Doubling Farmers' Income Requires Increase in Demand

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What Does it mean?

Prime Minister Narendra Modi stated on February 28, 2016 that it is his dream to see farmers' income double by 2022, when the country completes 75 years of independence. Obviously the income has to be doubled from the income in 2015-16. What was not clear was if the income has to be doubled in real terms or in nominal terms. Either way if inflation is contained, it is a formidable task. Gulati (2016) considered doubling income in real terms as an impossible task as it will require a growth rate of agriculture of 14.86 % per year for five years(though 2022-23 over 2015-16 has seven years). A NITI Aayog paper by Ramesh Chand (2017) argues that doubling income over 7 years will require a growth rate of 10.45 per year.

Another ambiguity is regarding farm Income vs farmer income. If the aim is farm income- the production centric, productivity increase led approach would help. It considers value of output. But if the goal is farmer income- the production has to be combined with profitability angle and thus emphasis has to be on market linkages, markets infrastructure etc. Here the doubling has to be of value added. Emphasis on Farmer income makes sense and that is what I have assumed.

Doubling of farm income is desirable as it would have many benefits. The large prevalence of child mal-nutrition and stunting would get reduced. 44 million children under the age of 5 years are stunted with lifelong consequences. Every other death of 1.2 million under 5 deaths is attributable to under-nutrition. More balanced diet will be available to women and children who at present consume less of nutritive foods.

The Ministry of Agriculture and Farmers' Welfare (MoA&FW) had set up a "Committee on Doubling on Farmer's Income", which prepared a report in 14 Volumes dealing with most aspects of the problem and policies, (MoA&FW, 2018). NABARD (2018) had also organized a national seminar on Doubling Farmers' Incomes by 2022. The committee's report covers in great detail issues of increasing farmers' incomes through agricultural growth, post-production measures of marketing and storage, increasing productivity, augmenting water availability, increasing water and other input use efficiency, better extension and seed replacement,

diversification to high value crops, exploiting the full value chain, price forecasting and marketing freedom, use of ICT, risk reduction through insurance, etc.

It also looks at changing pattern of demand in the country, emphasizes the need to change the focus from 'Farm to Fork' to 'Fork to Farm" where demand will drive production. It also considers export demand as part of demand. The recommendations concern mainly increasing output. What is missing is forecasting of demand and a strategy to move agriculture from here to there in a given time frame.

In this paper, I examine how demand forecast, its level and composition affect farm income. Even when many suggested measures are implemented, the difficulty of doubling farm income in 6-7 years seem very daunting.

A look at historical trend of agricultural GDP shows that the highest growth rate achieved since 1993-94 are shown in table 1. The highest growth rate achieved in real income was 7.5 % per year over 2004-05 to 2011-12. In nominal terms, income doubled over 2004-05 to 2011-12 and have increased at high rates over a number of years. However, nominal income growth does not reflect a corresponding increase in welfare. While cultivators may benefit, agricultural labourers will suffer when inflation increases. So real income growth must be considered as the intent of Prime Minister's statement.

Table 1: Growth rate of income per cultivator since 1993-94

	Income per cultivator		**Growth Rate over preceding period**	
	Current prices	2004-05 prices	Current prices	2004-05 prices
1993-94	12365	21110		
1999-00	24188	26875	11.8	4.1
2004-05	26146	26146	1.6	-0.5
2011-12	79173	43258	17.1	7.5
2012-13	91416	41553	15.5	-3.9
2013-14	104763	42760	14.6	2.9
2014-15	112507	43106	7.4	0.8
2015-16	120193	44027	6.8	2.1

Source: Ramesh Chand (2017), table 2.1

The Possible Ways

There are a number of ways to increase farmers' income.

a) **Increase output prices**, i.e. give a better terms of trade (TOT) to farmers. This will increase production but will reduce consumption. How does one balance this? How does one realize better TOT for farmers? If government interferes with dual prices, it will wind up with large amounts of stocks. What is the fiscal implication of it? How is it

to be financed? If at the cost of investment then growth rate of the economy goes down, incomes will go down and consumption will fall even more increasing public stocks. What does the government do with the stocks?TOT increase would have some welfare costs also. If wages of agricultural labour goes up in step with TOT, then adverse welfare impact would be only on poor urban consumers. Narayana, Parikh and Srinivasan (1991) have discussed the general equilibrium impact of TOT policies.Effective implementation of minimum support price is difficult to achieve. The photo below from a report in Indian Express of April 17.2 2019 shows that MSP for Mustard was not effective in Rajasthan for the last three years. Increased demand is important if farmers are to get a higher price.

HARVEST PRICE BLUES

A bumper crop in election seaso

Even as production hits all-time-high, mustard is selling in Rajasthan at below the MSP of not just the current, but last two years

DEEP MUKHERJEE
ALWAR (RAJASTHAN), APRIL 17

CLUTTERED WITH *sarson* (mustard seed), the auction yard at the agriculture produce market in Khairthal town of Rajasthan's Alwar district has turned somewhat slippery, with farmers and commission agents hovering around the produce unloaded from sacks brought in tractors.

Sitting at one corner of this *mandi* — one of the largest for the rabi oilseed in Rajasthan — Sunderlal Yadav flashes a wry smile, as he su-

the Rs 4,000 and Rs 3,700 for the preceding two years' crops.

Inside his one-room shop, Srinivas Gupta, a commission agent at the *mandi*, has a few words of consolation for Yadav, who has just walked in to complete the formalities before the auctioning of his crop. The auction facilitated by Gupta is completed a few minutes later, with Yadav's produce going for Rs 3,360 per quintal, the maximum price quoted by oil millers and traders gathered in the platform.

"It's not only farmers. We, too, lose when they don't get a good rate, as our 2.25 per cent commission is on the purchase price," notes Gupta. He does not expect prices to rise any-

A labourer unloading mustard at a *mandi* in Raja

b) **Increase consumption and exports.**If the economy grows rapidly and demand for agricultural products increase either for domestic consumption or for exports or both, this will create incentives to increase output through higher prices without government intervention and that will increase farm income. Thus rapid economic growth will be required. It will also create higher employment opportunities in non-agricultural activities, draw away workers from agriculture and reduce number of farmers. This will also increase per farmer income. This is the process historically followed in many industrialized countries and in a sense is inevitable for India to follow. Creating employment opportunities rapidly becomes a major issue.Prime Minister Narendra Modi has set an ambitious target of tripling annual agricultural exports to US$100 billion by 2025. This requires a set of coordinated reforms and actions.

c) Increase production through technical change and investment. If land productivity can be increased through enlarged irrigation either through increased investment or through more efficient use of water using micro-irrigation can increase farm output without increase in relative prices. Increased yields can also be realized through new varieties of crops and animal breeds. This will reduce costs and increase value added for the same level of output giving higher incomes to farmers.

d) **Change cropping patterns.**With growth of income, pattern of consumption will change. This will call for a change in cropping pattern. We have already seen that shares of vegetables, fruits, milk and animal products in total value of agricultural products have increased. One very important factor will be consideration of and diversification into sub-sectors that are exhibiting better growth rates e.g. livestock that is growing at the rate of 4.8 % with the total output more than all grains combined. To accelerate this process and to have all farmers share in this process requires development of marketing and transport channels. This however is not enough. See the photo below which is taken from Indian Express report on April 17,2019. Demand will restrict the extent to which cropping pattern change can lead to higher incomes.

BURSTING MYTHS

Cold realities

Production glut, not dearth of cold storage and processing infrastructure, is the real cause of farm distress today

e) Income transfer. As initiated by the BJP government and as was promised by the Congress party through its NYAY scheme, this can raise farmers' income to whatever level is desired. The Government plans to give annually Rs 6000 to 12.5 crore poor farm families with an annual outlay of Rs 75000 crore under the Pradhan MantriKisanSammanNidhi. As per the NSS household consumption expenditure survey of 2011-12, the monthly per capita expenditure (MPCE) of the poorest five per cent of people in one of the poorest states, Bihar was Rs 608 whereas the poverty line MPCE was Rs 971. With a household size of 5.5 and an increase in consumer price index of 23 % from 2011-12 to 2017-18, the household annual expenditure is less than Rs 50000. With Rs 6000 added it is still below the poverty line expenditure of around 79000 (=971*5.5*12*1.23). This transfer reduces poverty by 20 % (Parikh Kirit, 2019) but in no way doubles farm income. Of course the additional Rs 75000 crore to poor people will increase demand for agricultural produce and there will be some indirect impact on farm income.

The catch however is resources. How does one finance such a scheme? Additional resources need to be raised. If this is not done and it leads to fiscal deficit and inflation

or reduced public expenditure on health, education or investment, it can be counter-productive.

Of course, these are not exclusive options, one can think of a mix of policies.

The Importance of Demand

In all of these demand plays an important role. Demand depends on income (consumption expenditure) and relative prices both in rural and urban areas. The consumption pattern also changes from class to class. When national income increases with economic growth, the income distribution changes and people move to a higher expenditure class. Thus the pattern of consumption at the national level also changes. Parikh et al (2014) have econometrically estimated a nonlinear demand system based on many rounds of NSS household consumption survey data, 51st round (1994-1995) to 64th round (2007-08), as well as data from the Central Statistical Organization (CSO) of national level consumer expenditures over these years.It is a non-linear demand system and price and income elasticities suitable for projections extending over 30 years that involve large increases in income. Elasticities are calculated for 22 consumption commodities of which 14 are agricultural goods, agro-processing, textiles, manufacturing, coal, electricity, water supply, transport and services. The approach isextendable to many more commodities. We also present piece wise linear approximations of the demand system that can be incorporated into a long term policy model. Thus we estimate a Linear Expenditure system (LES) for each of ten rural and ten urban expenditure classes of consumers.

Based on this, the structure of projected demand for 2039 is compared with that in 2007 in figure 1.

It is seen that the share of food grains, pulses, oilseeds and sugarcane falls from nearly 43% in 2007 to 23% in 2039.Share of milk and milk products increases from 16% in 2007 to 30% in 2039.The share of Animal products increases from 12 % to 14 %. The large increase in Milk and milk products is consistent with the consumption of top decile in NSS data on household consumption expenditures. This has significant implications. Emphasis on expanding dairy output and animal products can provide income opportunities to many small farmers and landless households.Over 2011-12 and 2015-16, the gross value of Livestock products increased by an average growth rate exceeding 5.5%.

Thus in any strategy to double farm income, one must factor in demand and its composition.

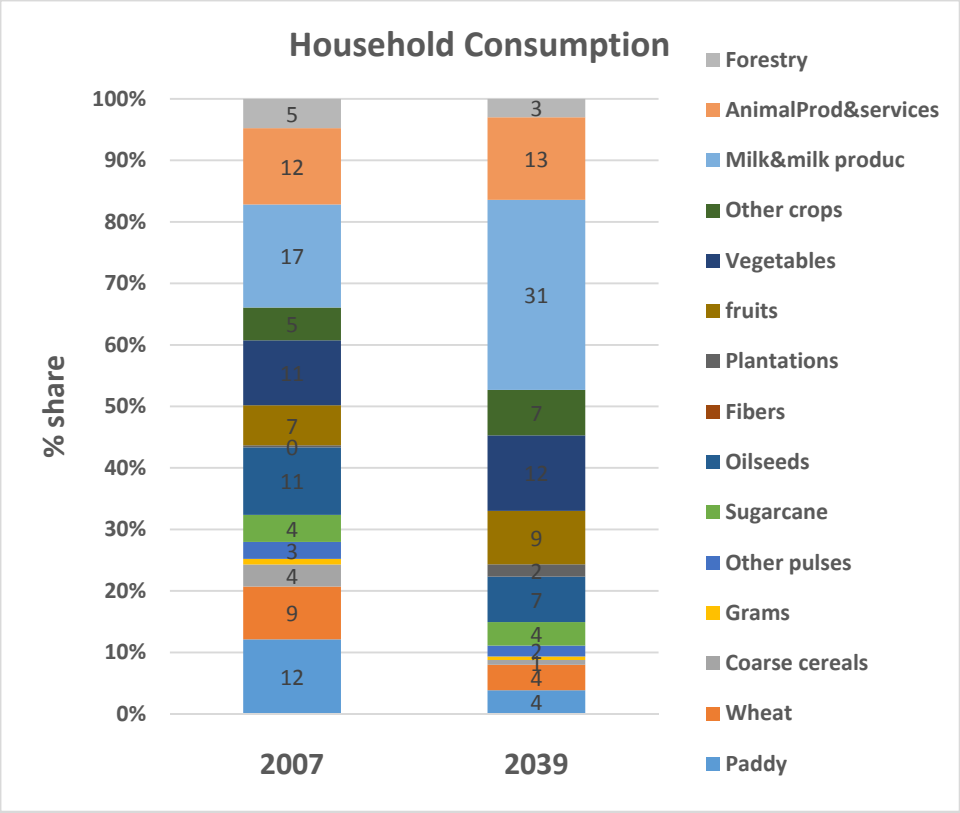

Figure 1: Changing Structure of Consumer Demand for Farm Products

To examine the issues involved in doubling of farmer incomes I have used some results from simulations carried out with a model (Parikh et al, 2016) with 15 agricultural commodities, endogenous income distribution and demand system. The model is a multi-sector, inter-temporal linear programming one that maximizes present discounted value of household consumption over 2003-04 to 2039.

Table 2 shows the projected agriculture GDP, per capita household consumption for three selected years, 2015, 2019 and 2023. By 2023 Ag-GDP grows by 80% whereas per capita consumption grows by 150 %. This is aggregate consumption at the national level.

Table 2: Projected Agriculture GDP and Per Capita Consumption

Year	AG-GDP	Per Cap Consumption	Ratio to 2015	
	Billion Rs	Rs/year	AG-GDP	PC Cons
2015	6469	38728	1	1
2019	8955	60939	1.4	1.6
2023	11799	95888	1.8	2.5

The impact on consumption of farm products is seen in table 3. This is based on a scenario where we have assumed higher development of irrigation, faster technical progress and higher levels of import and export bounds. It is seen that over 2015 and 2023 expenditure on Milk and products doubles, those on animal products, fruits and vegetables nearly double and the total expenditure on farm products increases by 80%.

Table 3: Household consumption of farm products

	Household Consumption of farm products Rs Billions at 2003-04 prices		
Commodity	**2015**	**2019**	**2023**
Paddy	734	795	837
Wheat	616	733	838
Coarse cereals	189	194	191
Grams	73	91	109
Other pulses	222	279	336
Sugarcane	402	550	700
Oilseeds	899	1143	1392
Fibers	0	0	0
Plantations	52	92	177
fruits	679	974	1351
Vegetables	1089	1542	2078
Other crops	562	808	1127
Milk and milk products	2126	3251	4699
Animal services & Poultry, eggs, meat, fish	1238	1752	2325
Forestry	305	365	447
Total expenditure	**9187**	**12570**	**16608**

Household consumption does not include farm products consumed as intermediate inputs or in restaurants, hotels, etc. These are however related to the level of household consumption. So the impact on domestic supply would be much larger. The impact on domestic production that determines farm income will depend on the level of trade.

Table 4 gives the ratios of consumption to supply and consumption to domestic production.

The consumption to supply ratios are all lower than 1.0 suggesting that the remaining is either government consumption, investment, intermediate use or net imports. When the ratio of consumption to domestic production is higher than the ratio of consumption to supply, it indicates net imports. We see that in 2023 in all food grains including pulses and oil seeds, imports take place.While in sugarcane, milk and products, vegetables and animal products the country is self-sufficient.

Table 4: Household consumption, Supply and Domestic Production

	Consumption/supply			Consumption/Domestic Production		
	2015	**2019**	**2023**	**2015**	**2019**	**2023**
Paddy	0.73	0.66	0.60	0.91	0.83	0.75
Wheat	0.72	0.66	0.62	0.89	0.82	0.77
Coarse cereals	0.87	0.81	0.75	0.87	1.08	1.00
Grams	0.58	0.54	0.48	0.64	0.60	0.54
Other pulses	0.68	0.62	0.57	0.76	0.68	0.63
Sugarcane	0.56	0.52	0.50	0.56	0.52	0.50
Oilseeds	0.63	0.57	0.56	0.70	0.55	0.62
Fibers	0.00	0.00	0.00	0.00	0.00	0.00
Plantations	0.23	0.22	0.27	0.21	0.20	0.27
fruits	0.75	0.68	0.67	0.75	0.69	0.68
Vegetables	0.78	0.75	0.73	0.78	0.76	0.73
Other crops	0.35	0.34	0.34	0.36	0.48	0.48
Milk and milk products	0.88	0.86	0.86	1.26	0.86	0.86
Animal services & Po	0.69	0.69	0.68	0.69	0.69	0.68
Forestry	0.60	0.52	0.45	0.55	0.47	0.42

Since farm incomes depend on domestic production, along with increase in household demand, domestic production also has to increase. Raising demand alone is not sufficient to double farm income.

Importance of Value Added

Farmers' incomes depend on how much is value added in production. Table 5 shows the projected value of agricultural output and value added.

Table 5: Value of Output and Value Added

	2015	**2019**	**2023**
Total Value Ag output	12484	18736	25096
Value added /output	0.52	0.48	0.47

Value added is slightly more than half in 2015 but gradually reduces as increased output requires more intensive use of inputs. Thus though the value of output doubles, value added goes up by 80% over 2015 to 2023. This is one year more than the targeted year for doubling of 2022 and it is the value added in agriculture. Not all of the value added in agriculture accrues to farmers, a sizeable part goes to agricultural labourers. Since the per capita earning of agricultural labourers is likely to be smaller than that of farmers, the farmers' income may almost double.

What do we need to Double Farm Income?

Some of the assumptions which are implicit in the way a macro model works are that marketing channels function and that consumers get the product they want, all the value added accrues to the farm sector and that there are not leakages and farmers get a fair share of the value added in agriculture. These assumptions underscore the importance of the various suggestions made by the Committee on doubling farm income in marketing regulations, storage, warehousing etc.

We have not assumed any MSP regime or wedges between consumer price and producer price apart from the standard trade margins.

What we have specifically assumed in this scenario are as follows:

- Net cultivable area does not increase and remains at 140 Million hectares.
- Irrigated area increases from around 70 mill hectares to 85 mill hectares by 2023.
- TFP growth rate is 3% per year.
- Import can be as high as 20% of domestic supply for wheat and rice, 25% for coarse grains, and 30 % for milk and milk products and other crops.

Are these assumptions realizable? With ground water recharge, wider adoption of micro-irrigation, the drive to push solar irrigation pumps, which facilitate micro-irrigation and provide incentive to farmers to use less water if they can sell surplus electricity to electricity distribution companies, irrigation can expand rapidly.

To realize a TFP growth of 3% per annum requires research in high yielding varieties of crops and animals, effective extension to reach the knowledge to farmers and persuading them to adopt the technology, timely supply of inputs and needed infrastructure of roads and power. With the emphasis the government has on rural roads and 24x7 power to all one can expect the infrastructure to be in place. However, getting the research and extension system in shape places some challenges.

The high levels of imports which are permitted goes against the idea many people have on food security and self-reliance. The need for such high levels of imports arise from the high levels of demand generated and despite the growth in irrigation and TFP the country is not able to produce the required agricultural produce domestically. Also high levels of imports permit optimal allocation of domestic resource of land and water to different crops and facilitate diversification.

Growth of demand requires growth of the economy and high levels on demand require higher growth rate of the economy.

Increasing Exports

As Srinivas and Mehta (2018) observes for increasing agricultural exports, we need to act on three fronts. “Prioritize the digital infrastructure for connecting smallholder farmers to exporters in the least developed states. … Accelerate technical and business expertise among small and medium enterprise (SME) trader-exporters. … Public private partnership and incentives linked to business models that make it easier for smallholders and SMEs to

become suppliers without raising transaction costs." It is also worth noting that the value of agricultural exports is around US$ 40 billion which is larger than the value of exports of textiles and garments put together (Shah Ajay, 2019). Thus export growth does provide an option to increase demand. However, for that we need diversification and production at competitive prices.

Conclusions – Doubling of Farmers' Income not without Growth in Demand

1. Farmers' incomes can be doubled by either increasing their output, or getting higher price for their output or through direct income transfers. Demand plays an important role here.
    - Higher output without corresponding increase in demand will lower prices and the impact on farm income can be small or even negative.
    - Ensuring higher price through a high minimum support price (MSP) without increase in demand will be difficult to implement and even when implemented the government will wind up with huge stocks. These may have to be unloaded on international market at substantial losses and the government finances will be stressed.
    - Just transferring money to farmers can increase their income. The share of value added in agriculture, forestry and fishing in total GVP in 2018-19 was 15.87% in current prices. Thus doubling of farm income through such transfers will require expenditure of 15% of GDP.This is clearly infeasible and in any case not sustainable.
    - High growth rate for the economy is required to increase demand for agricultural produce, which will stimulate increase in agricultural output and create incentives for diversification.
    - Demand can be increased also through exports, for which diversification and production at internationally competitive prices is required.
2. Increase in output and diversification requires actions on many fronts.
        - Increase irrigation and promote micro-irrigation.
        - Spread solar pumps for irrigation with surplus power purchased by DISCOMs to save water and facilitate micro-irrigation.
        - Establish marketing and storage systems or farmer's holding capacity which is less than 5% at the moment.
        - For this, expanding coverage and inclusivity of farm credit is important.The MoA&FW (2018) has observed (volume VII) that one percentage point increase in credit supply from public banks leads to approximately 0.82% increase in price realization of crops other than paddy. Credit increase farmer's holding capacity, technology adoption and diversification.
        - Provide facilities for expanding milk output where marketing and storage are even more critical.
        - Expand agricultural research to create options for high yield variety of crops and livestock appropriate to different agro-climatic conditions.
        - Effective extension to make farmers aware of these options is critical.

- Up to date information to farmers on prices and demand can enable them to maximize their gains.

Increased output has to go in steps with increased demand.

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