

Soil and Water Management towards Doubling Farmers Income

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SUMMARY

This article is related to the soil and water management towards doubling farmers income. As we know the Prime Minister's seven point strategy for doubling farmers income by 2022. Which includes different strategies like "Per Drop, More Crop", soil health cards, GAP etc., and other approaches for doubling farmers income are increasing productivity and cropping intensity, Diversification of cropping system, reducing cost of production and Integrated Farming System etc. Conservation agriculture, manure and composting, integrated farming system, diversified farming, agroforestry, rainwater harvesting, micro-irrigation, watershed development etc. are some soil and water management practices.

INTRODUCTION

"I wish to double the income of farmers by 2022 when India will celebrate 75 years of its Independence"

- Prime Minister while addressing farmers rally at Bareilly (Feb. 28, 2016) Budget 2016-17

"We are grateful to our farmers for being the backbone of the country's food security. We need to think beyond food security and give back to our farmers a sense of income security. Government will, therefore, reorient its interventions in the farm and non-farm sectors to double the income of the farmers by 2022."

- Finance Minister, Budget Speech, Feb. 29, 2016.

Agriculture development in India has been viewed by the context of increasing the output rather than welfare of the farmers. In the recent past, the sector has been facing regular distress and crisis posing a severe threat to peasants in practicing agriculture as a main source of livelihood. Under this perspective, the Government of India in 2016 announced to double the farmers income (DFI) by 2022 by shifting the focus from agricultural output and food security to income security. Farm household income comprise revenue from sources viz., wages, crop production, livestock rearing and non-farm activities. The intention of the Government of India is to double the income including farm and non-farm activities in a span of six years. Current food production of India is about 291.95 million tonnes, it needs to be increased to above 400 million tonnes before 2022 to feed the growing population because not much scope to expand the net cultivated area of 142.5 million ha. The increasing demand for food, fibre, fruits, fuel and fodder needs to be met by increasing the productivity of arable as well as waste land in irrigated and rainfed situation through applying soil and water management practices like conservation agriculture, manure and composting, vegetative strips, agroforestry, rainwater harvesting, gully rehabilitation and terraces, integrated farming, intercropping, micro-irrigation, integrated nutrient management, diversification of cropping system etc. Increasing agricultural productivity (higher yields), increased income and employment opportunities from agriculture.

"More Crop and Income per Drop of Water". We must minimize our water use – invest in science and technology to ensure that we can grow crops which use less water. In other words, find ways of valuing the crop per drop (Swaminathan, 2006). Since land is a shrinking resource for agriculture, the pathway for achieving these goals has to be higher productivity per units of arable land and water. Factor productivity will have to be doubled, if the cost of production is to be reasonable and the prices of our farm products are to be globally competitive. On an average, rice and wheat yields will need to be enhanced by about 40 per cent and pulses, oilseeds, maize, millets, sorghum and horticultural commodities yields by about 50 to 100 per cent. To ensure food and nutritional security for the growing population and to increase farmers' income, there is an urgent need to enhance resource use efficiency, reduce input costs and improve crop yields. Re-orienting conventional agriculture to more productive alternative farming systems has now been viewed as the need of the hour, as has been enunciated by Dr. M.S. Swaminathan, "If agriculture goes wrong nothing else goes right" and "Younger people will only join agriculture if it is technologically driven". This will require new approaches and innovations, as well as increasing collaboration between various stakeholders in the food system. Watershed development project are beneficial to the farmers (Patil *et al.* 2001). Land shaping techniques proved

financially viable propositions for coastal salt affected regions and provided scope for growing high value crops (Burman *et al.*, 2016). Field bunding and pair row sowing coupled with *in situ* rainwater conservation practice found promising for successful cultivation of dual-purpose sorghum (Rao *et al.*, 2010). The benefit cost ratio was higher in IFS than conventional system and IFS with cropping involving poultry, fish and goat was highly productive and profitable (Channabasavanna *et al.*, 2009). The drip irrigation had significantly increased yield, water use efficiency and net income as compared to flood irrigation (Pandey *et al.*, 2013 and Singh, 2002).

Prime Minister's Seven Point Strategy for Doubling Farmers Income by 2022

1. Irrigation- "Per Drop, More Crop"
2. Quality seeds and soil test based nutrient management- distribution of soil health cards
3. Investments in warehousing and cold chains
4. Value addition through food processing
5. Creation of a national farm market
6. New crop insurance scheme – Pradhan Mantri Fasal Bima Yojana (Minimum Premium and Maximum Security)
7. Promotion of ancillary activities like poultry, beekeeping and fisheries

Strategy for Doubling the Income of Farmers in India

A. By increasing productivity of crops

- Timely supply of good quality of sufficient seeds prior to season.
- By adapting GAP (Good Agricultural Practices)
- Timely availability of good quality of inputs
- Applying short duration high yielding varieties.
- By promoting Farm Mechanization
- Adaption of Integrated Nutrient Management and use of Integrated Pest Management
- By increasing irrigation facilities

B. By increasing cropping intensity

- According to land situation, irrigation and another facilities farm plan should be prepared for all three seasons Paddy - Wheat/Pulses/Maize, Maize – Wheat/Pulses/Maize, and Maize – Wheat/Pulses/Maize - Mung
- Short duration hybrid/HYV seeds to be used.
- Use of rice fallow land

C. Diversification of cropping system with high value crops

Cash crops- Sugarcane, Betel leaf and Vegetables etc., Spices - Turmeric, Ginger, Dhania, Garlic etc. Mushroom Cultivation, Rearing of honey bee and Medicinal Plant

D. By Reducing cost of production

- Subsidy on farm inputs, transport, diesel etc.
- Provision of subsidy on HYV/ hybrid seed market price.
- Use of green manuring e.g. Dhaincha, Cowpea, Sunhemp etc.
- Application of balance dose of fertilizer on the basis of soil testing.
- Use of renewable energy i.e. Solar energy, Bio gas etc.
- Use of bio fertilizers e.g. Rhizobium, PSB, Azotobacter, Azolla etc.
- Promotion of zero or minimum tillage technology.
- Use of organic manures

E. Promotion of Integrated Farming System

Crops/horticulture, dairy, fishery and poultry to provide regular income.

- F. Micro-irrigation**
- G. Effective procurement strategies to procure on MSP**
- H. Regular region wise weather forecasting.**
- I. Facilities of more warehouses and cold chain**
- J. Agro-forestry/ alternate land use planning**
- K. Construction of Water harvesting structures**
- L. Risk Management to crop with climate change**
- M. Insurance against crop**
- N. Paddy-cum-fish culture**
- O. Post-harvest management to reduce crop losses**
- P. Required value addition and processing**

Challenges in Agriculture

- High pressure on land due to Urbanization and Industrialization resulting in reduction of Gross Cropped Area to 58.90 Lakh ha. (2015-2016) from 66.32 Lakh ha. (1990-91)
- Marginalization of land holdings - declining farm size and income
- Deteriorating soil health
- Spatial and temporal variability in rain - erratic rainfall due to cyclonic North East Monsoon
- Depleting natural resource base particularly water, both ground and surface water
- Escalating inputs cost
- Inadequate capital formation by the public sector
- Shortage of labour force
- Incomplete adoption of location specific cropping system
- Poor adoption of improved crop management practices
- Inadequate post-harvest technologies, uncertain market prospects and linkages

Improved Soil and Water Management Practices

Conservation agriculture, manure and composting, integrated farming system, diversified farming, agroforestry, rainwater harvesting, micro-irrigation, watershed development etc. Increased agricultural productivity (higher yields), increased income and employment opportunities from agriculture and increased resilience to climate change and associated extreme weather events such as water scarcity, intense rainfall or droughts. Benefits- Increase soil organic matter, water infiltration, efficiency of water use, efficiency of nutrient uptake, improve soil structure, reduce soil erosion.

Strategies- Soil Resources Management

- Identification and conversion of fallow lands into cultivable lands
- Prohibiting diversion of agricultural lands to other purposes - by recommending suitable and profitable cropping system as per land capability classification.
- Promotion of zone/ region wise crop specific strategies
- Promotion of farm specific cropping pattern
- Increasing cropping intensity
- Targeting areas having larger extent with lesser productivity
- Integrated farming, diversified farming, crop rotation, dry land farming and crop diversification
- Sustainable and organic farming
- Reclamation of problem soils
- Village-based INM through stratified soil sampling and analysis
- Soil and moisture conservation practices
- Watershed based approach

Strategies - Improving Water Use Efficiency

- Improving water holding capacity of sub-basins and bringing more cropped area under irrigation
- Precision farming and micro-irrigation in a larger extent.
- Intensification of irrigated area development and water management schemes.
- Improving water resources - farm ponds, de-silting of lakes and ponds etc.
- Rain water harvesting
- Identification of fallows to cultivate less water intensive and more remunerative crop

Management Practices for Soil and Water Conservation in Dryland

- Tillage practices
- Vegetative barriers, wind breaks
- *In-situ* moisture conservation methods
- Use of anti-transpirants
- Use of mulch for moisture conservation
- Alternate land use system
- Integrated nutrient management (INM)
- Farm pond
- Use of drought tolerant crops
- Change in cropping pattern, sequence cropping, intercropping
- Timely sowing, optimum per hectare seedling number
- Use of balance fertilizer, biofertilizers etc.
- Land leveling
- Contour bunding and cultivation

CONCLUSION

Watershed management, rain water harvesting and paddy-cum-fish culture effectively improves the socio-economic status of farmers. Integrated farming system (IFS) and multi-tier cropping system avoid risk ability for growing field crops and micro-irrigation improves the water and fertilizer use efficiency. Strategies of MSP to produce, value addition and processing followed along with soil and water management practices were definitely useful for doubling farmers income (DFI).

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