

# Strategies for Doubling the Income of Farmers in India- An Overview

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## 1. INTRODUCTION

Indian agriculture is passing through difficult times due to two consecutive drought situations in several parts of the country, thereby resulting into wide spread distress among farmers. The rural areas in these parts are facing food and livelihood crisis, more specifically the shortage of fodder and drinking water. Government needs to proactively address the situation and make more long term farmers centric policies related to irrigation, farm diversification, farm profitability and community support programs so as to socially and economically empower farmers.

Assets, tools, labour and capital are the key elements that take material inputs and convert into agricultural output. Land is the primary asset in case of all terrain-based farming, for field crops, orchards, plantations, aquaculture, livestock, etc. However, in case of marine fishing, the primary asset is the maritime ecosystem and the vessels that harvest the produce. The tools vary across sectors, from simpler hand held implements to industrial scale equipment and high technology systems like sonars, radar, humidity controllers and sensor based equipment. The drivers of income growth for farmers are diversification of farm activities towards high-value produce, technology up-gradation and modernisation, knowledge based enterprise development, irrigation (micro-irrigation), each having a multiplier effect in production and productivity. Value chain optimisation at every level in the supply chain, in producing and moving the produce from farm to consumers, optimal price realisation for farmers through competitive markets and improvement in terms of trade are the other factors that ensure that the productivity at field translates into gainful productivity at income level.

The efficiencies achieved from the synergistic exploitation of all of above, is decisive in the productivity achieved at farm level. These efficiencies underpin the final cost of production, the total production achieved, and the reduced stress on man, assets and the ecology. From the

farmers' perspective, the cost and volume produced are most critical, as this is the wealth that he/she creates. This wealth is thereafter available to the farmers, to be monetised at prices that are directly linked to demand. The exchange transacted is the final value realised by the farmer, and the productivity impacts on the net income achieved.

Labour includes the individual enterprise dedicated to the core farming activities, by the farmer and the farming workers. Human capital in agriculture is involved in controls and decision making and as labour in the activities undertaken. The financial capital cuts across the operations and plays a critical role in the physical capacity to deploy appropriate tools and manpower, as well in the necessary inputs that go into farming. The inputs, such as planting material, water, fertilizer, animal feed, knowledge, etc. are linked to the initial capital available and the capital generated from monetising the output.

Honourable Finance Minister Mr. Arun Jaitley during his budget speech on February 29, 2016 announced the government's resolve to double the income of farmers. Perhaps, for the first time in the history of Indian agriculture a goal of doubling of income of farmers in six years is set. To quote: "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 Arun Jaitley, Budget Speech, February 29, 2016.

## 2. TRENDS IN INCOME

### **Based on series derived from Net Domestic Product**

There are hardly any data sources that can give time series estimates of income of farmers from all sources. Cost of cultivation data gives crop-wise income details for several years and have been used to estimate farm incomes by Sen and Bhatia (2004). These estimates do not account for other

sources of income such as from livestock and non-farm business and cover only a few crops grown and that too for not all the states. GDP from agriculture is only one possible source but not comprehensive. Efforts made so far by a few scholars suffer from shortcomings. Chand *et al* (2015) discussed them and computed farm income series for 30 years from 1983-84 to 2011-12 based on NDP from agriculture and allied sectors after netting out wage bill for hired labour. This income, however, does not include earnings from non-farm sector activities and salaries and is not directly collected from farmers. Their estimates revealed that income in real terms was Rs.44688 per holding which increased from Rs.22603 during 1983-84 and Rs.34103 during 2004-05. In other words, the real income grew at the compounded rate of 3.94 per cent per annum during 2004-05 to 2011-12 which is the fastest compared to previous two decades. It took about 18 years for the income to double as income grew at the rate of 3.94 per cent. In nominal terms, however, it took just 5.55 years for income to double i.e., by 2010, from the 2004-05 level.

Based on the trends in farm income from 1983-84 to 2011-12, a few conclusions can be drawn: 1. The income earned by farmers net of input cost and wage bill has seen low and high growth paths in different periods; 2. The growth in farm income accelerated towards recent period ending 2011-12; 3. Decent growth in farm income requires high growth in output, favourable farm produce prices and some cultivators moving out of agriculture; 4. A high growth in agriculture can reduce income disparities and promote inclusive growth; 5. Low growth of farm income seems to have been associated with agrarian distress and number of suicides and the distress in recent years is likely due to poor growth in farm income post-2011-12; and, 6. More than half of farm households in the country would remain below poverty level unless they adopt high income earning avenues and augment their incomes through nonfarm activities (Chand et al, 2015 *op cit*).

### Strategies for Doubling Farmers' Income

Doubling of the incomes of farmers in nominal terms has already been happening in recent periods and it is no challenge. Doubling the income in six years, in real terms, however, is a formidable challenge and needs large scale revamping, reorientation and innovation in the initiatives. Farmer's income can increase through increasing total output and their prices, reducing production costs through lowering input use and/or reducing input prices, diversifying production mix towards more remunerative enterprises and providing earning opportunities in non-farm sector. Apart from the traditionally known risks to farmers climate change is an additional risk factor that can cause loss of farm income. Apart from this, access to good physical, economic/financial, social infrastructure such as marketing and processing facilities, godowns and cold storage capacity, banking network that can provide much needed capital, educational, medical facilities and training facilities for imparting skills that market demands is important. For it would enhance the productive capacity on

farms, help farmers realise better prices, reduce wastage, enhance shelf life, adopt better technology, meet capital needs and improve quality and quantity of livelihoods and improve employability on better terms. Risk coping and mitigation through various mechanisms including insurance would also help indemnify loss of income.

## 3. ISSUES AND INTERVENTIONS

### 1. Natural Resource Management

#### a. Land related issues

Landlessness, fragmentation and smallness of operations is not a new phenomenon, but the stage at which it stands now, has serious consequences in almost every aspect of agriculture growth and development – be it production, storage, transporting, marketing and most importantly, incomes. Whether it owns and using modern technology, farm equipment; in accessing inputs or services like extension or high transactions cost of reaching out to them. Continuous declining of average size of land has implications for agriculture credit outreach too. Banks find it increasingly difficult to finance asset generating investments as they are not viable on marginal and small farms, unless they are also leased out to neighbouring farms which is uncertain. Ironically, it is also true that small and marginal farmers account for a substantial share in vegetables and milk, cereals and fruits produced. But, with very little marketable surplus, their farming is hardly commercial. Smaller farms, smaller volumes of produce, higher transport cost, reduced ability to negotiate for better prices are the other consequences leading to lower prices and lower incomes for farmers. And that is why even interventions like MSP and procurement prices do not touch these farmers with negligible marketable surplus. Unless land leasing laws are modified urgently that allow leasing out land on long-term basis, even the benefits of commodity exchanges and market reforms will not reach the farmers. Declining incomes due to reducing farm sizes are a serious disincentive for farmers to continue farming.

The small piece of land, although not providing sufficient employment and income, Cannot be sold as it is considered as last piece of insurance and gainful sustainable employment outside agriculture does not come easily. Neither the State nor the Market has been able to provide a satisfactory solution to this chronic problem. Possible answer lies in finding out ways to aggregate farmers, to make some minimum viable size of operating farms without the individual landowners losing their ownership rights. If this happens, transaction costs of providing and availing services and inputs will come down and minimum volumes will be produced on each operating farm which would enable the owners to negotiate for better prices. Cooperative farming, collective farming, producers organizations, joint liability groups (JLGs), leasing out land, or contract farming are some possible ways of aggregation. Going by the trend, fragmentation is unstoppable and/or

increasing the average size of ownership holding is improbable. What can possibly be done is, increase the operational holding size by encouraging land leasing. We may have to allow land leasing on a long term basis primarily by protecting the interests of the owners. Land leasing on a long term basis needs to be made legal with an unequivocal undertaking that the tenant would acquire no right on land. This single step would ensure that minimum size of operated holding which would make productivity enhancing investments possible and also result in a volume of produce emendable to storing, processing or marketing.

Such a provision will enable farmers to retain their land ownership and receive a pre negotiated lease rent when they lease out, and enable the tenant to create operational holdings of that minimum size which will make agriculture viable. The State therefore may have to consider amending the land leasing laws which will encourage freely operating land lease market. This move will be contrary to the earlier thinking on land reforms and is a politically sensitive issue, but this policy decision is urgently required.

There is no uniformity across the states in the country on the legal status of tenants and land leasing law; thereby, creating obstacles for developing a vibrant land lease rental market. In many large states like Telangana, Bihar, Karnataka, etc., land leasing is banned with exceptions granted to landowners among widows, minors, disabled and defense personnel. Kerala has for long banned tenancy but permitting only self-help groups. Andhra Pradesh, Tamil Nadu and Rajasthan have liberal tenancy laws whereas West Bengal limits tenancy to sharecroppers. All these impediments give room for concealed exploitative tenancy. According to latest NSSO 70th Round findings, the leased in area as a percentage of operated area for All India is 10.9 per cent (2012-13); an increase of 4.4 per cent compared to 6.5 per cent in 2002-03.

Econometric evidence exists to show that land rental increases the productivity of land use at the plot level. Experiences in Asian countries showed positive results in agricultural entrepreneurship, productivity, production, rural diversification, income growth and rural poverty reduction etc., on account of land tenure reforms<sup>3</sup>. Studies in India has also highlighted that tenancy restrictions have reduced productivity and equity<sup>4</sup>. There is a need to have a legal framework that secures operational freedom of tenure for tenants during the period of contract, protecting legal rights of the owner, operation flexibility to the cultivators, fair fixation of tenure, periods and rentals etc.

The model land leasing practices law, prepared by the Expert Group set up by GoI and circulated to states for adoption, will enable this class of tenants to have access to institutional sources of credit, and benefits like interest subvention, crop insurance, crop failure compensation, etc. Given that land is a state subject, it is left to the states to adopt this law and to make the law work for the benefit of poor farmers in their areas. b. Improving water use efficiency –

drip, sprinkler, piped water etc. Encouraging traditional, low cost methods About 45 per cent of cropped area in the country is irrigated. Although the ultimate irrigation potential in India is estimated at about 140 million hectares, the widening gap between the irrigation potential created and the capacity utilized is a matter of concern. Water productivity defined in terms of kilogram per cubic metre of water in major states is very low especially in case of crops like rice, sugarcane, etc. Increased importance needs to be accorded to enhance water use efficiency as productivity in agriculture in terms of 'crop per drop' approach is gaining importance and being advocated. This is an area where we need to introduce water saving devices and implement carefully. Involvement of local bodies, farmers groups, FPOs in generating awareness and demonstration effect holds importance.

c. Watershed Development Quality of natural resources, use of renewable sources, policies and social institutions to regulate/manage hold utmost importance in the sustained development of agriculture. Programmes like Participatory Watershed Management Programme, Tribal Development Programme and other climate change adaptation initiatives.

Umbrella Programme on Natural Resource Management (UPNRM) etc. have created successful models to boost rural livelihoods by supporting community-managed, sustainable projects around natural resource management projects.

Participatory investments in community-based projects in dry land areas under the Watershed Development Fund have shown that watershed projects, when designed, implemented and maintained through community participation and voluntary community labour, are better executed in terms of technical parameters and lead to substantial downstream benefits for all participants. There is a need to have a fast tracked coverage of vulnerable areas under this mode of conservation and development. d. Climate change – adaptive methods, seed, cropping pattern etc. Climate change is one of the most important areas of concern not just for India but for the world today, which can impact net income of farming. New and innovative measures to adapt to climate change, commonly articulated, include: (i) changes in agricultural practices to improve the fertility of soil and enhance carbon sequestration, (ii) changes in the management of agricultural water for more efficient use, (iii) agricultural diversification to enhance resilience, (iv) development of agricultural science and technology, agricultural advisory services, and information systems; and, (v) improving risk management and crop insurance.

The goal of increasing productivity without impacting environment can be attained through diversification and selection of inputs and management practices that foster positive ecological relationships and biological processes within the entire agro ecosystem. The lack of information on agro-ecology and the demand for management skills are major barriers to the adoption of sustainable agriculture which can be attained by skilling manpower. With the help of participatory

research and extension approaches these technologies can be developed further into location-specific sustainable resource management systems. e. Soil health – thrust on micro nutrient, bio fertiliser organic manures / fertiliser / pesticides There is a need to address certain critical issues like adequate supply of good quality seeds (as it is estimated that the quality of seed accounts for 20–25 per cent of productivity). Imbalanced use of fertilizers and widespread deficiency of micronutrients are some of the reasons for the decline in the crop response ratio. Yield enhancement can be better attained with the use of micronutrients, rather than applying additional doses of chemical fertilisers. In this context, the GoI initiated and launched Soil Health Card Scheme aimed to improve soil fertility on a sustainable basis, is expected to generate good results. Side by side, wherever feasible, the conservation farm technologies such as zero tillage, laser levelling, system of rice intensification (SRI) non pesticide management, etc. are to be further studied, piloted and implemented with local adoption.

## 2. Infrastructure Support

The Indian farmer suffers on account of inadequate. In fact, inadequate infrastructure has an adverse impact on the incentive to produce itself. Opportunities for enhancing net income lie both in increasing productivity and reducing the transaction costs for farmers by providing them access to quality infrastructure at various stages of production as well as post production processes. Public sector investment in irrigation, rural roads, power, telecommunications, marketing infrastructure, research and extension services results in high growth of the agricultural sector and reduction in poverty. However, there exist larger gaps in critical infrastructure affecting the production function of Indian farmers.

A stage has come to enlarge the scope of conventional rural infrastructure by including investments in soil testing laboratories, automatic weather stations and other technology applications such as use of drones, especially in the context of risk mitigation and the new crop insurance scheme which emphasizes faster payoffs to the farmers. In addition to the physical 'hard' infrastructure, there is a case for development of soft infrastructure too. In the context of agriculture, reliable and timely information which is the key to enhanced productivity and income to farmers, is hard to come by. Conventional set up of the extension mechanism has collapsed and the R & D efforts are on low key. Investment in soft infrastructure in terms of information and research and extension services to farmers will go a long way in agriculture growth and available evidence also indicates that investment in human capital too has an important role, the returns to which can be fairly quick. While investing, the complementarity between the hard and soft infrastructure needs to be kept in view. For instance, for a farmer it is necessary to get information about price trends, but unless he has access to storage facilities to take the price advantage; and then efficient road connectivity to reach the market, mere access to information may not be sufficient. Maybe, he will

also need access to finance based on the value of his stored produce in the interim period. Studies by IFPRI show that the presumed impact of access to financial services on household income and welfare may not materialize if complementary (hard & soft) infrastructures are not put in place.

### a. Irrigating farms

In India, approximately ₹34.90 lakh crore has been invested in development of Major and Medium Irrigation (MMI) over the last 60 years and an irrigation potential of about 42.35 million ha. has been created. The gap between the created and utilized irrigation potential is 18.87 per cent for the major and minor irrigation (MMI) sector, and 12.6 per cent for the Minor Irrigation (MI) sector. The overall irrigation efficiency of the major and medium irrigation projects in India is estimated at around 38 per cent, which is low. Efficiency of the surface irrigation system can be improved from about 35-40 per cent to around 60 per cent and that of groundwater from about 65-70 per cent to 75 per cent.

The introduction of irrigation technologies which are both economically and technically efficient like drip and sprinkler can improve water use efficiency. The adoption of sprinkler irrigation in the cultivation of groundnut and cotton in Gujarat and Andhra Pradesh resulted in 35 to 40 per cent savings of irrigation water. Similarly, the adoption of drip irrigation resulted in 40 to 65 per cent savings in water for horticulture crops and 30 to 47 per cent for vegetables<sup>10</sup>. Capital investment in water efficient devices like sprinkler, drip pipelining, etc. Seems unaffordable to SF/MF, even after considerable subsidy under various schemes. There is a possibility of group based approaches, enhancing subsidy component etc. which can be explored to attract more farmers to adopt such vital tools for reducing water wastages.

### b. Storage facilities –

Decentralised, cold chain for high value agriculture The weakest link in the commodity supply chain, as far as the Indian farmers are concerned, is the marketing link where middle level agents exist in various forms cornering larger margins due to the producers, accentuated further by the lack of adequate storage facilities. Given the concerns about perishable commodities and post-harvest loss - warehousing financing as well as cold-chain storage have to be accorded priority and implemented in a decentralized way for enhancing farmers' income. Agencies like Warehouse Development and Regulatory Authority through NABARD's consultancy arm NABCONS accord accreditation to warehouses to enable issue of negotiable warehouse receipts to farmers which, in turn, dissuades distress sales by them.

### c. Digitalization of land records

Digitized and well documented land titles are essential to end myriad disputes over land, spur farmers' interest in boosting soil health and enhance access to institutional credit and government's welfare schemes. Computerization of land

records - Record of Right (RoR) helps banks to have access to information on property rights by viewing/ checking records online, including abstracts of past transactions. The 'Bhoomi' programme in Karnataka, has registered improvement in having better access on RoR, which can be replicated in other states with the support available under The National Land Records Modernization Programme (NLRMP) of GoI.

Almost all major States have initiated the online land record system and have accorded legal sanctity to computerised ROR by providing information on the web with the exception for a few smaller states Lakshadweep, Meghalaya, Mizoram, Nagaland, Sikkim, Arunachal etc. This move should be supplemented with additional steps to persuade the states to undertake land consolidation. Enable Healthy Credit Environment Timely, adequate and affordable supply of credit is necessary to meet both working capital requirements and to accelerate investment in agriculture. It is known that if the credit delivery is not on time or not adequate, farmers tend to take recourse to informal credit which adds a hefty cost to household and undermines the advantage of sub vented credit. Not merely addressing volume, but improving the efficiency of delivery also becomes the enabler. Several other enabling interventions hold importance especially the flow of term loans to enable capital formation in the sector. The disparities existing among the stages and regions are substantial and need to be curbed as far as possible, through corrective policies.

#### **a. Bank regulatory reforms**

Over the decade, credit flow to agriculture has increased tremendously but it has not been reflected in the outreach in a concomitant manner. While supply side constraints are being removed with the aid of technology, what is equally important is to improve the absorptive capacity of farmers. Security oriented lending practices, formalities involved, legal formalities of states involved still hinder credit flow especially to the asset-less farming community. In several states, loans beyond certain limits involve extra costs like stamp duties, documents/registration fees, forcing farmers to limit the loan amount sought. Rationalizing these formalities will reduce additional cost burden on farmers. Channelization of credit through Priority Sector Lending (PSL) stipulation by RBI15, specifies that within the 18 per cent (of Adjusted Net Bank Credit (ANBC), or off balance sheet exposure whichever is higher) target outlined for agriculture, 8 percent is prescribed for Small and Marginal Farmers. Non-attainment of the stipulation(overall, just above 16 per cent as at the end of March 2015) on agriculture by some banks has contributed to the imbalance in credit availability across the regions warranting careful attention in this regard.

#### **b. Improving access to credit**

Geographical limitations and its diverse nature necessitated banks to harness advantages of technology, non-conventional modes, use of intermediaries such as Business Facilitators (BF) or Business Correspondents (BC) for providing financial

and banking services. Achievements of Financial Inclusion Plan - 2013-16 highlights that the enhanced penetration of banking services through BCs in the rural areas where normal banking operations are not feasible is a cost effective way of inclusion. Considering the importance of brick and mortar branches for increasing banking penetration and financial inclusion, RBI had decided to focus on villages with population above 5000 without a commercial bank and advised the concerned State Level Bankers Committee (SLBC) conveners to allot such villages among scheduled commercial banks, including Regional Rural Banks (RRBs) for opening of branches. This process need to be accelerated to attain the target and reach the benefit of financial inclusion to the excluded by the end of March 2017.

In addition to the low access to credit, its distribution across various farm size category is also a matter of concern. Data brought out by NSSO All India Debt and Investment Survey (2013), indicate positive correlation between size of land holding and access to institutional credit in India. For example, 13 per cent farmers with land holdings of less than 0.01 ha, have access to credit from a formal banking institution (while 64 per cent borrow from private money lenders) whereas, 60 per cent of the farmers with landholding in excess of 10 ha, have access to credit from formal banking institutions (while, only 16 per cent of farmers in that category rely on private moneylenders). There is a need to reverse the trend as the credit need of asset-less group is more compared to others and borrowing from informal sources implies a direct impact on cost of agricultural operations.

#### **c. Coverage of Small/ Marginal Farmers,**

Tenant Farmers, landless cultivators- the key to bring down the cost of credit RBI, with a view to provide adequate credit to this resource starving segments, has mandated that minimum share 7 per cent of ANBC be towards SF/MF category and is to be attained by the end of March 2016 and 8 per cent by the end of March 2017. As compared to the present share of about 6 per cent of ANBC to SF/MF, the achievement of the sub-limit will have a visible positive change in dispensation of agriculture credit to SF / MF ; hence, the need for banks to strictly adhere to it.

The security based lending practice in vogue, results in asset less borrowers not get access to institutional credit or finance and land in the trap of moneylenders and middlemen for lack of collateral on their part. It is suggested that a partial solution to these issues could be JLGs whose principle of mutual guarantee and timely repayments due to peer pressure lay the basic foundation for their success. To further this, it is suggested that a sub-limit of 1 per cent of ANBC (within the 8 per cent limit meant for SF/MF) may be exclusive financing to tenant farmers.

Another example of enhancing access to small holders and tenant farmers - easing of land documentation for credit purposes may be altered to state specific situation. In view of

increasing share of non-owner cultivation and weak lease markets, tenancy certificate system introduced in Andhra Pradesh<sup>16</sup> offer scope to ensure better access to credit by overcoming stipulation of written tenancy agreements (which land-owners are reluctant to provide). Government of Andhra Pradesh had issued Loan Eligibility Cards to about 58 per cent of the tenants in the State and studies<sup>17</sup> on the concept highlight positive impact in improved access to credit by the tenant farmers. The concept is worth replication in other states with proper modifications (to overcome shortcomings of the system as revealed by the studies in AP) befitting to local conditions.

#### **d. Credit Planning - Prioritizing of investment credit for Capital formation**

Agriculture credit has recorded a compound annual growth rate (CAGR) of 22.9 per cent during the period from 2003-04 to 2014-15. During the same period short term (ST) credit increased at a CAGR of 24.9 per cent, while long term (LT) credit grew at a CAGR of 18.7 per cent. Taking into account the cropping pattern existing in major states and the scale of finance (SoF used for financing crop cultivation) of 20 major crops, prevailing in 14 major states, it has been estimated that, on an average, a bank loan of ₹42,850 is required to cultivate one hectare land (in 2014-15). Short term credit disbursed during 2014-15 at ₹6.35 lakh crore (P) is estimated to be sufficient to meet the cultivation requirement of about 148 million ha of cropped area which worked out to roughly 75 per cent of gross cropped area of the country during 2014-15. If we target 90 per cent coverage of the GCA in the country with bank loan by the year 2022, and assuming almost 10 per cent annual increase in the SoF, the rate of growth in ST credit warranted will be in the range of 13 per cent per year, which is well within the current pace of growth of ST credit.

The sluggish yield and growth of output in the agricultural sector was associated with relatively low levels of investment compared to other sectors of the economy. At the macro level, the share of investment credit in total GLC declined from 42 per cent in 2005-06 to 24.8 per cent in 2014-15. At the same time Gross Capital Formation (GCF) as a percentage of GDP in agriculture has registered a very slow increase from 14.6 per cent in 2005-06 to 15.8 per cent in 2014-15(P)<sup>18</sup>, but continue to be far below the overall capital formation in the economy (34.2 per cent of the GDP in 2014-15). Considering the higher growth target of income of farmers, and the given Incremental Capital Output Ratio (5.32 : 1)<sup>19</sup> an investment credit requirement to double the income emanating from Agriculture and allied sources, productive capacity enhancement needed in the sector is enormous. In view of the share of Private contribution in GCF agriculture at 82 per cent, the contribution of bank loan in that share at 80 per cent and the LT achievement in 2014-15 at 2.1 lakh crore, this target seems to be very hard to attain. We therefore, need to look at strategies for stimulating and directing the flow of investment credit, more from public sector, corporates and

FDI in the sector and to focus more on value addition in allied activities.

#### **e. Thrust on moderating regional imbalances –**

Focus on Central, Eastern and NE Regions The spread of indebtedness (51.9 per cent in the country, 2013) was uneven across states which ranged between 92.9 per cent in Andhra Pradesh to 17.5 per cent in Assam. Corroborating the results of the NSSO 70th Round, the GLC disbursement data also showed skewed distribution against the East and Central regions of the country. Notably, the Central region of the country accounts for 28 per cent and 32 per cent of the Gross Cropped Area (GCA) and Gross Irrigated Area (GIA), but accounts for hardly 13 per cent of the agriculture credit disbursed during 2014-15. Among all the regions in the country, the Eastern region which has share in crop production at 16.37 per cent and 14.65 per cent in GCA and 15.25 per cent in GIA, accounts for hardly 9.47 of agriculture credit disbursed. The Southern region accounts for around 18.68 per cent of GCA and 16.17 per cent in food grain production but accounted for the largest share (37.65 per cent) of agricultural credit disbursed during 2014-15. What is important is to remove the impediments in credit flow, improving the efficiency of the banking units, increase the presence of facilitating agencies and other institutions in these regions.

#### **2. Research and Development and Extension services**

Developing countries like India spend less than 10 per cent of what industrial countries put into agriculture R&D as a share of their agri GDP. It has been estimated that Brazil has received almost \$16 benefit for every dollar invested in research establishments by improving the yield level of major crops. Several other studies across the world also highlighted that biological inputs including improved varieties and agronomical practices could claim 75 per cent in case of wheat, 50 per cent of growth in yield in maize, 85 per cent for soya-bean and 24 per cent<sup>22</sup> in productivity gains.

#### **a. Research and Development to reduce yield gaps**

Investment in basic research that creates opportunities for increasing production, to the extent feasible within the climatic zone, is necessary for a reduction in yield gap. Enhancement in income necessitates intervention in people's lives and livelihoods through research learning on areas such as agricultural productivity, modern irrigation, SRI, nutrient use, livestock management etc., based on the best possible research outcomes and thereby maximize the benefit to farming community and limit adverse effects.

There is a need to shift the focus of the research and development agenda from crop centric in irrigated areas to location-specific cropping systems in dry lands, hills and tribal areas. Greater attention needs to be directed towards horticulture crops, which are land and water-saving by nature. Efforts may also be made to harness remote sensing technologies to optimize the application of inputs, and explore areas in emerging capital-intensive biotechnology with a view

to reduce yield gap. Our research agenda need to focus on nutrition, health, environmental aspects of crops, agri-business, crop mix modelling, climate changes etc.

#### **b. Precision Farming**

In view of very low level of yield of major crops, selection of suitable seeds, application of adequate inputs at appropriate time, managerial practices, etc. are crucial. In this context, the concept of precision farming needs to be stressed upon, to ensure balanced use of inputs and better yields, as it has been a reality in the West. Most of the hybrid seeds that created good results at field level are produced and marketed by private sector. Private sector as well as government agencies in India may have to work in collaboration to avoid massive investment in R&D by the private sector so that governmental agencies can concentrate on massive production and distribution of high quality seeds at low costs.

#### **c. Cultivation under controlled atmosphere –**

Low cost methods Indian agriculture continues to be under the control of monsoon. With close to 55 per cent of its arable area under the mercy of rain, its variations play a crucial role in the success of an agricultural season. There is a need to decouple agricultural output from the fluctuation of climate to ensure higher and stable income to the farmers. Location specific / cost effective methods of cultivation practices under shade/controlled atmosphere need thrust.

Considering the growing importance of horticulture and hi-tech agriculture in the Indian economy, it is pertinent that protected cultivation is encouraged in all parts of the country, specifically in the North, North-East and Hilly Regions. Moreover, focus should be on identifying and developing suitable varieties of horticulture crops for protected cultivation. Further, crop nursery practices could be standardized under protected environment to optimize the use of available space.

#### **d. Participatory extension services**

NSSO (70th Round) estimated that 59 per cent of farmers do not get technical assistance and know-how from government-funded farm research institutes or extension services. They have to instead rely on progressive farmers, the media, input suppliers, private agents etc. Public sector Extension system not able to cater to the ever rising need of the farming community.

The needs of farmers in terms of information and technology support are becoming more complex due to the rapid pace of developments and the diversity of the sector. As the latest Economic Survey has highlighted, agriculture extension services have to be revitalized by making it more relevant, useful and timely in order to improve agricultural productivity by taking the form of a one-stop-shop that offers both hardware and software solutions to raise the incomes of farmers, especially small and marginal farmers.

The lab-to-land programme and new technologies can be made effective by leveraging information technology and mobile applications. In view of larger penetration of

visual media and smart phone in rural area, the possibilities of such development can be effectively utilized for dissemination of technology and package of practices (Kisan TV, for example, providing farmers a direct interface with agricultural experts, has shown good response).

With the ICAR Vision-2050 announced last year, the ‘Farmer FIRST’ initiative aims to enhance farmers-scientists contact with multi stakeholders’ participation for technology development and application. The “Mera Gaon Mera Gaurav” concept (commenced in Patna and Sikkim) will involve multidisciplinary scientists who will “adopt” five villages within a radius of maximum 100 km and they may perform the functions with the help of KVKs and Agriculture Technology Management Agency (ATMA), both already mandated with extension of technology.

#### **3. Risk Management – Integrated approaches**

Changing risk profile of agriculture has a significant impact on the farm incomes. Specifically, the risks agriculture faces range from - not realizing the expected yield, not realizing the expected price, not realizing the expected quality of output, risk of deterioration in the output during the stages of storage and transportation, to the risks of various types including spurious inputs which can be broadly classified as manmade risks. With growing commercialization of agriculture the magnitude of loss due to these unfavourable eventualities is large. Clearly, the risks transcend the ambit of production and go over to the whole gambit of agriculture and rural life. Increasing agriculture incomes is a challenge especially at a time when the dimensions of risk in agriculture are changing.

The current development process and lack of proper risk mitigation mechanism have adversely affected farmers in India. a. Integrated approaches farm – allied –non/off farm activities In view of small size of farm and ongoing fragmentation, promotion of diversification of farm in an integrated manner (both allied and off farm) is required to ameliorate the vulnerability of small farms in the country. There is a need to evolve a holistic farm resilience mission in an inter-disciplinary manner.

The most efficient way to enhance farmers’ income is to build up intra and inter-sectoral linkages and adopt value addition. Improving farm efficiency by mutual use of other sectors’ products and by-products as inputs to the linked sectors in a scientific way can go a long way in reducing production costs. Our farm-hold needs to be reshaped into a composite economic production unit, comprising farm, allied, processing unit, nonfarm products, etc. to make it a viable and sustainable economic entity. b. Allied activities – Thrust on diversification of farm activities Farm income can be accelerated by engaging farmers in allied activities, thereby insulating them against risks of vagaries of climate. Rapidly

growing purchasing power, both in urban and rural centres, has effected shift in demand pattern in favour of products of allied sector, value added products, ready to cook and ready to eat products thus moving away from traditional staple food varieties. The opportunities available has to be tapped with appropriate investments in Dairy, Poultry, Sheep Goat, Piggery, Rabbit rearing, Fishery, value addition, food processing, etc.

India, second largest producer of fruits and vegetables in the world, has registered a growth in area under horticulture of about 3.8 per cent per annum and production by 7.6 per cent per annum over the last decade. The country is also the highest producer of milk in the world, accounting for 17 per cent of the world's production. GoI had launched the National Livestock Mission in 2014–15 for sustainable and continuous growth of the livestock sector by emulating the success achieved in the dairy and poultry sectors across species and regions. There is increasing significance of poultry and livestock products in the context of diversifying farm and non-farm activities in the agriculture sector to increase livelihood security. Fisheries constitute about 1 per cent of the total GDP of the country and 5.08 per cent of agriculture GDP.

The GoI plans to further this by implementing an umbrella scheme under its Blue Revolution initiatives, covering inland fisheries, aquaculture, marine fisheries including deep sea fishing, mari-culture, etc. Recent discourses on the doubling of farmers' income in India has led to a few prominent commentators mentioning that these sectors hold vast potential to create and stabilize income generation in farm holds. c. Universalisation of crop insurance diversified approaches for disadvantaged regions Indian farmers are susceptible to shocks and damages and in view of low insurance penetration (less than 25 per cent coverage), there is a need to put in place a very comprehensive crop insurance system. Extant crop insurance schemes are constrained by issues of low penetration, high premium, inaccurate estimation of crop damage, delay in settlement of claims, low density of weather stations and other infrastructure support, etc. The present Pradhan Mantri Fasal Bima Yojaga (PMFBY) that aims to cover 50 per cent of the farmers within 3 years, needs a very rigorous execution to be effective.

It removes previous capping on premium so that farmers get full sum insured. On the technology front, introduction of Remote Sensing Technology, Smart phones, drones are to be used for quick estimation of losses and early settlement of claims. To ensure timely support during the distress, there is a need to use technology for quick and accurate assessment of damage, timely reporting and quick disbursement of relief measures to the affected.

At present the insurance cover to the allied activities are at the nascent stage. Larger investment in the sector may necessitate a system for proper and affordable risk coverage. Involvement private sector by instituting suitable incentives will be helpful in enhancing coverage of such insurance

schemes. In addition, timely conversion and rescheduling of loans by banks, etc. in the event of calamities is also crucial in sustaining the absorption capacity of farmers.

#### **4. Marketing strategies**

##### **a. National Common Market and APMC**

There is a need to streamline the taxation laws which are at large in variance across various states/ markets. Unless various marketing costs across states are rationalised, creation of the much awaited National Common Market may not be successful, thereby the aim of integration and digitisation of marketing operations to improve price discovery mechanism may not be attainable. States/UTs like Andhra Pradesh, Arunachal Pradesh, Assam, Goa, Gujarat, Maharashtra, Mizoram, Rajasthan, Uttarakhand and Tripura etc, have made amendments to their respective APMC Act for direct marketing, contract farming and markets in private/coop sectors include while other states are yet to accomplish this. GoI aims to integrate as many as 200 mandis in 2016, another 220 in 2017 and finally, a total of 585 mandis by 2018. Amendments to the APMC Acts of the States is a pre-requisite to join this e-platform, and 12 States have already amended their APMC Acts and are ready to come onboard. Integration of state Agricultural Produce Market Committees (APMC) with National Agriculture Market (NAM) requires certain prerequisites viz., (i) a single license valid across the State, (ii) single point levy of market fee and (iii) provision for electronic auction as a mode for price discovery.

**b. Direct marketing** – Farmers Markets Major impediment faced by the farmers in the country for enhancing income is in the marketing front, which can be overcome only through encouraging direct marketing. Agriculture marketing need to improve and earlier efforts have shown positive results by drastically reducing the role of middle men in the marketing chain and improving net income of farmers.

In order to promote direct marketing, Farmers' Markets were introduced with a view to eliminate the middlemen and arrange facilities for the farmers to sell their produce directly to the consumers at reasonable rates fixed every day, in various states. If farmers can directly sell their produce to the consumers, it not only saves losses but also increases farmers' share in the price paid by the consumers. Successful initiatives such as Apni Mandi in Punjab, Uzhavar Sandai in Tamil Nadu, Rythu Markets in Andhra Pradesh, VFPCCK (Vegetable and Fruits Promotion Council, Keralam) in Kerala etc. need to be encouraged with suitable incentives and enable replication across the country.

##### **c. Commodities future/ price realization**

Commodity futures market facilitate price discovery, crop planning and thereby enable price risk management to stabilize net income of farmers. Currently, 43 of the 113 commodities that are notified for futures trading are actively traded in 4 national exchanges and 6 commodity-specific exchanges. Share of agricultural commodities in the total turnover was 18.37 per cent in 2014-15 and the remaining

(81.63 per cent) of the total turnover was contributed by bullion, metals, and energy contracts. A study by Aggarwal<sup>26</sup> observed that futures market fares relatively well on price discovery and relatively poorly on hedging effectiveness.

A committee set up by the Ministry of Finance, recommended that FMC pursue a program of market development, make banks and other financial institutions an integral part of trading in commodity derivatives, permit foreign financial firms to participate in commodity futures trading, a work program to assist the emergence of high quality warehouses, negotiability of warehouse receipts and spot market trading in warehouse receipts, strengthen the regulatory framework for the commodity futures market at the earliest. There is need to improve the access and acceptance of such markets by the small holders. This will provide the farmer with the choice of alternative marketing channels, efficient in cost, transparent in processes, prices and quality assessment, assured payment, store produce and the advantage of warehouse credit, etc.

## 5. Scaling up and Aggregation

### a. Promotion of FPOs

Farmers organizations help in overcoming the challenges of high transaction costs, security stipulations of loans and support smallholders in gaining access to markets, public services, better price etc. through collective action. Aggregations of farmers, Farmers Producers Organizations (FPOs) proved to be an effective mode to improve access to credit by SF/MF, tenant farmers etc. who are otherwise unable to get access to the banks. Group based approach also helps in dispensing subsidy (for farm mechanisation, irrigation structures, land development etc.) to the deserving without any leakage. Putting a bottom ceiling on the smallest size and pooling small farms together to form formal/informal groups of producers may be a way to realise higher net income. Successful example from Karnataka in growing rose onions and gherkins for export need further dissemination.

The predicament confronted by the FPOs such as low gestation period, weak and inadequate forward linkages, low scale and collateral issues in obtaining adequate financial supports, etc. need to be addressed. A platform at state level involving all the stakeholders, supporting agencies to take care of entire chain of FPO need to be evolved for better impact.

### b. Strengthening cooperative as multi activity agents

With the large member base, wide network of organization set up in rural area and tested acceptance at ground level, especially by small and marginal farmers, the role of co-operative banks is indispensable in the progress of farming community. Though the share of cooperative banks in agriculture credit declined from 62 per cent in 1991- 92 to 17 per cent in 2013-14, there is no substantial reduction in the share of farmers covered with cooperatives, highlighting the need for strengthening them. In areas where individual

farming is not yielding good returns, collective farm activities can be thought of to take advantages of scale, joint investment, farm mechanisation, yield gain and bargaining in marketing.

Cooperatives are proven platform to reduce the input costs, enhancing bargaining power of farmers and thereby ensuring better prices. In addition their role as aggregator, conduit to handle storage facility also help farmers to avoid distress sale and attain advantage of seasonal changes in prices.

### c. Joint liability group

JLG model is a proven mechanism to effectively spreading institutional credit to the less privileged sections such as landless farmers, tenant farmers, sharecroppers and oral lessees. As the quantum of credit is not linked to savings, the concept is helpful in meeting larger credit requirement of the members as compared to Self Help Group (SHG), minimize waiting period for loans and getting the loans without any collateral insisted by banks. JLG can take care of the needs of mid-segment clientele like small farmers, micro entrepreneurs etc. and at another level it also takes care of the more marginalised sections of the society who do not have access to proper documents like land records and property records (like tenant farmers).

In production scenario, as well, the positive impact generated by JLGs under the ambit of Kudumbashree in Kerala points the possibilities of the concept in overcoming the barriers leasing of land in accessing credit and marketing of produces. Promotional support to facilitating agencies in awareness creation and capacity building and credit incentives to the members will accelerate the process of JLG formation and its sustenance.

### 6. Off Farm / Non-Farm / Wage income

In line with the trend reported by NSSO in various rounds, the share of farmer depending solely on agriculture is on the decline. Wage income, involvement in off farm, non-farm activities in rural area continue to provide income without any seasonality. With two third of land holding in India being marginal, the relevance of farming animals, rural nonfarm activities and wage/ salaried employment cannot be overstated, meaning strategy for doubling farm income must bolster the livestock and RNFS employment as well.

### a. Skilling for diversification of activities

India is expected to have the largest available workforce in the world, in the years to come. The advantage that the country enjoys is that of the 1.2 billion population 65 per cent is under the age of 35. The average age of an Indian in 2020 will be 29, compared with 37 in China and the United States<sup>31</sup>. In order to reap the advantages of demographic dividend that India enjoy, there is a need to have a massive skill development and employment generation initiatives. GoI has initiated a comprehensive skill India campaign with an ambitious target of training and improve employability, 40 crore people by 2022 with programmes such as National Skill Development

Mission, National Policy for Skill Development and Entrepreneurship 2015, Pradhan Mantri Kaushal Vikas Yojana, etc. There are many areas where private sector can participate in the skilling initiatives. As a non profit facilitator and as also a for profit enterprise, a private/ corporate entity can involve in areas such as : (i) forecasting industry demands (ii) setting quality and industry benchmarks (iii) Strategic partnership with training providers (iv) facilitating industry on the job training and apprenticeship (v) channelizing CSR funds towards skill development (vi) investing in training infrastructure etc.

The ARYA program on “Attracting and Retaining Youth in Agriculture (ARYA) has already started in selected districts through KVKs with an objective for entrepreneurial development of Youth in Rural Areas to take up various Agriculture, allied and service sector enterprises for sustainable income and gainful employment.

#### **b. Supplementary income through Activity Based Groups**

In addition to the farm based activities, groups based income generating activities are found to be a good source of supplementary income the farm family. There are successful groups in southern states in the field of hire services, catering services, food processing, artificial jewellery making, ornamental fish rearing, textiles, bus services, etc. wherein members joined together as a group (especially women) and earned income to support family.

Being a ‘savings-first, credit later’ model, credit discipline became a norm for SHGs and ‘social collateral’ made them bankable (otherwise kept outside the ambit of formal banking). With a total number of 77 lakh SHGs (as on 31 March 2015) and around 45 lakh of them credit linked, they are seen to be far reaching but there are concerns in the sector regarding over concentration in some states/ centres, low level of credit linkages, low loan per group, slow migration to individual accounts and economic units, etc.

A larger share of SHGs has entered into income generating activities but confronted with limitations relating to marketing. Lack of maintaining quality standardization, proper branding, marketing channel, transportation and other infrastructures were highlighted as major constraints preventing the much awaited flourishing of economic units under SHG fold. State level coordinating agencies have to provide suitable branding and marketing arrangement to SHGs.

#### **c. MGNREGA to compliment family income**

Job opportunities under MGNREGA create good buffer benefiting the farming community during lean season as a reliable source of supplementary income. Effective utilization manpower available under the scheme for asset creation under common properties, water, soil protection structures, etc. generate positive impact on agriculture sector, as well. The

programme need to be continued with modification to eliminate the shortcomings reported.

### **7. Strengthening / Widening partnerships**

#### **a. Involvement of corporate**

Research and Development, technology adoption in agriculture, especially, use of biotechnology, genetic engineering, etc. in agriculture cannot be done by public sector alone, leaving larger space to private sectors. Larger involvement of private corporate are being made in specific areas such as seed industry, fertilisers, pesticides, extension, implements, marketing, irrigation etc.. There is a need to streamline the association with private corporate in agriculture. For eg. most of the hybrid seeds that created good results at field level are produced and marketed by private sector. In order to ensure availability of high quality seeds at affordable prices, the governmental agencies may have to consider association with various international players in the field by procuring seed production and multiplication technologies from them and make it available to the masses at an affordable prices. One of the recent initiative under the brand ‘Unnati’, launched 5 years back in Samireddypalli near Chittoor in AP, is an example wherein involvement of corporate reported dramatic improvement in productivity of crops. Coca-Cola, Jain Irrigation and local variety mango growers implemented ultra-high density plantation by adopting drip irrigation and specifying adequate amount of water fertilisers and pesticide, thereby raising the yield level from 1.5 tons per ha. to 5 tons per ha resulting in a commensurate growth in net income.

Private sector as well as government agencies in India may have to work in collaboration to avoid massive investment in R&D by the private sector so that governmental agencies can concentrate on massive production and distribution of high quality seeds at low costs. Possibilities also lies in areas such as hybrid seed production, micro nutrient industry, farm equipment development, extension, marketing, value addition, etc.

#### **b. Collaborative approach**

The myriad of agencies/departments/institutions involved in supporting farming community often lack coordinate functioning, and leads to multiplicity of schemes and lack much needed concerted attention on issues. The success of Bhoochetana scheme in enhancing yield rate of major crops in rainfed areas in Karnataka based on 4Cs underscore the importance of coordinated mission mode approach. Consortium (of development agencies including academic institutions), Convergence (of all development schemes), Capacity Building and Collective action made a difference in the success of the scheme. At the decision making level, an umbrella platform needs to be evolved to collaborate all the related schemes and activities to avoid duplication in effort and leakages as well.

### c. Supply chain approach and contract farming

Agricultural supply chains involve both backward as well as forward linkages among all the stakeholders i.e. input companies, government institutions, market intermediaries, consumers and farmers<sup>35</sup>. Agencies involved in provision of seeds, pesticides, fertilizers, farm machinery, information on farming practices, weather, sowing and harvesting time, pest management, fertilizer use, etc. to farmers constitute links in the supply chain. Contract farming and supermarket procurement arrangements are two supply chain arrangements that are gaining ground in India. Recent experiences indicate that contract farming and supermarket procurement approaches will have to involve small-scale farmers in the medium term, as the farm structure obliges them to do so.

Success of such initiatives depend on factors such as ease of entry and competition among buyers, organizing farmers into formal or informal groups, enhancing farmers' capacity to adopt improved production and postharvest techniques, enabling farmers to obtain capital to make on-farm improvements, training farmers and buyers about their rights and obligations and developing institutions to assist farmers, etc.

Shortcomings in extending or larger play of banks in supply chain such as large number of small players and higher transaction cost involved, difficulty in organizing them, default level and weak legal framework, politically unstable decision, etc. need to be overcome for the success of the concept. The successful contract farming practices by companies like Appachi Cotton, AVT Natural Products, Cargill India, Escorts, The Global Green, Hindustan Lever, ITC - IBD Ken Agritech, Mahindra Shubhlabh Services, Nestle India, etc. in the field of cotton, maize, vegetable, agro processing, etc. need further replication to assure stable growth in agriculture.

### d. Non-Government Organisations

Non-Government Organizations (NGOs) and Non-profit organizations work with various intentions to uplift the poor, economically weaker, marginalized, underprivileged, impoverished, etc. and innovate and participate in various schemes and programmes of their own, in collaboration with governments or with international organizations. The advantages of these low cost agents of growth in reaching out to people at the ground level and helping minimize leakages, need to be utilized.

One of the prominent reasons highlighted for backwardness in the field of social and development initiatives in North and North East India Region (NER) having impact on financial inclusion, health, education, livelihood, and environment is the scarcity of good NGOs. There is also a need for local and regional networking of NGOs working in the field which will help in creating opportunities for mutual learning, identifying appropriate development initiatives, mobilization of resources, improving coordination among line departments, planning extension, share research findings,

approaches, resources, cooperation with corporate sector and government agencies.

### III. Summary

Agriculture today is far more integrated with the macro economy - even global economy for that matter - and no longer 'rural only' in orientation with the increasing aspirations. The ramifications of such linkages with the macro concerns are far more explicit than food security or inflation. Issues in the sector go much beyond production, to the entire management of food economy covering product diversification, pricing, procurement, storage, transport distribution, marketing, mitigation of risks etc., calling for policies looking at agriculture far more comprehensively. Beyond such issues, questions are emerging like, Can we think of making a farm viable without making farmer viable? If agriculture is facing challenges can rural sector do well? If rural money power does not sustain, will the economy grow? The initiative of doubling the farm income by 2022 has to be viewed against this background.

While the significance of having an enabling environment is not new, the current concerns warrant a fresh and comprehensive examination of the factors, especially those that are unique to biological nature of the agriculture sector. While examining the elements that constitute an enabling environment, it needs to be recognized that the components of enabling environments considered by traditional assessment frameworks are relevant and necessary, but not sufficient to cover the specific requirement of the initiatives on hand.

The general observation is that the enabling environments are forged by the traditional, broader macro-level forces (political, social and economic) that are relevant to other sectors of an economy. However, specific additional factors were also identified as essential. Efficient land markets and tenure systems; access to appropriate rural and agricultural finance and risk management products; specific regulatory provisions, consistent trade policies and access to regional / national / global markets as per the requirements; availability of skilled human resources, improved technologies and adequate infrastructural facilities and utilities are but a few. The priority ranking of these factors differs from region to region – reflecting each region's level of development and the critical bottlenecks facing its strategic commodities.

Enabling environment could do well to absorb diverse approaches to income enhancements, viz., by saving on cost, by increasing productivity and by using both approaches. It should also keep the perspective of inter-sectoral complementarities and convergence opportunities, so as to help the farm household incomes grow in conjunction with the farm economy as a whole. It should be flexible enough to accommodate and address the state/location specific issues to make the exercise more realistic.

For years together, various stakeholders have been trying to create a conducive environment, yielded mixed results but nevertheless, have gained very useful experience. The build-up of the enabling environment now has to happen on the strength of this experience. Understanding the specific efforts of each of the stake holders and facilitate convergence of knowledge, strength and practice in a manner which will make a difference to the farmers, farms and the rural areas needs to be focussed. Given the time frame, the emphasis now, could be on co joining their knowledge with possible practical solutions. The available framework for the enabling environment has to keep the state specific needs, in fact, as close to the location specific needs.

Fresh investments in agriculture and creation of infrastructure are no doubt important, but improving efficiency of existing infrastructure might bring quicker results. Bringing soft infrastructure in terms of information, demonstrations and advisories to farmers, in conjunction with the given hard infrastructure would make greater impact on farmers. Investments are absolutely essential, but alongside, ground level institutions which have proved to be effective in giving the benefits of aggregation in financial terms are also critical. All these in tandem with well entrenched institutions will help farmers tide over the adverse environment on the basis of the social capital already created.

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