

# Transforming Indian agriculture: is doubling farmers' income by 2022 in the realm of reality?

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Indian agriculture is essentially monsoon- and market-dependent, and suffers frequent distresses posing threat to the welfare of farmers as well as interest in farming. Declining farm productivity and income have serious implications on rural prosperity and overall economy. Hence, increasing the real farm income, i.e. nominal (actual) income adjusted to inflation has become a priority for the state and policy planners. The Government of India, in its budget 2016–17 proposed to double the farmers' income by 2022 (marking the 75th year of Independence) by addressing the agrarian distress and crisis. Indian agricultural databases lack farmer income series. Nevertheless, it has been estimated from survey data that the farm income growth, currently hovering around 1%, has declined since 2011–12 (ref. 1). We discuss here the farm income trends across holding sizes and states, as well as disaggregated sources of farm income using the National Sample Survey Office (NSSO) data for 2003 and 2013 (ref. 2). The potential pathways integrating science and technology (S&T), institutions and policy to double the farmers' income are explored.

## Trends and dynamics in farmers' income

The state's intent to double the income of farmers comprising farm and non-farm income in a span of six years since the announcement, requires a compound annual growth rate of 12.25%. Analysis of disaggregated sources of farmers' income indicates that barring Odisha, no state has experienced any doubling in farmers' income between 2003 and 2013. Rather, it has declined in Bihar and West Bengal and remained static in Assam. In nominal terms, the average increase was more than three times, from Rs 2115 (2003) to Rs 6426 (2013). Medium and large farmers with 4.01–10 ha and >10 ha respectively, have experienced a major shift in income (Figure 1).

Livestock has contributed significantly but non-farm income has remained

almost the same at the national level and declined in a majority of the states<sup>3</sup>. Several estimates have corroborated the trend<sup>1,4-6</sup>. Annual farm income (per cultivator) between 1983–84 and 1993–94 witnessed an increase of 3.67% (2.74%), dropped to 3.30% (1.96%) in the subsequent decade, and then increased to 5.36% (7.29%) from 2004–05 to 2011–12. The total income shared between the cultivators and labourers during the past three decades hovers around 80% and 20% respectively<sup>1</sup>. Prima facie, the possibility of farmers' income growth to touch double digits by 2022 seems preposterous and wishful thinking. An analysis of the extant and possible sources of income, their status and potential, the kind of research thrust, institutional support and policy tweaks required to enable them respond positively to realize the objective within the timeframe is the focus of this note.

## Potential pathway for transforming Indian agriculture

The options for framing the pathway for innovations and interventions through S&T, institutions and policy to transform agriculture are: increased productivity, cost reduction, remunerative prices, focus

on land use (diversification) and ownership, risk management, favourable output prices<sup>1</sup>, focus on the eastern region and livestock<sup>3</sup> enhancing the efficiency in production as well as natural resource use and risk management<sup>4</sup>. The sources of growth are total factor productivity, judicious use of inputs, application of biotechnology and genetic engineering, and shift to high-value crops. However, the low-hanging fruits include bridging of yield gaps across the crops and regions. All these measures can be subsumed under three major approaches, viz. S&T, institutions and policy (Figure 2)<sup>7</sup>.

## Science and technology

Technology – the outcome of science – enables increased output with the same input or to realize the same output with reduced input. Besides, output level can be enhanced by consolidating the existing potential by bridging the yield gaps between agronomic potential achieved in research and extension farms and the actual yields obtained in the average farmer's field. Yield level of cereals has struck a plateau demanding barrier breaking intervention through cutting-edge science. Considering the gestation period, harnessing new science or research

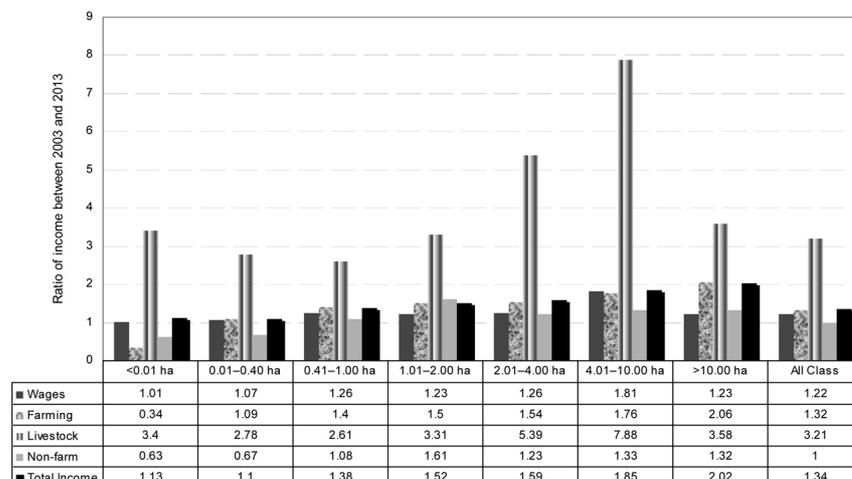


Figure 1. Income ratio between 2013 and 2003 distributed across size of holdings and sources.

to address the objective within the specified time period is far-fetched. Rather, the strategy should be to consolidate the gains of the available technologies supplemented by policy actions. Development of wheat hybrids would certainly raise farm productivity. Low harvest index in pulses is due to narrow genetic base, poor plant architecture, predominance of self-pollination inhibiting heterosis exploitation and augmenting genetic erosion as well as linkage drag, to cite a few. Science should facilitate development of high-yielding but short-duration genotypes reducing the stress on land and rejuvenation of soil. The concern here is to increase the productivity per day rather than yield per unit area. In the case of dairy, the yield levels have to be increased across indigenous and crossbred cattle, and buffaloes with ‘high throughput genomics’ approach. Dwindling stocks of healthy brooders and advances in hatchery technology will be the challenges as well as a platform for new opportunities in fisheries. Developing efficient and cost-effective vaccines against devastating diseases like avian influenza is essential for profitable poultry management.

Technology that promotes better resource use efficiency results in lower costs of production and boosts the net income. It has to be utilized through collective/community approach, right from planned production to value-added marketing for raising the income. Rural areas

face severe input crises like water, fodder and quality seeds/breeds/strains directly impacting production. Resource conservation techniques like zero tillage, micro irrigation and seed priming, soil test-based fertilizer application, etc. will ensure rational use of resources. Perishables get spoiled during transport and non-perishables (cereals and pulses) during storage. Reducing the pre and post-harvest losses through scientific storage, processing and value addition both at farm and community level supplements the production in tune with the maxim ‘what is saved is earned/produced’. The diversification of farm activities towards high-value crops and enterprises can more than quadruple income from the same piece of land. Another augmenting factor for doubling farm income is through integrating crop production with bee-keeping, fishery, farm forestry and timber production (in uncultivated lands).

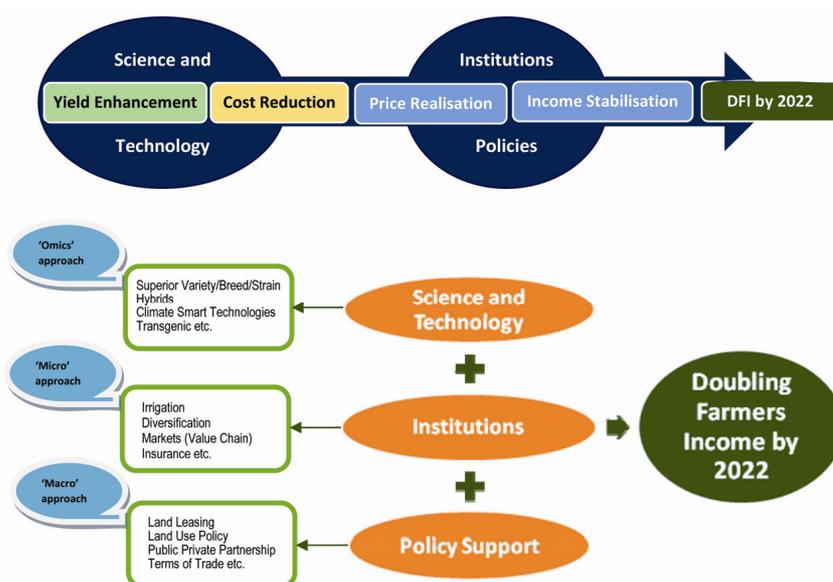
*Institutions*

A common cause for crop failure is drought. Irrigation is the best insurance against crop failure due to drought. Nothing has proved really effective in more than doubling the physical output as irrigation has done. The thrust of the state is to ensure ‘per drop more crop’ through accelerated irrigation schemes supplemented by massive promotion of micro irrigation techniques for maximum

coverage of irrigated crop area. Diversification, enhancing irrigation and cropping intensities are sure ways of increasing productivity, income and employment. Growing high-value crops is a means of overcoming land shortage and labour abundance<sup>8</sup>.

Agriculture in India is a gamble with the monsoon, and the economic pursuit of the enterprise is worth it only when adequate risk management options are available. The risk coverage in vogue till recently through the National Agricultural Insurance or Modified National Agricultural Insurance or through Weather-based Crop Insurance in the country has been based on cost of cultivation and crop loan (credit) than income insurance. The game changer is the new S&T-based Prime Minister’s Crop Insurance Scheme, which is based on crop income rather than cost of cultivation/credit. This scheme includes all the cultivators and not merely those availing crop loans, at 50% of the premium, and the rest is shared between the federal and provincial governments and covers the sum assured or income by covering the loss of sowing, loss of crop and loss of harvest for two months.

Apart from production, farmers have to get the right price for their produce. Better price realization through competitive markets, value chains and improved linkage will augment the farm income. Here comes the utilization of information and communication technology (ICT)



**Figure 2.** Framework for doubling farmers income by 2022 (ref. 7).

and its application for better market connectivity and price realization<sup>5</sup>. The recently initiated National Agricultural Marketing brings more than 500 markets on a single e-platform, integrating markets sans middlemen and enabling farmers to bid their products to sell anywhere in India. This integration will have operational meaning for the farmers only when the Agricultural Produce Market Committee (APMC) Act and Essential Commodities Act (ECA) are either revamped or done away with. This is very much evident in the difference in realization of the price potential between livestock products not covered under these Acts, and the fruits and vegetables covered under the APMC. Further, it will not be suffice if commodities are delisted under the APMC, unless alternate marketing platforms are made available with attendant, scientific storage, processing and transport facilities where private can play a vital role.

### Policy

Since a majority of the holdings fall under small or marginal, collective or joint farming will reduce the costs significantly through economies of scale. Integrated farming system, mixed farming and diversification should be a part in the entire farm household. Public-private partnership should be the priority for increasing research and farm productivity as well as efficiency, which warrants for high level of investment to unleash the potential<sup>9-11</sup>. Linking rural roads to crucial input markets is another viable option to reduce the drudgery and transport cost.

Terms of trade is another important policy tool to enhance farmers' income by tweaking the prices of farm products compared to their non-agricultural counterparts as had happened during 2004-05 and 2011-12, but without stoking food inflation. Inflation in agricultural prices also leads to an enhanced real farm income, if prices received by the farmers increase at a faster rate in comparison to

those paid by them. For the past few years, the wholesale price index (WPI) or WPI-based inflation of non-agricultural prices is declining, whereas that of the agricultural prices has been increasing by about 5% (in 2015-16), implying a 5% growth in real farm income. If technology and factor prices could result in per unit cost savings, farmers' income would rise at a much higher rate than the rate of increase in output.

Income is the most relevant measure to assess farmers' welfare and agriculture transformation. Even today, the highest returns on investment on per unit basis are from agriculture. What is lacking is the scale, unlike corporate investment. Certainly, returns from cultivation alone will not help achieve the set target of the Indian Government. It has to be supplemented to a larger extent by livestock and other off-farm activities supported with policy intervention at all levels. Forty-seven per cent of farm households operate on plots less than 1 acre with an average of 2200 m<sup>2</sup> of agricultural land according to the Agricultural Census (2010-11). This too is fragmented and about half of it has no access to irrigation. An NSSO (2003) survey indicated that many would like to quit farming as it is not sustainable and economical, which can be only partially obviated by increasing farm size by pooling. But land leasing is insecure, informal and inefficient as on date. The state should enable ease out without ceding away ownership and facilitate consolidate holdings for economic operation through land leasing laws coupled with direct transfer of benefits to the cultivator than the owner of the land. Legalized leasing will enable cultivators' access to credit, subsidies, insurance and other entitlements that will facilitate land improvement and investment. A pre-requisite for the success of the scheme is digitization of records along with JAM (Jan Dhan, Aadhaar and Mobile), already in place. Last is engaging the cultivators in non-farm activities during off-season, which depends on the skill particularly of the marginal and

landless farmers to seize upon profitable non-farm opportunities without losing possession of their land, unless they choose to do so. For this to be effective, solid basic education is essential. The state should integrate investment and leadership in S&T, institutions and policy applications on a war footing to accomplish this.

Disclaimer. Views expressed here are personal and not of the respective organizations.

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