on farm land. Economic policy and economic wide reforms in 1991. Coordination and involvement of states and Reform of APMC act. These all changes will help farmers in sustainable development.

4. Institutions

Collective action of farmers working through organised institutions and allied sector institution. Till June 2016 SFAC has promoted 510 FPOs with membership of 5.17 lakh farmers in 28 states of country. Some state governments and NABARD are also promoting FPOs. However the their number of FPOs and their network very small so it needs to be expanded to enable farmer to reduce transaction cost, access technology raise bargaining power and integrate with value chain.

5. Production centric

There need to raise output through concerted efforts on increasing productivity, input management, resource conservation. Major contributors: i) Pradhan Mantri Krishi Sinchai Yojana, ii) Soil health card, Neem coated urea and iii) Pramparagat Krishi Vikas Yojana etc. Focus on Zonal Planning in bigger states like UP-Regional crop plans essential as per the resource and demand situation. Promoting

regionally important and suitable commodities like horticulture and integrated farming systems. Investment and subsidies in few technologies like poly-houses may help multiply the returns-need for risk mitigation: insurance against crop and income loss, Pradhan Mantri Fasal Bima Yojana, Climate Smart Agriculture and role of ICAR and SAUs crucial.

6. Post-harvest management centric

Need for suitable strategies for reducing post-harvest management to reduce crop losses, maintain the cold storage facility, required value addition and processing for different crop at different place for higher income. States like MP (Madhya Pradesh) established processing units in the major producing area/clusters.

7. Marketing related

Essential to ensure whether the increased production is converted to money which need for integrated and value chain approach. New scheme *e-NAM* would prove to be game changer which provide estimation of regional, national and international demand to avoid the situation preventing the situation of price. There is need for stable commodity trade policies should be farmers friendly.

8. Non-farm and other concerns

The creating suitable and other concerns in case of irrigation, requirement of capital is huge. Rural infrastructure need for attracting private investment. Agro-tourism can be a lucrative off-farm activity to go for diversification of fruits, vegetables and flowers mainly because of the price risk and uneconomic lot for marketing. There is need for separate plans for small farmers in to terms of bargaining power in various different transactions in the input and output market. FPOs have shown very expressive benefits to all kinds of farmers especially small farmers, women, tribal farmers, youths, even in remote and disadvantaged areas.

9. Prime minister's seven point strategy for doubling farmers' income by 2022

1. Focus on irrigation with per drop-more crop
2. Quality seed and soil health
3. Investment in warehousing and cold chains
4. Value addition through food processing
5. Creation of a national farm market
6. New revolutionary crop insurance scheme to mitigate risks at affordable cost
7. Promotion of ancillary activities like poultry, beekeeping, fisheries etc.

A total of 40 recommendations for increasing incomes of farmers

Increasing incomes by improving productivity

1. Biotechnology is set to play critical role in different crops and livestock production by enhancing yields, nutritional status, stress tolerance and crop protection. India must have a clear vision of the GM crops. The policy support accordingly is provided for the development of seed and biotech industry in the country. There are 2 sources to increase in agricultural output *viz.* area and productivity. Enhancing access to irrigation and technological advancement are the most potent instrument to raise agriculture productivity and production in the country.
2. Improving agricultural productivity/yield in rainfed

regions/area of India which constitutes more than 50% of the country's arable land. Besides watershed management, constructing check dams, irrigation canals and farm ponds should be taken up for providing lifesaving irrigation for the crops.

3. Bridging yield gaps among the different states. It is important in improving national productivity i.e. the gap in rice yields almost three (3) times between Punjab state and Chhattisgarh state. There is urgent need for develop a strategy document for assessing the present trends of crop productivity vis-a-vis the potential yield of major crop systems, so that some specific action plans should be taken up for bridging the yield gaps, which will contribute to enhanced productivity/yield of farming systems. Increased Budget on Farmers Exposure Visits and Training Scheme of MoA. This is a powerful scheme towards helping farmer bridge the yield gap.

Water and inputs (Water and Agri-input policies)

1. Fertilizer subsidy and rationalizing the NPK pricing for maintaining NPK ratio in the soil and improved application technology to improve efficiency and reduce fertilizer subsidy by Rs. 25,000 – 30,000 crores annually. Policy on promoting crop specific speciality fertilisers and fertigation, besides setting standards and regulating bio-fertilisers under Soil Health Mission is needed.
2. In India crop losses are huge and estimates range from Rs. 90,000 to Rs. 1.50 lac crores annually. To protect crops from pests and diseases, pesticides play an important role in crop productivity, quality improvement and cost reduction. In market the Government needs to check flood of spurious pesticides by regulating registrations, strengthening quality enforcement and tackling corruption.
3. Farm mechanisation in India has been a story of tractorisation. Time has come to promoting efficient tools and equipment's and small engine driven tractors to address small farm requirements. Through a mix of specialised CHCs and with State Agros, Cooperatives and input dealers. High focus should be given to Custom hiring facility in farm mechanization. Through MANAGE network of AC & ABCs, Custom Hiring Centres (CHCs) can be promoted effectively by enhanced incentivisation and by giving provision to hire agribusiness consulting companies by MANAGE/States for promoting Custom Hiring Centres (CHCs) among ACABCs.
4. There is a need for integrated water use policy. India should critically examine several on-going initiatives/programme and develop its country-wide system for judicious and integrated use and water management. A commission on efficient water use in farming should be established to assess the issues, regulatory concerns, water laws and legislations, research, technology development and community involvement. This will help resource-poor farmers in the rainfed ecosystems.
5. Farmers however need to be educated on water usage systems. The most important part is the crops planning, which needs to be done keeping water resources of a region and the water intake by various crops in mind. For example high water consuming crops like sugarcane and paddy should be grown in high rainfall areas.

Integrated farming system

1. Promotion of integrated farming system approach involving synergic blending of agriculture crops, horticulture, dairy, poultry, fisheries, etc. by integrated approach farmer can increase their income.
2. Dairy husbandry is a boon for small farmers, as a family with 3 cows or buffaloes can earn an annual income of more than Rs. 50,000, while conserving native breeds. With stall-fed, high yielding animals, the dung availability will increase and gives a boost to biogas and agricultural production and productivity. With introduction of improved goat husbandry practices by appointing local youth to facilitate the activities as Field Guides, 35 million goat keepers in the country who are living below the poverty line, can enhance their income by four folds from Rs. 8000 to 35,000 per annum (BAIF's experience in Jharkhand, Odisha and Rajasthan).
3. Promotion of intensive vegetable production using improved or new good varieties, organic manure and drip irrigation, can provide 5 times higher income annually, to the tune of more than Rs. 2 lakhs per acre (BAIF's experience in Andhra Pradesh, Karnataka and Maharashtra).

Better market price realization

1. Revision of the APMC (Agricultural Produce Market Committee) act and monitoring its implementation in the states. Need to amend APMC act by all the states to encourage competitive marketing environment and participation in NAM (National Agriculture Market). Direct marketing and contract farming should be made easy for the all farmers. Also to encourage the different States for contract farming under which the buyer can provide the farmer access to new or modern technology, quality inputs, other support and a guaranteed price.
2. The launch of NAM (National Agriculture Market) requires easing of norms of licensing to enable seamless participation of buyers from across the country, movements of agriculture produce without restriction, harmonization of tax laws (including a uniform GST), standardization of grades and recognition of electronic trades.
3. Reforms to the APMC (Agricultural Produce Market Committee) acts to permit pan-India trades, electronic auctions and trading in warehousing receipts. Enactment of policies that enforces the standardization of agricultural produce such that graded product would have a form of a label or logo mandatorily attached to it to signify that the product meets all the standardization and grading requirement for packing, sealing etc., and "Certificate of Authorization" given only those traders who are willing to follow the regulation.
4. Agriculture infrastructure, storage systems and market yards needs to be strengthened. More multipurpose market yard complexes, comprised of godowns, cold storage, service centre etc. needs to be set up for farmers to directly participate, especially online in NAM (National Agriculture Market). All farmers need to be educated on the available initiatives/scheme of the Government.
5. Reducing post-harvest losses by strengthening storage infrastructure, cool chain systems for perishable crops, post-harvest processing and value addition, transport, marketing, commerce and trade. FPOs can play an

important role, provided they are provided proper training. FDI policy in food sector need to be relooked and allowed with more research inputs available now on its benefits.

Special measures (Special policy measures)

1. Structural reforms in agriculture related to land lease and market restrictions need to be addressed. The market regulation on movement and procurements by private sector is hampering market growth and prices realization by farmers. Similarly due to land leasing policies of State Governments the concept of contract farming is not successful. The experiments of contract farming are based on "win all", bringing value to all partners in operations. This needs to be encouraged on a large scale.
2. Through a nationwide crops competitiveness study, states' profiling of crops and animal resources should be done, indexing them against national and global benchmarks on cost, quality and productivity parameters, and their short, medium and long term strategic advantages. Based on this national indexing and estimation of market demands in short, medium and long terms national crop planning needs to be done. If India has to succeed in global market on a long term basis, this task is unavoidable.
3. Agriculture to be brought to the concurrent list: Bringing the entire gamut of post-production activities in agriculture, such as PHM, marketing, processing, infrastructure, agribusiness etc. under the concurrent list of the Constitution for better central planning, as the business of food and agriculture is globalizing and role of central Government is increasing in making laws and policies, especially in post-harvest, trade and agribusinesses, where MNCs and corporate sector is involved in big way.
4. Review of current scenario of farm credit and subsidy disbursement system. All financial benefits, mainly the subsidies in different forms, should be provided and transferred directly to farmers account through e-governance through which tracking of farmers' application, status and approval of all schemes is available online. Gradually phase out all subsidies including fertiliser and only transfer money to farmers, calculating aggregate measure of support. This improves efficiency of government investments.
5. Implementing ambitious Agribusiness Hubs Model, operating on a national platform and establishing 2.40 lac multi-functional Agribusiness hubs in all the Gram Panchayats of the country. This will revolutionize the farm economy and create jobs. The project outlines creating 10.0 million jobs, 50,000 crores of additional annual farm value, providing increased market opportunities of Rs. 50,000 crores and initiating various multifarious socio-economic activities, aimed at improving farm incomes.
6. ICT-based agricultural extension helps in empowerment of farming communities. Information technology (IT) can support crop, fertilizer and pesticide use planning and disease monitoring and prevention, both in crops and animal husbandry, besides improving farmers' operational and financial management and to effectively connect them with the markets for better price realisation.
7. Diversification of agriculture in the First Green Revolution areas such as Punjab, Haryana and Western U.P. seems need of the hour. Farmer is mainly concerned with the profit he gets from a particular crop or commodity. Crops like maize, soybean, pulses, oilseeds, fruits and vegetables have the potential to replace rice and wheat in this area. Upward push in MSP (Minimum Support Price) in favour of proposed diversification crops will be a practical option to achieve this objective.
8. Integrating all central and state subsidies, need to be targeted to empower farmers through infrastructure development in rural areas to promote agribusiness, food processing, water management techniques, soil health enhancement and management, seed production and processing, custom hiring, plant protection, dairy, poultry, fisheries and enterprises etc. This will boost up agriculture sustainability and farms profitability.
9. Strengthening Organic Food Program for India to make 10% of the global 60 billion USD market for each. Major parts of India such as NE, HP, J&K, Uttarakhand, MP, Chhattisgarh, Jharkhand, which are organic by default, must be made Organic by Process for the producers to get advantage of market value.
10. Establishing Special Agriculture Zones (SAZ) by selecting export oriented and industrial use crops. Promoting Crop Stewardship Programs, GAP and Certification, formation of Global Commodity Boards, on the pattern of California Walnuts, Washington Apples etc., can help double in 5 years the current level of 1.70 lac crores of agri exports, which will benefit farmers significantly. We need to globally position Indian food and agri produce such as North Eastern region as Organic Zone, Spices of Kerala, Cardamom of Sikkim, Mango of Malihabad, Orange of Nagpur, Kashmiri Apples, Bihari Litchies and Ratnagiri Mangoes, Tea of Darjeeling, Soybean of Indore and Nilgiris and so on and promoting Geographic Appellation. Like tea belt of Assam, cotton belt of South India, the nation has to streamline rice belt, wheat belt, corn belt, oil seed belt, Pulses belt, sugarcane belt, tomato belt, mango belt, apple belt, ginger belt, turmeric belt, orange-lime-lemon belt, orchid belt, cut flower belt, jack fruit belt, peach and plum belt. Likewise livestock, fishery, apiary and sericulture belts shall also be created across the country with the objective to improve production and export.
11. Promoting scientific agriculture micro-irrigation on a very large scale. Micro irrigation with the nutrient application can be highly effective and efficient and priority should be given to empower farmers with micro irrigation. Advanced concept of Precision Agriculture need to be promoted on a large scale, emulating the success of TN Precision Farming Project. A National Project on Precision Agriculture on the pattern of TNPFP should be launched with integrated approach from advance production technologies to formation of FPOs and linking them with the markets. Studies done by LSE, Harvard, IIM-A and other premier global institutions show an increase of 80% to 600% extra yields in different crops under Tamil Nadu Precision farming Project.

Key strategies by NABARD

1. Increase in agricultural productivity
2. Leveraging water resources for enhancing farm incomes
3. Special Focus on Dry land Areas
4. Need for cost reducing mechanisms
5. Income Enhancement through Diversification

6. Income Enhancement through Professionalization
7. Stabilizing Income and Risk Management
8. Climate Change and Sustainable Agriculture
9. Focus on Small Holders' Problems
10. Leveraging the Flagship Programmes of the Government

Extension strategies for doubling farmers' income

- Intensive campaigns through all media in remote area
- Awareness programmes through KVKs and line department
- Interactive sessions at grassroots level to double the income
- Sending voice/Short Message Service through mobile on different income generating practices
- Brain storming session at bureaucrat's level including agricultural scientists and with line department scientists.
- Skill development programme for farmers, farm women and rural youths
- TV programmes on cultivation of high yield crop and practices
- YouTube programmes of various crop production techniques
- Radio programmes for rural area on income generating activities
- Demonstration on improved practices or on high yield crops

Suggestions

The focus of Extension Agent may shift from Technology related information dissemination to Comprehensive development and management aspects. Pluralistic Model of ATMA may have to continue with 'desired changes'. While observing prudence in selection of NGOs, existing fear of giving equal space to NGOs in extension delivery process may be overcome, and NGOs doing information dissemination work may be given a fresh identity of 'Extension Support Organizations. Introduction of the concept of 'paid extension'' by way of promoting 'Agri-Clinics' in PPP mode, like Vety Clinics with Agripreneurs being paid partly by Government and partly by farmers. By building skills of non-agri graduates in vocational areas for establishing Agri-Business Centres, without mandatory extension services through a sub-scheme under RKVY to promote Skill Development in Agriculture & Allied areas. Promoting non-farm employment with farm women being in focus may contribute to increasing family income. Extension support to focus on end-to-end approach from production to marketing with appropriate facilitation for inputs, insurance, credit storage, marketing etc. For changed Extension focus - from production to farmer's welfare and income generation, the mode of extension delivery may have to be changed at the University level with introduction of stronger university learning on Farmers Welfare & income enhancement aspects. Regular training of field functionaries viz. BTMs/ATMs to meet 'welfare' & 'enhancement of income' related needs of farmers with a blend of Farm-level planning may have to be ensured. For effective extension, the problem of job uncertainty of contractual staff engaged under ATMA may have to be overcome. Emerging ICT Intervention to make the process more swift and effective and a strength of mobile telephony may be tapped for replication and up scaling of location specific good work done by farmers using this source through WhatsApp application etc. Pico projectors, handheld devices to be promoted. Interactive Mobile Apps (Connected

to KCC) For 24 X 7 availability of information. Pre-condition- Farmer's access to Smart Phone & affordable 2G/3G service for operation of Mobile App. Through increased numbers and more effective Kisan Call Centres to reach out to farmers Video-Conference facility are made available under Kisan Call Centre Scheme so that the interaction between farmers seeking information and KCC Agent becomes virtual. Farm tele-advisors should provide image based advisories to farmers for better impact. A regular mechanism to upgrade the knowledge of Farm tele-advisors be put in place. Extensive use of electronic media like AIR, TV & focused Ad campaigns in prime time etc. CSC of Gram panchayat to show films on best practices and new technologies.

Institutional strengthening

Mini MANAGE for NER for capacity Building of Sr/Middle level Extension Officer. Elevation of Extension Education Institutes as Centre of Excellence retaining the existing mandates, as per relevance of the Region these are located in. One of the EEIs is upgraded to meet Trade related awareness building and knowledge transfer to middle-level extension functionaries who could guide the farmers accordingly. Enhance outreach through DAESI programme. There is strong potential in the 'institution of Change Agents at village level such as 'Krishi Sakhi' which may be strengthened. The concept of Farmer-to-Farmer learning and extension should be promoted with presence of Farmer Leaders in every village.

A case study on impact of Soil Health Card Scheme on farmers' income: A case study of *kharif* crops in Madhya Pradesh, (Chouhan *et al.* 2015)

The study conducted in Madhya Pradesh on Soil Health Card Scheme impact on farmers' income, by studying the economics of cultivation of 3 major *kharif* crops like paddy, soybean and maize. The data were collected from 30 soil tested beneficiaries/farmers before and after application of recommended doses of fertilizers (RDF) and found that yield of paddy, soybean and maize increased by 19.42%, 13.79% and 9.6%, respectively after adoption of RDF (Table 1). The farmers net income per acre increased from Rs. 11231 to 17385 (54.8%) in paddy, from Rs. 6696 to 11228 (67.7%) in soybean and from Rs. 3380 to 8105 (139.8%) in maize after soil testing by the farmers/beneficiaries. According to this study and data shown that, soil health card scheme was found highly beneficial to the farmers/beneficiaries in term of increasing farm income. However, there is a need to generate awareness about the benefits of Soil Health Card Scheme among the farmers and strengthening of soil testing laboratories/services on a wider adoption of recommended doses of fertilizers (RDF).

Table 1: Impact of application of recommended doses of fertilizers on crop yield in MP

Sl. No.	Crops	Average yield (quintal/acre)		% Change
		Before	After	
1	Paddy	20.6	24.6	19.42
2	Soybean	5.8	6.6	13.79
3	Maize	6.3	9.3	3.00

Success stories on organic farming in sugarcane
Manharbhai Chhotubhai Patel from Village of Surat district a 64 Years old age farmer having qualification B.Sc. (Botany)

and land 3.6 Ha. He used 10 M.T. of Compost at the time of land preparation. He had grown Jute-Ikkad in the month of July for Green Manure production and then mixed it in soil after September. He planted sugarcane using pair row system in the month of October and utilized drip irrigation system. He used 2.0 MT Castor cake per hectare, 600 Kg Neem cake and 2.0 MT of bio-compost, produced at sugar factory in the month of November. In the month of December he applied the above organic fertilizer and 2.0 MT Vermi Compost per hectare. After 4 to 5 month of planting and earthing up in sugarcane crop, he applied 10 kg *Azotobacter* and 10 kg PSB Culture, and then did mulching with dry paddy straw in between the rows of sugarcane. He produced 105 M.T./Hectare of sugarcane. 3200 Farmers, Government officers, Hon. Agriculture Minister, Scientist of Agriculture University have visited his farm. He has been honoured with “Sardar Patel Krushi Research Award”, the “Golden Jubilee Memorial Trust Excellence Award”, “Krushi na Rushi” and other awards. (Anonymous, 2017) ^[3].

Conclusion

The national policies with region specific recommendations are very much needed to achieve the income equality across the space and also across different social groups and class of farmers. Small and marginal farmers forms major part of the agricultural households in the country, hence there is a need to leverage the animal husbandry component in their farm business in order make their standard of living on par with rest of farming community. Similarly the other sub-sectors, namely agro-forestry, horticulture, food processing, fisheries, sericulture & bee keeping, and bamboo and other minor forest produce development need to give emphasis to achieve sustainable and assured incomes. Post-harvest losses need to be reduced by creating the infrastructure accessible to farmers and also by exploring the possibility of value addition in every crop. As the input cost forms major portion of cost of cultivation there is a need for reducing the external inputs without halting the production levels. In dry land areas water management interventions need to be given emphasis and also area under canal irrigation need to be increased by effective implementation of irrigation projects. Remunerative price through established markets for all major crops need to be assured across all the states. Measures should focus on increasing the real income of the farmers not the nominal income. Non-availability of reliable database on farmer's income, slow progress in implementation of irrigation projects, regional imbalances in credit distribution, the negative outcomes of climate change like frequent droughts, floods etc..., lack of region specific technologies and strategies, leakages in benefit transfer are some of the hurdles in achieving the goal. Doubling the farmers' income is quite challenging but it is needed and is attainable, three prolonged strategies focused on Development Initiatives, Technology and Policy Reforms in agriculture is need to double farmers income. ICAR and SAUs should develop different models of farming system for different type of socio-economic and resource poor farmers. Through value addition this nation can achieve doubling of farmers' income.

References

1. Anonymous. 101 Success Stories to Double the Income of Farmers, Department of Agriculture & Co-operation Gujarat State 2016.
2. Anonymous. Report on Doubling Farmer's Income by

- 2022-Farm Crisis and Farmers' Distress. Indian Council of Food and Agriculture, India International Centre, New Delhi 2016, 1-10.
3. Anonymous. Success Story of Smt. Chenamma: Innovative Vegetable Farmer, Karnataka, IIHR 2017. (www.iihr.ernet.in).
4. Ashok Gulati, Shweta Saini. From Plate to Plough: Raising farmers' income by 2022, The Indian express 2016.
5. Government of India. Income, Expenditure and Productive Assets of Farmer Households: NSS 59th Round (January–December 2003), Report No. 497 (59/33/5). National Sample Survey Organization, Ministry of Statistics and Programme Implementation: New Delhi 2005, 8-22.
6. Government of India. Some Aspects of Farming: NSS 59th Round (January–December 2003) Report No. 496 (59/33/5). National Sample Survey Organization, Ministry of Statistics and Programme Implementation, New Delhi 2005, 12-18.
7. Government of India. Key Indicators of Situation of Agricultural Households in India: NSS 70th Round (January – December 2013). National Sample Survey Organization, Ministry of Statistics and Programme Implementation, New Delhi 2014, 9-39.
8. Gulati A. Budget 2016: 2022 a long toil for tillers of the soil. The Times of India 2017.
9. Narayanamoorthy A. Farm Income in India: Myths and Realities, keynote paper for annual conference 2017, Indian Society of Agricultural Economics, Mumbai 2016, 1-16.
10. Nirmal Rajalakshmi. Real or nominal? Which farm income will Modi double in 5 year. The Hindu Business Line 2017.
11. Ramesh Chand. Doubling farmer's income: strategy and prospects. Presidential address at 76th annual conference 2016, Indian Society of Agricultural Economics, Mumbai 2016, 1-20.
12. Ramesh Chand. Doubling the farmers' of income rationale, strategy, prospectus and action plan NITI policy paper no. 1/2017 2017.
13. Ramesh Chand, Saxena R, Rana S. Estimates and analysis of farm income in India: 1983-84 to 2011-12. Economics and Political Weekly 2015;40(22):139-145.
14. Thiagu Ranganathan. Farmers' income in India: evidence from secondary data. A study submitted to Ministry of Agriculture, Institute of Economic Growth, New Delhi 2016, 21-36.