Supporting Indian Farms the Smart Way

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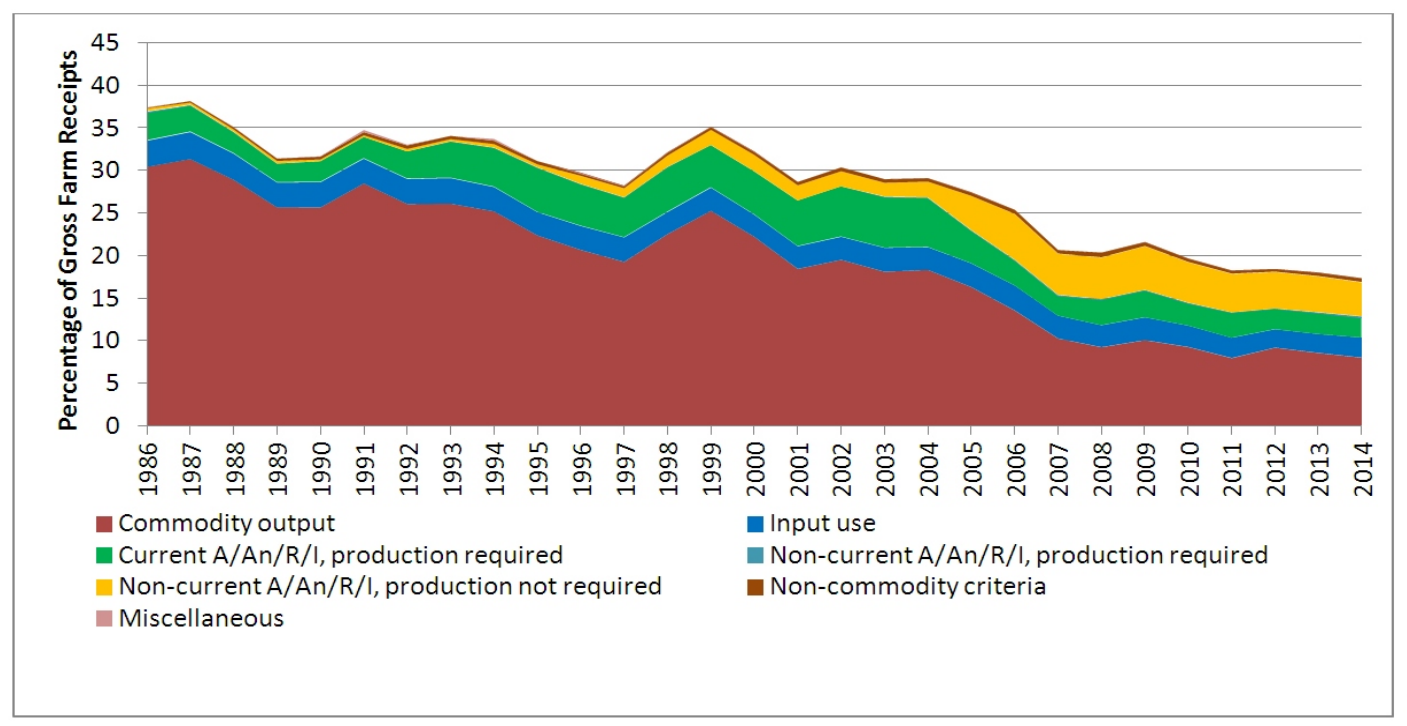
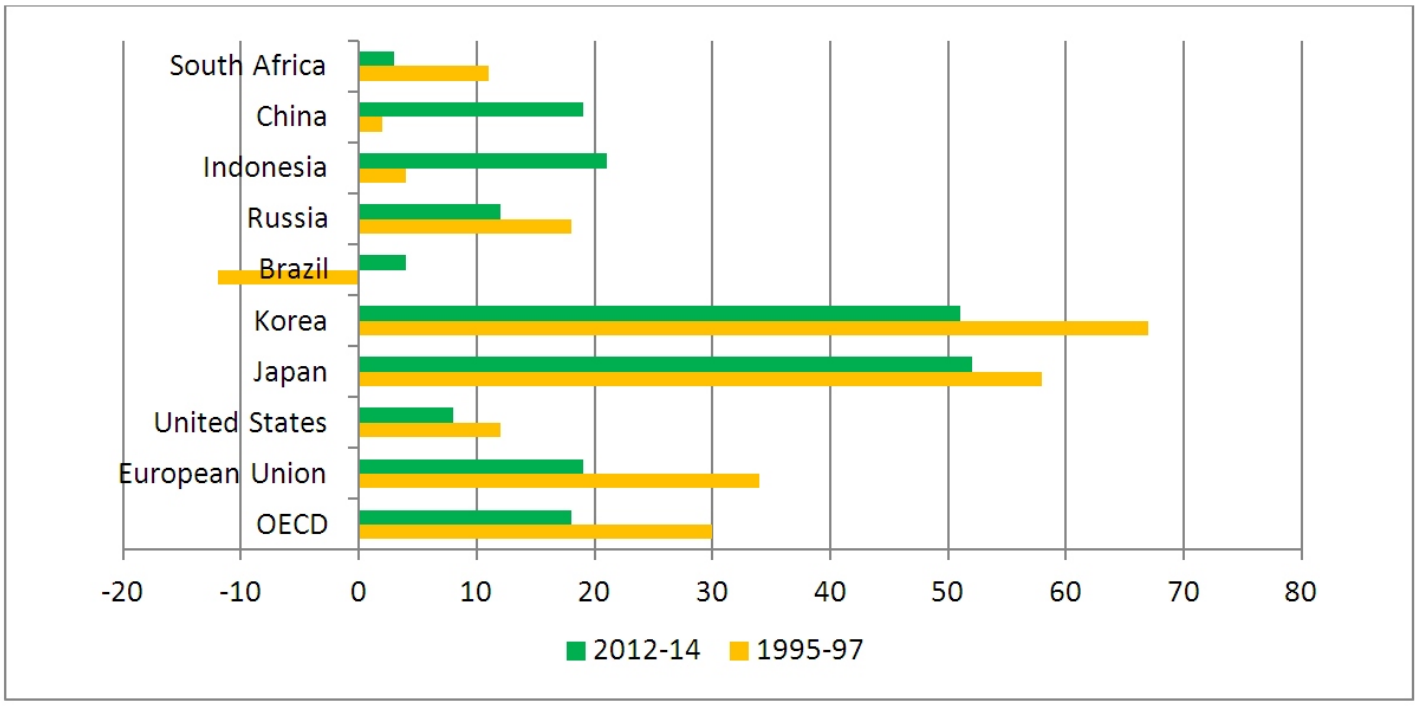
Most of the major agriculture producing countries in the world support their agriculture and farmers in one way or the other. They have multiple objectives to do so. These objectives often range from ensuring food security at national level to augmenting farmers' incomes to reducing income inequalities between farming and non-farming communities to promoting sustainable agriculture and protecting environment and even rural landscapes (OECD, 2016). OECD has been estimating Producer Support Estimates (PSEs) for its member countries and some selected non-member countries over a period of time. Three things come out very clearly from their research are: (1) the level of support OECD countries have been providing to their agri-producers has been pretty high in mid 1980s (almost 37 per cent of value of farm receipt), and has been gradually falling to almost 17 per cent by 2014; (2) the major instrument of policy support has been output prices (being higher than international reference prices); and (3) over time, role of income policy (non-conditional on production) in supporting their farmers has been increasing (Graph 1). When PSEs are compared across major OECD countries and non-member countries such as China and Indonesia, it comes out that lately support in China and Indonesia has increased significantly, almost to 20 per cent of value of farm receipt, which is higher than the OECD average support levels (Graph 2).

Graph 1: OECD-Level and composition of Producer Support Estimates



Source: Agricultural Policy Monitoring and Evaluation Report, OECD

Graph 2: Producer Support Estimate by country, 1995-97 and 2012-14 (per cent of gross farm receipts)



Source: Agricultural Policy Monitoring and Evaluation Report, OECD

India is no exception when it comes to providing agricultural support, although the overriding concern for India remains producing enough food supplies for its currently 1.3 billion people, which by 2022 is likely to surpass China's population (UN Population Projections, 2016). The main policy instruments of supporting Indian farms remain that of subsidizing key farm inputs (such as fertilizers, power for irrigation, canal waters, agri-credit and crop insurance) on one hand, and Minimum Support Prices (MSP) for major crops, on the other. Besides these price policy instruments, public policy also makes investments in agriculture, especially in agri-Research and Development (agri-R&D), water sector for irrigation, rural power supplies, rural roads, health, etc. Although such a policy framework has made India more or less "self-reliant" in food at macro level, and at times even generated net agri-exports as high as USD 25 billion in 2013-14, for example, yet it has neither promoted efficiency in the use of scarce resources, especially water, power and fertilizers, nor equity amongst farmers nor sustainability in the use of natural resources, especially water and soil, and nor protected environment from Green House Gas emissions from agriculture.

This study, therefore, looks at the magnitude, structure and trends in input subsidies and investments in/for Indian agriculture, and then analyses the trade-offs of putting extra resources (say a million rupees) in investments or subsidies, at the margin, if the objective is to achieve higher growth in agri-GDP or faster alleviation of rural poverty. It also looks at the best practices of many other countries in supporting their farmers, and the policy instruments they use to achieve higher efficiency, better equity and sustainability. Based on this analysis and review of policies, we recommend a set of policies that can hopefully help India to achieve higher agi-growth, faster poverty reduction, while ensuring sustainability of its precious resources of water and soil.

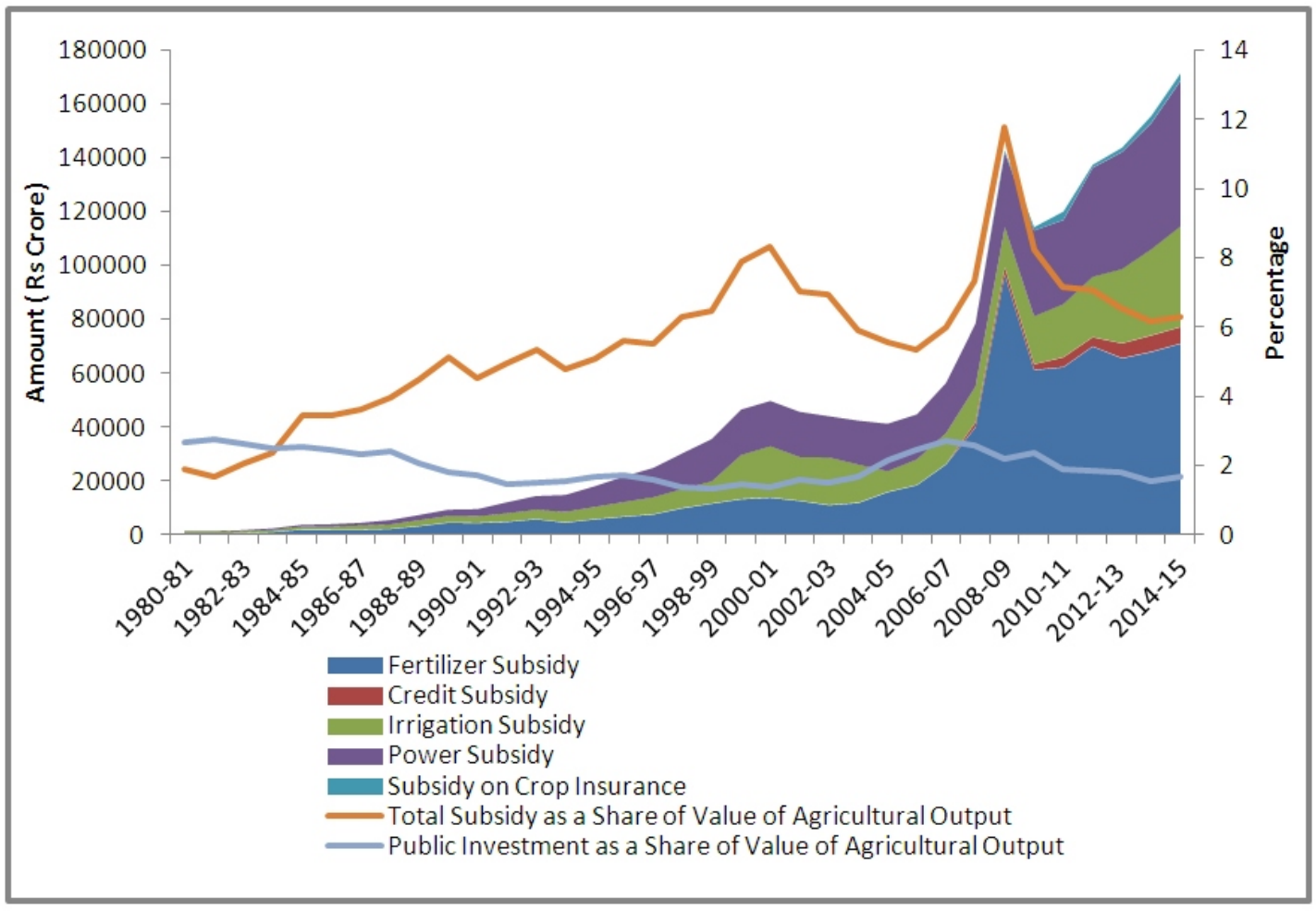
Magnitude, Structure and Trends in Input Subsidies

Among all the input subsidies to agriculture, fertiliser subsidy was the largest amounting to Rs.71075 crore in FY15. Apart from this, the unpaid subsidy to fertiliser plants was Rs. 40500 crore in that year, taking the total fertilizer subsidy to Rs.111575 crore. The water sector receives subsidy mainly through two channels- power subsidy and irrigation subsidy. The irrigation subsidy according to government estimates (calculated as imputed irrigation charges minus depreciation) was Rs.37246 crore in FY15 whereas power subsidy that goes to agriculture was about Rs.54000 crore[1]. The expenditure on interest subvention scheme amounts to Rs.6000 crore in FY15. Besides, premium subsidy on crop insurance was about Rs.2600 crore. The total value of input

[1] Due to the problem of non-metering 70 per cent of subsidized power supplies to rural areas is considered as going to agriculture.

subsidy, therefore, accounts to Rs.170810 crore in FY15 (Graph 3), accounting to 6.3 per cent of value of agricultural output and 1.5 per cent of GDP. Subsidizing farmers by reducing the price of inputs way below their cost of production or imports can be quite regressive, i.e., Rich households could benefit more from subsidization than their poorer counterparts. This Could distort the market in a way that hurts the poor (Economic Survey 2014-15, Volume 1, pp 53-56).

Graph 3: Structure and Trends in input subsidies in Indian agriculture



Source: Calculated and constructed using the data in National Accounts Statistics, CSO; Expenditure Budget, GoI; Power division, Planning Commission

Large increases in fertiliser consumption, often driven by highly subsidized fertiliser prices, especially urea, have inflicted significant costs as unduly low pricing of urea has led to imbalanced use of soil nutrients. This has resulted in soil degradation and deficiency of secondary macronutrients and micronutrients in soil. Subsidy on water for agriculture has resulted in inefficient usage of water resource in India (for both surface and ground water). India cannot afford to be grossly inefficient in the use of water as it is already headed towards water scarcity. Cost of constructing major and medium irrigation projects are very high (Rs. 5.12 lakh/ha at 2014-15 prices for all-India) and delays in completion of several projects is causing further cost escalation. In power sector, charging agricultural sector much below the cost of supplying power or what other sectors have to pay, has led to excessive exploitation of groundwater, resulting in fast depletion of groundwater tables in several regions. This does not auger well for sustainability. Credit subsidy has been introduced by the government to provide cheap agricultural loans to farmers. Despite large amounts of credit disbursed to agricultural sector, non-institutional sources still account for 44 per cent of outstanding debt among cultivator households in 2013. There has also been an increase in the gap between budgetary provision and subvention amount required by the banking sector amounting to approximately Rs. 35000 crore in FY15.

The rise in input subsidies given to agriculture inputs, like fertiliser, power and irrigation has squeezed public investments in agriculture. The trend shows that that public investments in agriculture as a percentage of value of agricultural output has declined from 2.7 per cent in 1980-81 to 1.7 per cent in 2014-15. On the other hand, total input subsidy as a percentage of value of agricultural output has increased from 2 per cent to 6.3 per cent over the same period (Graph 3).

Subsidies and investments: getting big bang for the buck

In this context, an empirical exercise was conducted to estimate the impact of subsidies versus public investments for agriculture on agricultural growth and poverty reduction. A single equation model would be insufficient in explaining the role of government expenditure on poverty and agriculture growth, so a system of nine equations has been developed, taking endogeniety of variables into consideration. This linkage has been established through the development of nonfarm employment and rural wages.

The following equations are used to establish relationships between investment, subsidies and growth and poverty for 17 major states using panel data, somewhat akin to the work done earlier by Fan, Gulati and Thorat (2007)[2]

POVERTY = f1 (AWY, WAGES, NFE) ..... (1)

AY = f2 (FERT, ROADS, LITE) ..... (2)

WAGES=f3 (AWY, LITE)..... (3)

NFE = f4 (AWY, ROADS, MGNREGA) ..... (4)

FERT= f5 (FERTS, IRRI, RDE, ELEC)..... (5)

IRRI = f6 (IRI, IRS)..... (6)

ELEC=f7 (POWS)..... (7)

ROADS= f8 (ROADI)..... (8)

LITE= f9 (EDUI)..... (9)

Where AWY is agricultural product per worker, WAGES is rural wages, NFE is non-farm employment, FERT is Fertiliser consumption, ROADS is road density, LITE is rural literacy rate, FERTS is fertiliser subsidy, IRRI is irrigation ratio, RDE is expenditure on research and development in agriculture, ELEC is electricity consumption in agriculture, IRI is expenditure on irrigation, IRS is irrigation subsidy, POWS is power subsidy in agriculture, ROADI is expenditure on roads, EUDI is expenditure on education.

The results of the modeling exercise reveal that the marginal returns in terms of number of people brought out of income poverty, to investments in research and development, roads, education, and irrigation outweigh the benefits from input subsidies in power, fertilizer, and irrigation (Table 1). The number of people brought out of poverty per million rupees spent on fertiliser subsidy is only 26 as compared to 328 persons for agri-R&D if an equivalent amount is spent on agri R&D. Similarly the return on agricultural GDP per rupees spent is 0.88 for fertiliser subsidy as compared to 11.2 in agri-R&D. Thus, investments unambiguously turn out to be the best instruments given their higher marginal returns to additional rupee of investment as compared to input subsidies. Thus, there is an urgent need to increase investments in agricultural R&D, roads, education to boost agricultural productivity and alleviate poverty from the country.

Table 1: Poverty and Growth Effects of Government Investments and Subsidies

	Number Decreased per mn. Rs.spent (Statewise)	Returns in GDPA per Re. spent (Statewise)
Agricultural R&D	-328	11.2
Roads	-130	1.10
Education	-42	0.97
Irrigation	-10	0.31
Power subsidy	-23	0.79
Fertiliser subsidy	-26	0.88
Irrigation subsidy	n.s	n.s

[2]Fan, Shenggen, Ashok Gulati, and Sukhadeo Thorat (2007), "Investment, Subsidies, and Pro-Poor Growth in Rural India", IFPRI Discussion Paper 00716, Development Strategy and Governance Division and New Delhi Office, International Food Policy Research Institute, Washington D.C.

What should Indian policymakers do?

In the context of the problems discussed above, we strongly recommend a shift from subsidized price policy for inputs to investments and to income policy for supporting farmers. Many OECD countries as well as some developing ones are already moving in this direction. This shift in policy will address the problem of huge leakages and inefficiencies in the existing structure. To have that policy change in place, the use of JAM (Jan Dhan accounts-Aadhar-Mobile) trinity and digitization of land records will come handy. Apart from this, some specific measures have been recommended to tackle problems in individual sectors.

To rationalize the fertiliser subsidy sector, our main suggestions are:

- Switching to direct cash transfers to farmers on per ha basis, liberalizing the fertiliser sector (especially urea sector) step by step; letting domestic prices be determined by demand and supply forces in open markets;
- Seriously pursuing the soil health care programme, and if possible, making cash transfers conditional upon regular soil health check and recommended optimum fertiliser usage; and
- Encourage Indian investments in nitrogenous fertilisers in Gulf countries (e.g., Iran, Kuwait, Oman, etc.) where gas prices are typically less than $3 per MMBTU compared to the pooled price of $7.5 per MMBTU in India, with some medium to long-term agreements for imports. Some other suggestions are also made in this study. They indicate that encouraging better fertiliser application technologies like fertigation, digitization of land records in order to pinpoint the beneficiaries of the subsidy and ensuring timely reach of both fertilisers and subsidies to the farmers are just equally important for ensuring good health of fertiliser sector.

Some of the major policy recommendations for water sector are as follows:

- Improve pricing situation to curb wastage of water. Like fertiliser sector, movement towards cash transfers is desirable in water sector also. In case of surface irrigation, the pricing could be done so as to recover at least the working expenses and a part of that could be transferred to the beneficiary account. For electricity, incentives could be given as cash transfers for using less electricity than a pre-specified level as done in China. Alternatively, per hectare amount could be decided and farmers could be compensated on that basis.
- Ensure adequate quality and quantity of electricity and water supplied to farmers. Farmers may be willing to pay more money for water but only against a commitment of improved, assured and timely supply of both surface water and electricity.
- Explore solar power as third crop with facility of putting excess power into the grid. The costs of solar power having come down even below that of thermal power, it can be a boon to environment and also help check depleting water table as it can incentivize farmers to earn more by putting excess power to grid. In phase-1 all diesel operated pumpsets be targeted to be replaced by solar pumpsets.
- For major and medium irrigation, the spillover projects are needed be completed in mission mode in order to avoid further cost escalation. To address the problem of increasing gap between Irrigation potential created and utilized, proper emphasis should be given to command area development. If possible, private players could be permitted to create command areas to make the last mile delivery of water to the fields feasible.
- For increasing water use efficiency, drip and sprinkler irrigation technologies should be encouraged. Extension services are necessary to make farmers understand the advantages of using drips and sprinklers. Drip and sprinklers can be dovetailed with solar pumping.
- Discourage the production of water intensive crops in water scarce areas (like rice in Punjab and sugarcane in Maharashtra). This leads to faster depletion of groundwater resources in the already over exploited regions (Punjab) or lower productivity due to lack of irrigation for other crops (case of sugarcane and cotton in Maharashtra)[3] . To tackle the depleting ground water problem, artificial recharge of ground water could be considered. Various impact assessment surveys of artificial ground water recharge in all the states have been done by Central Ground Water Board and the results are promising. It is time to implement the lessons from those surveys and reduce the rate of ground water depletion.
- Learn from international experience like China, as they have developed a technology based on capillary force

[3]Cotton only has 3 per cent of its area irrigated while sugarcane has 100per cent. The productivity of cotton is also low in Maharashtra compared to some other states like Gujarat. Also, only 18 per cent of Maharashtra's GCA is irrigated as against 100 per cent for only sugarcane.

principle known as "trace irrigation system" which is supposed to use water more efficiently even compared to drip irrigation. Japan uses "solar sharing" method to produce crop and electricity for irrigation (using PV cells) using the same field and also selling excess power to the grid, if any, to increase farmers' income. Israel, a country which is mainly a desert, does not compromise with the efficiency in water use and even uses desalinized sea water and recycled water for agricultural purposes.

Some of the major recommendation for agricultural credit subvention and crop insurance are as follows:

- Increasing bill on credit subsidy and diversion of agri-credit to non-agricultural use has called for serious review of interest subvention scheme. Also, loan waivers have the potential to trigger a cycle of events that could dry up the channels of institutional credit. Making such waivers part of a comprehensive package could increase the effectiveness of government intervention.
- Requirement of infrastructure like weather stations, drones and Low Earth Orbit (LEOs) for effective implementation of crop insurance scheme. In order to cover the entire country on block level, there is a requirement of approximately 25,000 AWS and 170,000 rainfall data loggers, in addition to 9,000 AWS that is already in place. Although the guidelines states that insurance claims would be settled in 15 days from crop damage, the technology required to operationalize this process will take time. The process of digitization of land records, linking of bank account and Aadhar number is yet incomplete. The issue of tenancy and owner has to be resolved so that the benefits of insurance are passed to the intended beneficiary.

Given the vast leakages and inefficiencies prevailing in input subsidies along with their low marginal returns in terms of poverty alleviation and agricultural growth, it is high time that policymakers in India shift their priority from subsidies to investment, and to direct income support to farmers, and free up input prices to be determined by market forces. However, this change cannot happen in one go, and our recommendation is to go gradually but steadily, at the margin. On the whole, the revival of Indian agriculture calls for prioritizing investments, rationalizing subsidies and invest in changing requirements of the modern agriculture, especially agri-R&D.

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