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Ministry of Agriculture &
Farmers Welfare

Report of the Committee on Doubling Farmers' Income

Volume XIII

**“Structural Reforms and
Governance Framework”**

**“Strengthening the Institutions, Infrastructure and
Markets that Govern Agricultural Growth”**

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Foreword

The country has witnessed a series of concerted discussions dealing with the subject of agriculture. In 1926, the Royal Commission of Agriculture was set up to examine and report the status of India's agricultural and rural economy. The Commission made comprehensive recommendations, in its report submitted in 1928, for the improvement of agrarian economy as the basis for the welfare and prosperity of India's rural population. The urban population was about 11 per cent of the whole, and demand from towns was small in comparison. The Commission notes, that communication and physical connectivity were sparse and most villages functioned as self-contained units. The Commission encompassed review of agriculture in areas which are now part of Pakistan, Bangladesh and Myanmar. The net sown area in erstwhile British India was reported as 91.85 million hectares and cattle including buffaloes numbered 151 million. Almost 75 per cent of the cultivated area was under cereals and pulses, with rice and wheat occupying 46 per cent of the net sown area. The area under fruits and vegetables was about 2.5 per cent and that under oilseeds and non-food crops was about 20 per cent. In the ensuing years, as well known, the country underwent vast changes in its political, economic and social spheres.

Almost 40 years later, free India appointed the National Commission on Agriculture in 1970, to review the progress of agriculture in the country and make recommendations for its improvement and modernisation. This Commission released its final report in 1976. It refers to agriculture as a comprehensive term, which includes crop production together with land and water management, animal husbandry, fishery and forestry. Agriculture, in 1970 provided employment to nearly 70 per cent of the working population. The role of agriculture in the country's economic development and the principle of growth with social justice, were core to the discussions. The country was then facing a high population growth rate. After impressive increase in agricultural production in the first two Five Year Plans, a period of stagnancy set in and the country suffered a food crisis in the mid-1960s. The report in fifteen parts, suggested ample focus on increased application of science and technology to enhance production.

Thirty years hence, the National Commission for Farmers was constituted in 2004 to suggest methods for faster and more inclusive growth for farmers. The Commission made comprehensive recommendations covering land reforms, soil testing, augmenting water availability, agriculture productivity, credit and insurance, food security and farmers competitiveness. In its final report of October 2006, the Commission noted upon ten major goals which included a minimum net income to farmers, mainstreaming the human and gender dimension, attention to sustainable livelihoods, fostering youth participation in farming and post-harvest activities, and brought focus on livelihood security of farmers. The need for a single market in India to promote farmer-friendly home markets was also emphasised.

The now constituted DFI (Doubling Farmers' Income) Committee besides all these broad sectoral aspects, invites farmers' income into the core of its deliberations and incorporates it as the fulcrum of its strategy. Agriculture in India today is described by a net sown area of 141 million hectares, with field crops continuing to dominate, as exemplified by 55 per cent of the area under cereals. However, agriculture has been diversifying over the decades. Horticulture now accounts for 16 per cent of net sown area. The nation's livestock population counts at more than 512 million. However, economic indicators do not show equitable and egalitarian growth in income of the farmers. The human factor behind agriculture, the farmers, remain in

frequent distress, despite higher productivity and production. The demand for income growth from farming activity, has also translated into demand for government to procure and provide suitable returns. In a reorientation of the approach, this Committee suggests self-sustainable models empowered with improved market linkage as the basis for income growth of farmers.

India today is not only self-sufficient in respect of demand for food, but is also a net exporter of agri-products occupying seventh position globally. It is one of the top producers of cereals (wheat & rice), pulses, fruits, vegetables, milk, meat and marine fish. However, there remain some chinks in the production armoury, when evaluated against nutritional security that is so important from the perspective of harvesting the demographic dividend of the country. The country faces deficit of pulses & oilseeds. The availability of fruits & vegetables and milk & meat & fish has increased, thanks to production gains over the decades, but affordability to a vast majority, including large number of farmers too, remains a question mark.

The impressive agricultural growth and gains since 1947 stand as a tribute to the farmers' resilience to multiple challenges and to their grit & determination to serve and secure the nation's demand for food and raw material for its agro-industries.

It is an irony, that the very same farmer is now caught in the vortex of more serious challenges. The average income of an agricultural household during July 2012 to June 2013 was as low as Rs.6,426, as against its average monthly consumption expenditure of Rs.6,223. As many as 22.50 per cent of the farmers live below official poverty line. Large tracts of arable land have turned problem soils, becoming acidic, alkaline & saline physico-chemically. Another primary factor of production, namely, water is also under stress. Climate change is beginning to challenge the farmer's ability to adopt coping and adaptation measures that are warranted. Technology fatigue is manifesting in the form of yield plateaus. India's yield averages for most crops at global level do not compare favourably. The costs of cultivation are rising. The magnitude of food loss and food waste is alarming. The markets do not assure the farmer of remunerative returns on his produce. In short, sustainability of agricultural growth faces serious doubt, and agrarian challenge even in the midst of surpluses has emerged as a core concern.

Farmers own land. Land is a powerful asset. And, that such an asset owning class of citizens has remained poor is a paradox. They face the twin vulnerabilities of risks & uncertainties of production environment and unpredictability of market forces. Low and fluctuating incomes are a natural corollary of a farmer under such debilitating circumstances. While cultivation is boundarised by the land, market need not have such bounds.

Agriculture is the largest enterprise in the country. An enterprise can survive only if it can grow consistently. And, growth is incumbent upon savings & investment, both of which are a function of positive net returns from the enterprise. The net returns determine the level of income of an entrepreneur, farmer in this case.

This explains the rationale behind adopting income enhancement approach to farmers' welfare. It is hoped, that the answer to agrarian challenges and realisation of the aim of farmers' welfare lies in higher and steady incomes. It is in this context, that the Hon'ble Prime Minister shared the vision of doubling farmers' income with the nation at his Bareilly address on 28th February, 2016. Further, recognising the urgent need for a quick and time-bound transformation of the

vision into reality, a time frame of six years (2016-17 to 2022-23) was delineated as the period for implementation of a new strategy.

At the basic level, agriculture when defined as an enterprise comprises two segments – production and post-production. The success of production as of now amounts to half success, and is therefore not sustainable. Recent agitations of farmers (June-July 2017) in certain parts of the country demanding higher prices on their produce following record output or scenes of farmers dumping tractor loads of tomatoes & onions onto the roads or emptying canisters of milk into drains exemplify neglect of other half segment of agriculture.

No nation can afford to compromise with its farming and farmers. And much less India, wherein the absolute number of households engaged in agriculture in 2011 (119 million) outpaced those in 1951 (70 million). Then, there are the landless agricultural labour who numbered 144.30 million in 2011 as against 27.30 million in 1951. The welfare of this elephantine size of India's population is predicated upon a robust agricultural growth strategy, that is guided by an income enhancement approach.

This Committee on Doubling Farmers' Income (DFI) draws its official members from various Ministries / Departments of Government of India, representing the panoply of the complexities that impact the agricultural system. Members drawn from the civil society with interest in agriculture and concern for the farmers were appointed by the Government as non-official members. The DFI Committee has co-opted more than 100 resource persons from across the country to help it in drafting the Report. These members hail from the world of research, academics, non-government organisations, farmers' organisations, professional associations, trade, industry, commerce, consultancy bodies, policy makers at central & state levels and many more of various domain strengths. Such a vast canvas as expected has brought in a kaleidoscope of knowledge, information, wisdom, experience, analysis and unconventionality to the treatment of the subject. The Committee over the last more than a year since its constitution vide Government O.M. No. 15-3/2016-FW dated 13th April, 2016 has held countless number of internal meetings, multiple stakeholder meetings, several conferences & workshops across the country and benefitted from many such deliberations organised by others, as also field visits. The call of the Hon'ble Prime Minister to double farmers' income has generated so much of positive buzz around the subject, that no day goes without someone calling on to make a presentation and share views on income doubling strategy. The Committee has been, therefore, lucky to be fed pro-bono service and advice. To help collage, analyse and interpret such a cornucopia of inputs, the Committee has adopted three institutes, namely, NIAP, NCAER and NCCD. The Committee recognizes the services of all these individuals, institutions & organisations and places on record their service.

Following the declaration of his vision, the Hon'ble Prime Minister also shaped it by articulating 'Seven Point Agenda', and these have offered the much needed hand holding to the DFI Committee.

The Committee has adopted a basic equation of Economics to draw up its strategy, which says that net return is a function of gross return minus the cost of production. This throws up three (3) variables, namely, productivity gains, reduction in cost of cultivation and remunerative price, on which the Committee has worked its strategy. In doing so, it has drawn lessons from the past and been influenced by the challenges of the present & the future.

In consequence, the strategy platform is built by the following four (4) concerns:

- Sustainability of production
- Monetisation of farmers' produce
- Re-strengthening of extension services
- Recognising agriculture as an enterprise and enabling it to operate as such, by addressing various structural weaknesses.

Notwithstanding the many faces of challenges, India's agriculture has demonstrated remarkable progress. It has been principally a contribution of the biological scientists, supplemented by an incentivising policy framework. This Committee recognizes their valuable service in the cause of the farmers. It is now time, and brooks no further delay, for the new breed of researchers & policy makers with expertise in post-production technology, organisation and management to take over the baton from the biological scientists, and let the pressure off them. This will free the resources, as also time for the biological scientists to focus on new science and technology, that will shift production onto a higher trajectory - one that is defined by benchmark productivities & sustainability. However, henceforth both production & marketing shall march together hand in hand, unlike in the past when their role was thought to be sequential.

This Report is structured through 14 volumes and the layout, as the readers will appreciate, is a break from the past. It prioritizes post-production interventions inclusive of agri-logistics (Vol. III) and agricultural marketing (Vol-IV), as also sustainability issues (Vol-V & VI) over production strategy (Vol. VIII). The readers will, for sure value the layout format as they study the Report with keenness and diligence. And all other volumes including the one on Extension and ICT (Vol. XI), that connect the source and sink of technology and knowledge have been positioned along a particular logic.

The Committee benefited immensely from the DFI Strategy Report of NITI Aayog. Prof. Ramesh Chand identified seven sources of growth and estimated the desired rates of growth to achieve the target by 2022-23. The DFI Committee has relied upon these recommendations in its Report.

There is so much to explain, that not even the license of prose can capture adequately, all that needs to be said about the complexity & challenges of agriculture and the nuances of an appropriate strategy for realising the vision of doubling farmers' income by the year of India's 75th Independence Day celebrations.

The Committee remains grateful to the Government for trusting it with such an onerous responsibility. The Committee has been working as per the sound advice and counsel of the Hon'ble Minister for Agriculture and Farmers' Welfare, Shri Radha Mohan Singh and Dr. S.K. Pattanayak, IAS, Secretary of the Department of Agriculture, Cooperation and Farmers' Welfare. It also hopes, that the Report will serve the purpose for which it was constituted.

12th August, 2017

Ashok Dalwai
Chairman, Committee on
Doubling Farmers' Income

About Volume XIII

The thirteenth volume of the Report of the Committee on Doubling Farmers' Income (DFI) examines the structural weaknesses and reforms needed in the agricultural system. The discussions in this volume range from recommending reforms in the land policy and trade regime to defining a farmer, farmers' welfare, measure and monitoring farmers' income, and overseeing the operationalisation of the strategy for doubling farmers' income.

Normally, it is seen that focus is given to improved administrative efficiency and upgraded management practices to achieve enhancement in delivery of goods and services with respect to both time and quality. The DFI Committee deliberated upon this approach and concluded that this would not suffice. Given that, doubling farmers' income within a tight time schedule is a leap forward that entails a totally new approach to the practice of agriculture, the structural constraints and challenges needed to be addressed. Hence, it worked upon important dimensions of structural reforms and governance framework as related to farmers and farm income.

Considering that the vision to double farmers' income correlates with developments in other areas of public expenditure, the necessary synergy to bring improved convergence to the interventions undertaken by various departments and ministries is also a vital discussion. The challenge to double farmers' income can be fulfilled when all ministries, not just agriculture alone, offer an active partnership in meeting this target.

This volume highlights how improved use-efficiency of the farming assets, people and regulations can accelerate the necessary changes in the agricultural system, as has been discussed in the previous volumes of the DFI Report. As such, this volume will reiterate certain previously discussed recommendations and will explain the structural changes required in every aspect of the support and governance mechanism at different levels.

This volume of the Report, is expected to aid planners, governance bodies and citizens to revisit the existing mode of functioning and appropriately redefine how the agricultural sector is approached. A paradigm shift in attitude and action, from the erstwhile production-centric agenda, towards income-centric sustainability for farmers and nutritional security of the country is the future for India's agricultural development.

Ashok Dalwai

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Doubling Farmers' Income

Volume XIII

“Structural Reforms and Governance Framework”

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Chapter 1

Structural Reforms for Higher Efficiency

In transforming India's agriculture, there will be basic challenges, which are structural in nature. The planned change has to be time-bound, resource use efficient and cost effective. In order to drive the change for desired results, the speed & quality of implementation of the action plan is important. However efficient such execution, the outcome will be limited, if the system suffers from certain inherent constraints. These need to be identified & addressed to realise the full potential of the strategy for change.

1.1. Shifting the Production and Income Curves

The previous volumes of this Report logically analyse the constraints and challenges and offer potential solutions to raising the farm income. The strategy essentially advocates transforming agriculture into agri-business, which means that the outcome of agriculture should preferably be measured in terms of income returns per unit of asset (land/waterbody/livestock/bird etc.) as against measuring it in terms of production per unit of asset. The strategy then argues for improving productivity, reducing cost of cultivation/production and realising remunerative prices on the produce, for net positive returns at the farmer's level. While various interventions suggested in the pre-production, production and post-production stages will bring in greater efficiency and result in higher returns to the farmer, the inherent bottlenecks that plague the agricultural structure in India today, do not permit the factors of production to play up fully and contribute at their optimal level. The operational efficiency realised even under best circumstances of implementation is likely to be linear and hence incremental in impact.

Operational efficiency in agriculture can be defined as the ratio between an output gained from an agricultural activity and an input used to run this activity. When improving an activity's operational efficiency, the output to input ratio improves and should drive agricultural policy.

Inputs would typically include water / fertilizer, etc., money, man-power (measured as headcount or as the number of full-time equivalents) and time / effort. Outputs would refer to the harvested grain, fruit, vegetable, milk, meat, fish, fibre, by-products and other material. Both require to be computed in terms of value and not only in quantity. It is possible to shift the production curve, as also the income curve to the next higher level by identifying and addressing the systemic constraints.

There exist certain structural weaknesses, which when appropriately addressed will mean the enhancement of the genetic potential of the factors of production; and expansion of the space for these factors to express more wholesomely. Thus, the same intensity of operational interventions will bring more visible results in the following ways:

- efforts made to achieve higher productivity will shift the productivity curve;
- initiatives undertaken to achieve resource use efficiency will result in greater resource saving and cost saving; and
- measures taken to improve marketing efficiency will yield higher returns on output.

1.2. Basic Constraints Facing Agriculture Sector

Land, labour and capital have for long been recognised as the principal factors of production. These also constitute the factors of production in industry. However, what differentiates these two sectors, making agriculture much more complex is its biological nature. While in case of a production system based on mechanical processes, the variables can be controlled, and hence, there exists the scope for manoeuvring the demand and supply, agriculture sector suffers from lack of this opportunity.

Being biologically dependent, the variables like climate & weather and their ramifications (temperature, humidity, rainfall, etc.) which are external to the management system are not manoeuvrable. The downside of this is, that the investments made in the factors of production by a farmer are irrecoverable and the outcome is more a matter of chance. The statistical probability of success is at best 50:50, and in reality is worse-off, most of the time.

Further, once the investments are made in the production process which begins with land preparation and sowing/planting, it is Hobson's choice with respect to the supply side. The scope for varying the supply according to demand dynamics is non-existent. The consequence is, that the farmers as a collective body become vulnerable to market dynamics, and tend to suffer from price volatility and fluctuations in the market, just as they face risks in the production environment till the harvest.

As seen above, the space available to play with the factors of production, at the farmer's level, is limited. Further, these challenges are compounded by the very size, availability and accessibility of these factors. The structure of land holding and land immobility; access to inputs including credit as obtains today do not provide a favourable environment to the farmers to practise enterprise based and profit generating farming. On the contrary, the situation constrains the farmer from working efficiently and effectively.

Apart from these well recognised factors of production, the new challenge that is staring at the farmers is the certainty of climate change. The implications of climate change are multiple and intense. The long evolved system of agricultural system itself is at risk, on account of changing seasons as also vulnerability of crops, livestock, poultry, fishery, etc. to pests and diseases. The cost of mitigation and adaptation to the new parameters of temperature, rainfall etc., are huge and it is the small and marginal farmers who will experience greater pain.

1.3. Important Structural Weaknesses

The target of doubling farmers' income by 2022-23 is only a first radical step, engendering a fundamental shift, to the way agriculture has so far been perceived and practiced in India. If the agriculture sector is to respond suitably to the redefined mandate (DFI Volume-VIII), it will require continuous transformation, so that it acquires the characteristic of agri-enterprise, whereby farmers take to agriculture as a chosen option, and are able to earn their livelihood as entrepreneurs and simultaneously cater to the country's strategic requirement of food security.

It is in this context, that some basic structural issues are identified, so that appropriate reforms can be effected. These are:

- i. Land divisions and fragmentation.
- ii. Definition of a farmer - many exclusions.
- iii. Uncontrolled variables - production risks and market unpredictability.
- iv. Controlled regime – difficulty in doing agri-business.
- v. Agricultural policies – holding back income growth.
- vi. Infrastructure constraints – limiting the market and income growth.
- vii. Climate change – complicating the agriculture.

Addressing and mitigation of these structural concerns is discussed in following chapters.

Key Extracts

- Transformation to the agricultural eco-system, will require time-bound, efficient and effective changes. The outcomes will be limited unless certain structural weaknesses in the system are appropriately addressed.
- The structural weaknesses range from operational limitations, policy controls and infrastructural constraints, to unpredictable variables and climate change impact.
- Each of these weaknesses, if countered in isolation, will not fully address the concerns. The targeted outcome should aim to measure a shift in the productivity curve, improved resource use efficiency and in yielding higher returns to farmers.
- Mitigating the basic structural weakness will be an important facet in implementing and guiding the agenda to double farmers' income.

Chapter 2

Structure of Land Holding

Land is the principle asset of a farmer, and it constitutes the basic input in farming. On account of continuing division and fragmentation of land, the size of a farmer's holding has become a concern. The viability of farming and the income that a farmer earns thereof are posing a challenge. This chapter examines the impact of land size on farm-incomes and identify probable solutions.

2.1. Changing Agrarian Structure

Today, Indian agriculture is dominated by small and marginal farmers, who account for more than 86 per cent of the total number of landholdings, that counted to 11.88 crore as per 2011 census. The net arable land measures 141 million hectares. The number of land holdings have been steadily increasing since 1951, when they were 6.99 crore in number. In the year 1995-96, number of holdings were 11.55 crore and the average size of holding was 1.41 ha. and by 2010-11, the average size declined to 1.15 ha. The country's population has been increasing steadily since independence and the dependence on agricultural output has only increased.

While the population dependent on agriculture for livelihood has come down from more than 70 per cent in 1951 to 48 per cent by 2011, in absolute terms, the number of families and the number of holdings have only increased. The NSSO's Situation Assessment Survey (SAS), during the agricultural year July 2012 – June 2013 shows that, of the estimated 15.61 crore number of rural households, the number of agricultural households stood at 9.02 crore, accounting for 57.8 per cent of the former.

Further, of the 86 per cent of the small and marginal land holdings, the majority are marginal (equal to less than 1 ha. in size). The small size of land holdings is a challenge by itself, which is rendered more complex by its fragmentation. While land division is linked to law of inheritance, fragmentation is associated with the practice of dividing and sharing every piece of land among the inheritors.

Most farms in India are thus family farms, sometimes referred to as 'handkerchief size' holdings. The changing agriculture structure, as it pans out in different states, is detailed in DFI Volume-I. It is important to note, that land size has a bearing on production, input costs and final income. The income from operational efficiency is influenced by the size of land holding. It is difficult operationally to individually harvest the scales of economy at both production and post-production stages, and this adversely impacts the costs of production and transaction.

2.2. Land Size and Income

As per NSSO's 70th Round, the average annual income of an agricultural household came from four (4) sources, namely, cultivation, livestock, non-farm business, and wages & salaries. The average annual income was Rs. 77,976 in 2012-13.

The average ratio of farm to non-farm income as a proportion of the farmers' income was 60.20: 39.80 (60:40 approx). It is relevant to observe, that the ratio of farm income was directly

correlated with the size of the landholding (categorised as marginal + small, medium + semi-medium, large) as presented below:

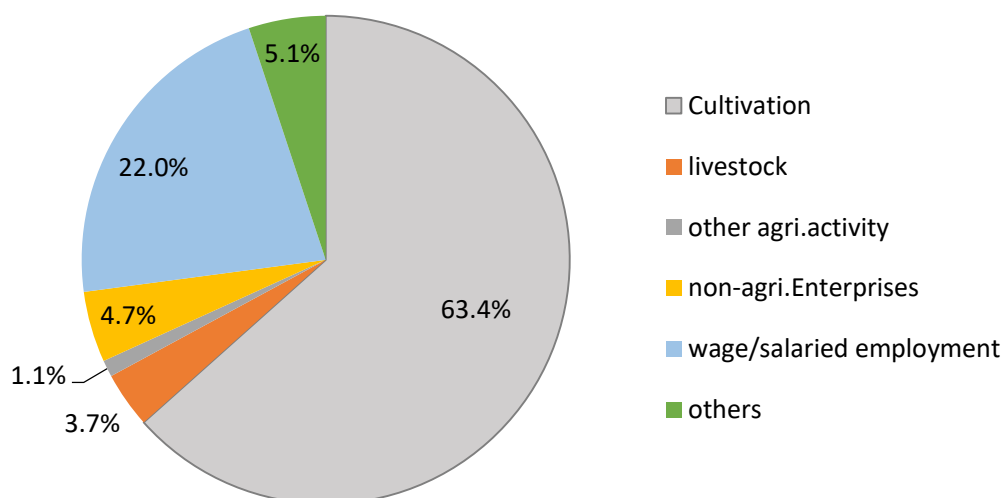
- The income ratio from cultivation increased from 36.5 per cent (marginal + small) to 70.8 per cent (medium + semi-medium) to 85.5 per cent (large).
- The income ratio from livestock declined from 14.8 per cent (marginal + small) to 11.5 per cent (medium + semi-medium) to 6.9 per cent (large).
- The income ratio from wages and salaries declined from 37.5 per cent (marginal + small) to 13.0 per cent (medium + semi-medium) to 3.2 per cent (large).
- The income ratio from non-farm business declined from 7.2 per cent (marginal + small) to 4.8 per cent (medium + semi-medium) to 4.4 per cent (large).

It is obvious, that size of the landholding impacts the percentage of income that accrues to the farmer. It therefore, has a say on the viability of farming and the status of farmers' income.

As per the same NSSO 70th Round (July 2012 – June 2013), while the average monthly income of a farm household in 2012-13 was Rs. 6,426, the average monthly consumption expenditure was Rs. 6,223, leaving a paltry surplus of Rs. 203. That, farmers owning upto 1 ha. of land are not able to balance their farm budget is also clear from the same survey.

Among various sources from which the agricultural households derived at least some income during 365 days prior to the date of survey, the source that yielded the maximum income was taken as the principal source of income. As clear from figure 2.1 below, agricultural households were mainly dependent on *cultivation* followed by *wage / salaried employment* for their livelihood, as about 63.5 per cent of the agricultural households reported cultivation, and 22 per cent reported wage / salaried employment as their principal source of income.

Figure 2.1 Percentage distribution of agriculture households by principal source of income



Source: NSSO's SAS of Agricultural Households (July 2012 – June 2013)

2.2.1. Principal source of income and land size

The principle source of an agricultural household (AH)'s income is largely a function of the extent of land possessed. This is exemplified by the data vide table below.

Table 2.1 Distribution of agricultural households by principle source of income during the last 365 days for each size class of land possessed.

Size class of land possessed (ha)	Per 1000 distribution of households by principal source of income							No. of agri. Households, estd. ('00)
	Cultivation	Livestock	Other agricultural activity	Non-agricultural enterprises	Wage / salaried employment	Others *	All	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
<0.01	16	229	27	108	564	55	1000	22,890
0.01 – 0.40	421	48	12	75	352	93	1000	287,663
0.41 – 1.00	692	23	9	36	200	41	1000	314,811
1.01 – 2.00	830	25	9	32	86	18	1000	154,577
2.01 – 4.00	859	24	11	16	71	18	1000	84,345
4.01 – 10.00	879	27	5	9	59	20	1000	33,019
10.00 +	894	55	15	18	17	1	1000	3,706
All sizes	635	37	11	47	220	51	1000	902,011

Source: (NSSO's 70th Round of SAS of Agricultural Households (July 2012 to June 2013))

*others' includes pension and remittance also

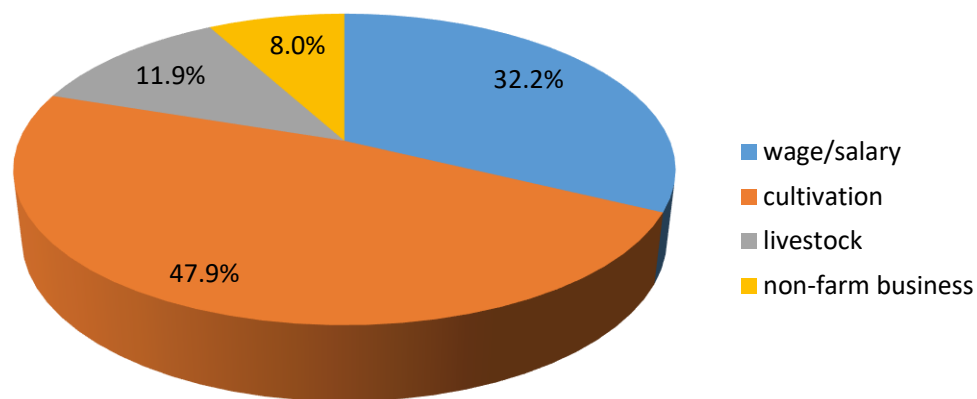
The table above highlights that:

- Among the agricultural households (AHs) possessing less than 0.01 hectares of land (which included landless agricultural households also), about 50 per cent reported wage / salary employment as their principle source of income, while another 23 per cent reported livestock as the principle source.
- The class of AHs that possessed little land (0.01 to 0.40 ha) earned their income from both cultivation (42 per cent) and wage / salary employment (35 per cent).
- Majority of AHs with more than 0.40 ha of land reported cultivation as the principle source of income.
- Non-agricultural enterprises were the principle source of income for about 8 per cent and 11 per cent of the AHs, respectively, of bottom two size classes of land possessed (<0.01 ha and 0.01 – 0.40 ha).

2.2.2. Income and Expenditure – A farmer's balance sheet

Average monthly income of the agricultural households included net receipts from cultivation, farming of animals, non-farm business and income from wages / salaries.

Figure 2.2 Distribution of average monthly income per agricultural households by sources



Source: NSSO's 70th round of SAS, July 2012 – June 2013

In the following two tables, further examination is done with respect to an AH's monthly income and consumption expenditure and net investment in productive assets. The data brings out that net receipt from cultivation was directly correlated to the size of land class – lower the size class of land, lesser the net receipt (net receipt was worked out by deducting total expenses from total receipt for each source of income).

This indicates, that the size of land held matters in earning a farm income. Similarly, as brought out in the same table, net investment in productive assets per agricultural household increased with increase in land size. The capacity of a farmer to invest in productive assets influences the farm income and viability of farming.

Table 2.2 Average monthly income from different sources, consumption expenditure and net investment in productive assets (Rs.) per agricultural household during July 2012 – June 2013 for each size class of land possessed

Size class of land possessed (ha)	Income from wages / salary (Rs.)	Net receipt from cultivation (Rs.)	Net receipt from farming of animals (Rs.)	Net receipt from non-farm business (Rs.)	Total income (Rs.)	Total consumption expenditure (Rs.)	Net investment in productive assets (Rs.)	Estd. No. of agri. Households* (00)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
<0.01	2902	30	1181	447	4561	5108	55	23857
0.01 – 0.40	2386	687	621	459	4152	5401	251	287381
0.41 – 1.00	2011	2145	629	462	5247	6020	540	315008
1.01 – 2.00	1728	4209	818	593	7348	6457	422	154810
2.01 – 4.00	1657	7359	1161	554	10730	7786	746	83964
4.01 – 10.00	2031	15243	1501	861	19637	10104	1975	33519
10.00 +	1311	35685	2622	1770	41388	14447	6987	3499
All sizes	2071	3081	763	512	6426	6223	513	902039

Source: NSSO's 70th Round of SAS, July 2012-June 2013

*estimated number of households based on the common households of visit 1 and visit 2 differs from the estimate based only on visit I households due to effect of multiplier

Figure 2.3 An agricultural household budget by land holding

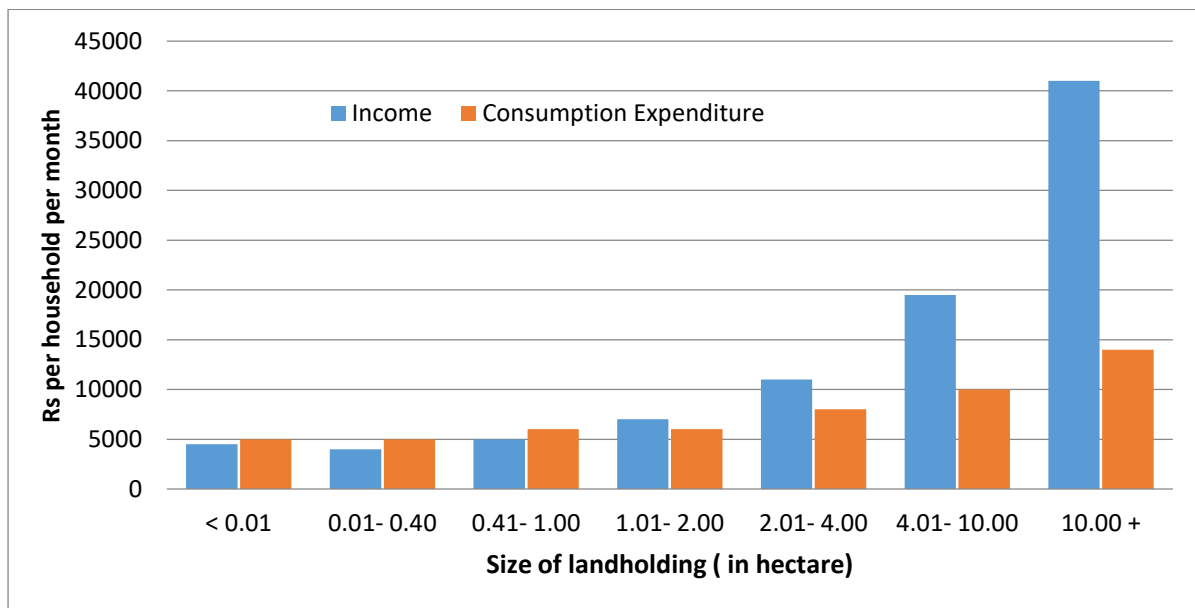


Table 2.3 Average monthly income from different sources, consumption expenditure and net investment in productive assets (Rs.) per agricultural household during July 2012 – June 2013 for each size class of MPCE

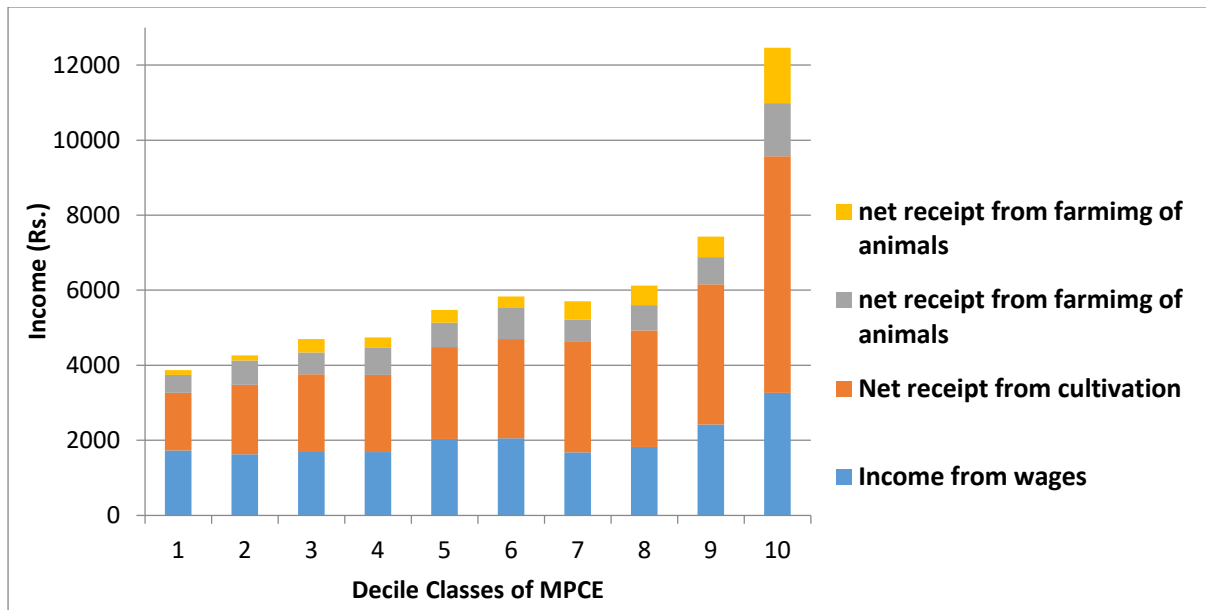
Decile class of MPCE	Income from wages	Net receipt from cultivation	Net receipt from farming of animals	Net receipt from non-farm business	Total income	Total consumption expenditure	Net investment in productive assets	Estd. No. of agri. Households* (00)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1	1729	1533	478	130	3870	3537	243	65652
2	1624	1858	642	139	4263	4337	131	71640
3	1716	2046	578	357	4697	4708	306	77307
4	1685	2059	732	263	4739	4933	420	82771
5	2036	2445	651	339	5471	5358	242	85534
6	2049	2653	821	308	5830	5515	390	92140
7	1679	2944	596	484	5703	5896	699	96285
8	1822	3106	671	524	6122	6385	253	101973
9	2424	3737	723	546	7430	7169	627	108704
10	3265	6306	1414	1473	12458	11107	1339	120033
All classes	2071	3081	763	512	6426	6223	513	902039

*estimated number of households based on the common households of visit 1 and visit 2 differs from the estimate based only on visit 1 households due to the effect of multiplier.

Source: NSSO's 70th Round of SAS, July 2012 – June 2013

The table above depicts average monthly income from different sources, total consumption expenditure and net investment in productive assets per agricultural household during the agricultural year (July 2012 – June 2013) for each decile class of MPCE (monthly personal consumption expenditure). The average net receipt from cultivation has shown a significantly increasing trend from bottom top decile classes.

Figure 2.4 Average monthly income per agricultural households from different sources for each decile class of MPCE



2.2.3. Indebtedness of agricultural households

The SAS, 2012-13 also collected information on the amount of outstanding loan on the date of survey; and the source and nature of loan. The information included all kinds of outstanding loan irrespective of the purpose for which loans were taken.

Table. 2.4 shows that about 52 per cent of the agricultural households in the country were estimated to be indebted, and the average outstanding loan per agricultural household was Rs. 47,000 (approx).

Table 2.4 Average amount of outstanding loan (Rs '00) per agricultural household by size class of land possessed for major States

State	Average amount of outstanding loan (Rs'00) per agri. households belonging to the size class of land possessed (ha)								Est. no. agri. households having outstanding loan (00)	Proportion of indebted agricultural households (0.0%)
	<0.01	0.01 - 0.40	0.41 - 1.00	1.01 - 2.00	2.01 - 4.00	4.01 - 10.00	10.00 +	All classes		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Andhra Pradesh	2409	739	893	1049	1623	3500	2494	1234	33421	92.9
Assam	4	8	24	67	71	173	0	34	5995	17.5
Bihar	73	138	132	341	279	424	1494	163	30156	42.5
Chhattisgarh	0	48	93	79	202	239	0	102	9538	37.2
Gujarat	69	120	247	311	826	1624	1148	381	16743	42.6
Haryana	95	192	737	900	1573	1162	4681	790	6645	42.3
Jharkhand	0	56	46	85	92	200	0	57	6464	28.9
Karnataka	355	778	633	987	1248	2321	3673	972	32775	77.3
Kerala	1690	1592	1944	3467	6070	7505	15726	2136	10908	77.7
Madhya Pradesh	91	119	152	270	629	1168	1952	321	27414	45.7
Maharashtra	102	453	232	455	582	2071	3869	547	40672	57.3
Odisha	88	167	337	181	326	1302	22281	282	25830	57.5

State	Average amount of outstanding loan (Rs'00) per agri. households belonging to the size class of land possessed (ha)								Est. no. agri. households having outstanding loan (00)	Proportion of indebted agricultural households (0.0%)
	<0.01	0.01 - 0.40	0.41 - 1.00	1.01 - 2.00	2.01 - 4.00	4.01 - 10.00	10.00 +	All classes		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Punjab	131	246	516	1641	2292	3266	9274	1195	7499	53.2
Rajasthan	1694	334	431	678	1031	1548	1528	705	40055	61.8
Tamil Nadu	377	674	1192	1200	2147	3224	4512	1159	26780	82.5
Telangana	563	578	794	1033	1097	1369	2690	935	22628	89.1
Uttar Pradesh	219	160	218	457	1075	1248	2178	273	79081	43.8
West Bengal	57	146	197	330	329	435	2760	178	32787	51.5
All India*	311	239	354	548	949	1827	2903	470	468481	51.9

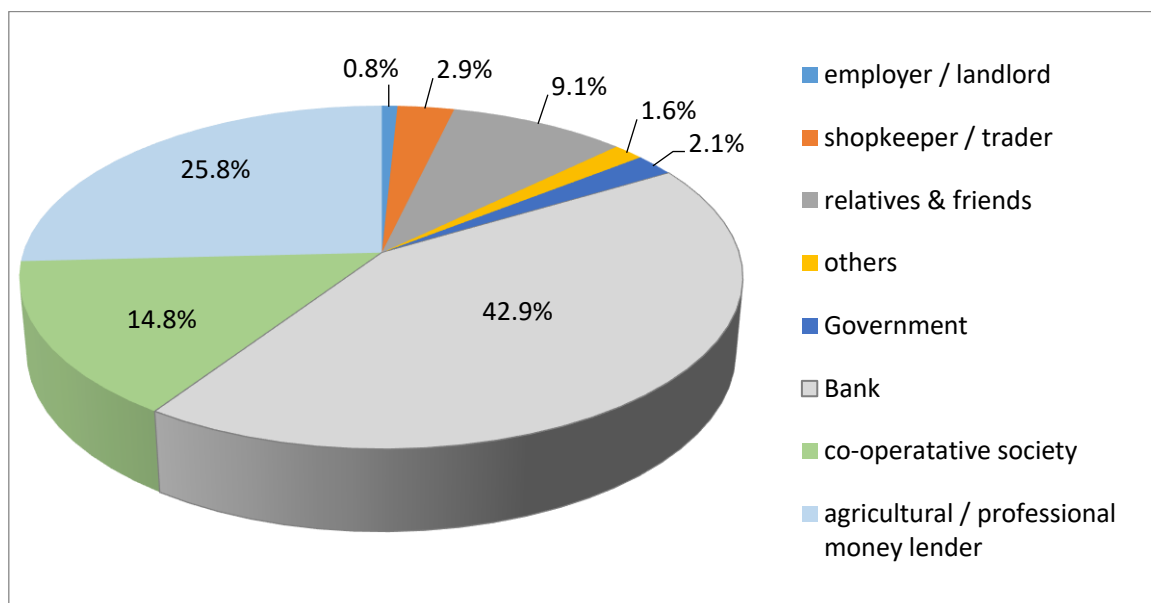
* based on all States and UTs, including States and UTs not shown in this Statement

Source: NSSO's 70th Round of SAS of Agricultural Households (July 2013 to June 2013)

The table further shows that higher the size class of land, higher was the outstanding debt.

Source of loan: The SAS brought out that at All India level, about 60 per cent of the outstanding loans were taken from institutional sources. Among the non-institutional sources, agricultural / professional money lenders (25.8 per cent) had the major share in terms of outstanding loan.

Figure 2.5 Distribution of outstanding loans of agricultural households by source of loans



It is useful to observe, that access to institutional credit was higher among those possessing larger extent of land. In case of lowest size class of land possessed (less than 0.01 ha), only about 15 per cent of the outstanding loans were from institutional sources (government, co-operative society, bank) whereas the share was about 79 per cent for the households belonging to the highest size class of land possessed (more than 10 ha).

Table 2.5 Distribution of outstanding loans by source of loan taken for different size classes of land possessed

Size class of land possessed (ha)	Per 1000 distribution of outstanding loans by source of loan								
	Govt	Co-operative society	Bank	Employer / landlord	Agricultural professional money lender	Shopkeeper/ trader	Relatives & friends	Others	All
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
<0.01	4	16	129	6	637	14	175	18	1000
0.01-0.40	13	146	310	8	324	25	142	31	1000
0.41-1.00	17	139	376	8	274	66	106	14	1000
1.01-2.00	26	147	475	7	233	15	76	20	1000
2.01-4.00	19	156	500	14	238	12	58	3	1000
4.01-10.0	38	175	502	4	187	14	65	15	1000
10.0 +	11	143	635	0	161	5	38	6	1000
All sizes	21	148	429	8	258	29	91	16	1000

2.2.4. Relationship between farm size and productivity

The long debated question of relationship between farm size and productivity was studied extensively by various researchers. Based on extensive analysis of both kharif and rabi crop seasons, Sarthak Gaura and Srijit Mishra (2015) concluded that, *“the efficiency of the smallholder as a result of greater productivity has to be treated with some caution as it ignores the low absolute levels of their returns, which raise questions about the sustainability of their livelihoods. This is further aggravated by the fact that they pay relatively higher unit costs and because of their greater dependence on purchased inputs”*.

In as much, a study by Ramesh Chand et al (2011) finds that, *“while the farm in India is superior in terms of production performance, it is weak in terms of generating adequate income and sustaining livelihood. Tiny holdings below 0.8 ha do not generate enough income to keep a farm family out of poverty despite high productivity. Nearly three-fourths of small farmers in India fall under poverty if they do not get income from non-farm sources”*.

Further, authors suggest that, *“serious steps should be taken to create employment avenues for smallholders outside agriculture, but within the countryside so that the workforce in small farms gets work and income from non-farm activities without leaving the farms. This seems to be the only way to achieve higher productivity and to sustain agricultural growth together with augmenting the income of smallholders for improved livelihood”*.

The global trends on farm size are not very helpful either. The recent study by Sarah et al (2016), based on extensive trend analysis from 1960 to 2000, concludes that:

- there are more than 570 million farms in the world; more than 475 million farms are smaller than 2 ha, and more than 500 million are family farms;

- from 1960 to 2000, average farm size decreased in most low and lower-middle-income countries and in South Asia; and
- globally, 84 per cent of farms are smaller than 2 ha, and they operate about 12 per cent of farmland.

The inverse relationship between farm size and productivity based on the aggregate of all crops has been quite pronounced in recent years. Various theories about disappearing advantages of marginal and small farmers, and efficiency gains of large sized farmers with economic development, are not found to be operating in Asian countries like India, China, Thailand, and Cambodia. In converse, the key is to counter the lower net returns from small holdings, which will require collective farming, off shared and contiguous farm lands.

2.3. Land Pooling and Improving Land Use Efficiency

Since independence, agriculture has been recognised as a primary activity that supports majority of the Indian population. In the absence of the ability of non-farm sector to absorb surplus manpower that is now engaged in agriculture, the primary sector has continued to be the principle livelihood provider to a vast majority. It is only since 2005-06, that a small shift of people from agriculture to non-agriculture sector has been noticed. In result, the number of cultivators have decreased from 12.73 per cent in 2001 to 11.88 crore in 2011.

Further, both the society at large and successive governments in particular have treated land as the primary asset, and that, as many families as possible should have access to it. The country's constitutional commitment to socialism has meant that land, the primary asset should be equitably distributed. It is this philosophy that has inspired the states to adopt progressive Land Revenue Acts, that:

- lay down the maximum land ceiling beyond which a citizen cannot own agricultural land;
- tiller shall be the owner of the land;
- a person with non-farm income beyond a certain threshold is barred from purchasing agricultural land; and
- a person not already owning a piece of agricultural land is barred from purchasing one.

These provisions have, in the past, helped the landless as also the tenants, sharecroppers and lessees to gain ownership and unhindered access to land, thereby incentivising them to invest in agriculture, adopt new technologies and farm management practices, and produce more. Amongst other adoptions (high yielding variety and hybrid seed, fertilizer, water and procurement of the produce at MSP) that constituted a positive policy framework ushering in green revolution in the country, pro-people land reforms too provided a strong platform for India's celebrated agricultural revolution.

However, the contemporary antidote to the non-viability of farming, arising from continuing

land division & fragmentation, seems to be the facilitation of land pooling. The very laws that had earlier driven a positive change in the socio-economic status of large number of cultivating class, by enabling a more robust production system, are in some ways now seen to be becoming an impediment to sustaining the pace of that progress.

Various studies reveal, that on an average 5-10 per cent of the arable land remains fallow in kharif season alone. In a densely populated India with hunger for land, it is ironical that substantive parcels of land remain uncultivated. This is on account of the fear of leasing out land, by those incapable of cultivating themselves for various reasons including, working elsewhere. Though it is common to see oral land lease, it comes with several disadvantages. The lessee does not get recognised as a farmer and hence remains deprived of access to government sponsored schemes / programmes, relief support in case of national calamity and institutional credit. This environment is regressive from the perspective of agricultural growth and farmers' welfare. Permitting land lease by law, is one way of land pooling and favouring land use efficiency.

Apart from land division, fragmentation is another big challenge. While the consolidation laws under the State Revenue Acts do enable exchange of land pieces spatially distributed between / among farmers, with a view to increasing the size of the plots and viability of farms, the process of achieving it is not easy. Not only is it costly, but is a long drawn process, besides inviting protracted legal entanglements.

2.4. Land Pooling via Farmers Mobilisation

Indian socio-economic ethos and constitutional spirit do not admit of reverse exchange of land ownership, however forceful its need or appropriateness may be. No argument for it can hold water, given the large majority of people dependent on cultivable land and related agricultural activities; and the inability of the non-agricultural sector to absorb surplus manpower of high magnitude. Against this backdrop, there exists a strong case for designing alternate ways of land pooling, without breaching the spirit of equitability of asset ownership at the societal level, and without compromising the deed of right, title and ownership at individual level. This would aid in enhancing operational scales and resultant efficiency. Some of these are discussed in the following sub-sections.

2.4.1. The Andhra Pradesh Licensed Cultivators Act, 2011

The above entitled legislation of the state of Andhra Pradesh (Act No. 18 of 2011) provides for a good example of a legal intervention to help informal tenants to access institutional credit, insurance and other benefits under governmental schemes. The Act provides for issuance of loan eligibility cards (LEC) to all licensed tenants on yearly basis, which authorizes the lessees to access bank credit, insurance subsidy etc.

However, much is left desired as regards the popularity of the Act. In the year 2011-12, of the total of 1.74 million tenant farmers in Andhra Pradesh, 0.68 million applied for LEC, and 0.51 million were issued the same. In the following year 2012-13, the licensed cultivators reduced

to 0.41 million, accounting for recognition of 24 per cent of the tenant farmers in the state. Some of the reasons for this poor response are:

- (i) Objection by landowners, fearing that they may lose land if tenants are registered as licensed cultivators.
- (ii) Apprehension on the part of the tenants, that they may be evicted if they try to get registered as licensed cultivators.

The questions that arise in this context are:

- (i) How does one remove fear from the minds of the landowners, that they will not lose land rights, if they lease out, or if their leased out lands are registered for licensed cultivation?
- (ii) How does one build confidence and a trust between the landowner and his tenant, that land leasing is a win : win solution for both?
- (iii) Will it not make better sense to make necessary amendments in tenancy laws to make land leasing legal and open and deliver the desired benefits to tenant farmers?

2.4.2. The Model Agricultural Land Lease Act, 2016

As discussed earlier, the fear of losing right, title and ownership over one's own land by leasing out, discourages the land owners even when they are themselves unable to cultivate to lease out their parcels of land. This is the cause behind substantive extent of land remaining fallow. The State Revenue laws provide for right to ownership by proving adverse possession for a certain period as prescribed by the actual tiller. The census 2011 reveals, that the extent of lease in the country is around 6 per cent. In the absence of a legal provision back-stopping such leasing, most of it is oral and therefore does not entitle the lessee to claim the status of a farmer and access various benefits available from the government and credit institutions. It is further known, that a lot of land remains fallow for many do not opt to offer their piece of land on oral lease. It is, therefore, necessary that lease is legally recognised by enacting a suitable law. However, it should explicitly and emphatically protect the interests of the land owner, in supersession of any other provision of law that may be in force.

The Model Agricultural Land Lease Act, 2016 prepared and approved by the NITI Aayog offers an appropriate template for the states and UTs to draft their own piece of legislations, in consonance with the local requirements and adopt an enabling Act. This needs to be pursued with the states and UTs as a time bound activity. This Model Act specifically bars lease in favour of private corporates.

Key elements of the Model Land Leasing Act

- (i) Legalise land leasing to promote agricultural efficiency, equity and power reduction. This will also help in much needed productivity improvement in agriculture as well as occupational mobility of the people and rapid rural change.

- (ii) Legalize land leasing in all areas to ensure complete security of land ownership right for land owners and security of tenure for tenants for the agreed lease period.
- (iii) Remove the clause of adverse possession of land in the land laws of various states as it interferes with free functioning of land lease market.
- (iv) Allow automatic resumption of land after the agreed lease period without requiring any minimum area of land to be left with the tenant even after termination of tenancy, as laws of some states require.
- (v) Allow the terms and conditions of lease to be determined mutually by the land owner and the tenant without any fear on the part of the landowner of losing land right or undue expectation on the part of the tenant of acquiring occupancy right for continuous possession of leased land for any fixed period.
- (vi) Facilitate all tenants including share croppers to access insurance and bank credit against pledging of expected output.
- (vii) Incentivise tenants to make investment in land improvement and also entitle them to get back the unused value of investment at the time of termination of tenancy.

2.4.3. Contract farming

Contract farming refers to a pre-season agreement between the farmers and a sponsoring company, that promises the former a price at which the latter will purchase the produce post-the harvest. Such an agreement offers the farmers to transfer the future (post-production) price risk to the sponsor. Given the imperfect market situation that obtains in India, a situation of glut post-the harvest is most commonly accompanied by a sharp price drop. The perishable nature of agri-commodities combined with immediate cash needs of the farmers, leads to distress sale, causing non-realisation of the potential monetary value of the produce.

Contract farming, which in a way is a futures trade, helps the farmers to focus on their production for optimal yields, without the anxiety of post-harvest price situation. Since the contract farming agreement is generally with a group of farmers, whose land may be contiguous or in clusters dispersed within a confined geography, the farmer-members will also come to enjoy certain other advantages related to infrastructure and transaction facilities, which may not be financially feasible to own individually. Some of these include facilities for pre-conditioning, primary processing, weighing, assaying, pack-housing, pre-cooling, transportation, storage (dry & cold), etc.

Another advantage of such contract farming, is the scope that exists for benefitting from better input management. The group of farmers can buy inputs collectively and distribute among themselves, which would be more cost effective than when procured in small parcels. They can as a group purchase from authorised wholesalers and benefit from cheaper price and also a more assured quality of the product. Input supply along with farm machinery, extension education, etc. can also be made a responsibility of the sponsor as a part of the contract.

In effect, contract farming can generate benefits emanating from the farmers coming together

to run their operations of input and output management collectively, thereby harvesting the economy of higher scales, without diluting the status of their land ownership.

There have been efforts to promote contract farming in the country for more than a decade without much success. While the intervention has not been able to scale up, there yet are many bright examples, particularly in the horticulture sector worthy of emulation. These can be studied for replication and scale up across the country and commodities.

One of the reasons for slow progress of contract farming has been the conflict of interest arising from authorising the APMCs to regulate the agreements. Since the provisions relating to contract farming have been a part of the state APMC Acts, the subject has not received the deserved advocacy & promotion at the field level, apart from being hindered by the conflict of interest that APMCs bring to the fore. After all, contract farming too is a form of marketing that is also the principle mandate of the APMCs.

It is an appropriate decision of the government to draft an exclusive Model Contract Farming Act, which found authorization in the Union Budget 2017. As a prelude to this, the Model APLM Act, 2017 leaves out all the provisions relating to contract farming. The Committee constituted by the Ministry of Agriculture & Farmers' Welfare is to formulate a suitable draft for the government and it is hoped that it will be shared with the states and UTs during the early period of the year 2018 after receiving due approval from the competent authority.

One of the challenges of any contract farming, is to ensure that the two parties to the Agreement honour their respective obligations and commitments. It would therefore be necessary to create a win : win situation for both the parties by facilitating:

- sharing of profits with the farmers in case the sponsoring company benefits excessively from windfall gains; and
- sacrifice of a small percentage by the farmers in case the prices plummet sharply and the sponsor is likely to experience unsustainable loss.

The Act should provide for flexibility, so that:

- The States/UTs are able to attract sponsors.
- An empowered Authority in place can enforce the agreement, make rules / guidelines to advise, guide, counsel, supervise and monitor contract farming and services, besides promoting the same through advocacy.

Services as a contractual arrangement should also be part of this Act. The Act should also be all encompassing, across all the sub-sectors including field crops, horticultural crops, dairy & livestock, poultry, fishery etc. From the global experience, it is seen that contract farming has not been able to easily attract small and marginal farmers. It is, therefore, important that the provisions of the Act are not only attractive enough for the small and marginal farmers to enter the fold of contract farming, while protecting their interests including land rights in particular.

2.4.4. Farmer Producer Organisations (FPOs)

There already exists vast experience of bringing common interest groups together, across the country, with different objectives. Some illustrations are Self Help Groups (SHGs) of women in the domain of micro-finance; Joint Liability Groups of NABARD for enhancing credit borrowing by farmers (lessees in particular); Commodity Interest Groups (CIGs) etc. In addition, there are many successful farmer producer organisations (FPOs) registered as both farmers' cooperatives and companies.

Realising certain challenges and weaknesses of a cooperative FPO, efforts have been made since 2012 to promote farmer producer companies (FPCs) registered under the Company's Act. Both NABARD and SFAC (Small Farmers Agri-business Consortium) have been advocating and promoting FPCs. The rationale for promoting FPCs registered under the provisions of Companies Act, 1956 (facilitated by a special amendment) is the possible advantage of combining the spirit of a cooperative with the operational flexibility of a private company. There are some among the FPCs that have demonstrated success, proving the advantages of collective operations. However, progress has been slow and can be accelerated.

It would help if every farmer is encouraged and supported to become member of an FPC and also integrate himself with a value chain platform. These will help him surmount the challenges of price unpredictability at the marketing stage, and help converge his production from small holding with others. Given the large number of small & marginal farmers in particular and the large number of landholdings, the scale up is a daunting task. Yet, it is a necessity and the framework for promotion and the target to be chased are discussed in Volume-IV of this Report, which may be referred to. Large area based farming clusters in the form of Village Producer Organisations (VPOs) is also discussed, to create village level economies of scale, both for specific crops and for integrated farming systems.

FPOs and VPOs offer the farmers advantages that come from higher scales of operation at various stages of the agricultural value system. The obvious advantage of collective actions is the collective output and the increased bargaining power of each farmer-member. And the farmer can avail of these advantages while retaining his individual ownership status. In the view of this Committee, a minimum of 7,000 number of FPOs & VPOs should be targeted by 2022-23 and double that target number in the six years thereafter. This will be important to address the structural weakness of small and marginal farm holdings.

2.5. Other Land related Issue

Land Management has continued to be challenging and the owners are never at ease on account of a plethora of issues. There is need for resolving all these and given the power of technology - IT, ICT, geo-spatial technology etc., it is much easier today to surmount the long standing land related challenges. Some of these are discussed below:

2.5.1. Civil disputes

More than 55 per cent of the civil disputes across the country are related to land. Developing

accurate and approved land ownership records with GPS (global positioning system) and revenue department certification would drastically reduce the profitability of civil disputes and also the huge amounts of expenditure incurred by the farmers on court cases. This exercise can also be carried out in Public Private Partnership mode, successful examples of these being the Government of Karnataka's "Urban Property Ownership Records" and Government of India-supported scheme on land use resurvey in collaboration with state governments. Other linked interventions are comprehensive digitisation of land records; online and location agnostic registration of land transactions; and automatic & continuous mutation of land records that reflects an updated ownership status.

2.5.2. Developing land markets

Often farmers tend to suffer loss in sale of land, due to opaque practices of land agents. The huge price differentials underlines the need to develop a transparent land market (similar to the share market). Providing an online platform to buy and sell land, with geo-tagging, would enable both the seller and the buyer to negotiate a price and realise better returns. At the outset, this will mean that land sellers will be induced to get their land size and title digitally geo-tagged, for which GIS-based farm plot surveys will have to be carried out across the country.

Based on guidelines of the Department of Revenue, a digitally signed and geo-tagged certificate should be issued to the actual plot owner, which an owner desirous of making a sale can display in the land market. This exercise may be initiated on a pilot basis in select districts in PPP mode in collaboration with the Government of India and respective state governments. Based on the learnings and formulation of suitable guidelines, the practice can be scaled up.

Key Extracts

- The country's population has increased, adding to the demand for agricultural goods, but fragmentation of land holding, is impacting the operational viability of farms.
- Land, the principle asset of the farmer, is now handkerchief sized and this has direct bearing on the production and associated income returns to individual farmers.
- Land pooling must be incentivised through legislating the Model Land Leasing Act, 2016. The Act safeguards owners land rights while providing tenants, including share croppers access to govt. support for cultivation.
- The Committee constituted by Ministry of Agriculture & Farmers' Welfare is to recommend a suitable draft for a Model Contract Farming Act, including services.
- Farmer producer organisations need to be encouraged, including FPCs. In accordance, they may be given priority for cultivation on pooled land and for allied infrastructure development so as to harvest the desired economy of scale in operations.
- Comprehensive digitisation of land records including location agnostic online registration of transactions, to generate seamless and updated record of land ownership be carried out.

Chapter 3

Defining a Farmer for Inclusiveness

Governments at both central and state levels, as also credit institutions, make available support-system in terms of inputs, technology, management practices and knowledge. Since the entitlement is linked to possessing title deed of the land, a substantive number of farmers who cultivate land as lessees, sharecropper, tenants, etc. stand deprived of access to the beneficial support system. In the larger interest of agriculture, there is a need to adopt a liberal approach in defining a farmer. This chapter examines the need and norms for farmer inclusiveness.

3.1. Agricultural workers

Agricultural Statistics defines agricultural workers to include cultivators and agricultural labourers. In the year 1951, the total numbers of agricultural workers were 97.2 million (cultivators 69.9 million + agricultural labourers 27.3 million). There was a steady increase in respect of both the cultivators and the agricultural labourers from census to census conducted decadal till 2001, when the total number of agricultural workers rose to 234.1 million, comprising 127.3 million cultivators and 106.8 million agricultural labourers. As per 2011 census, while the total number of agricultural workers rose to 263.1 million, the number of cultivators declined for the first time to 118.8 million and agricultural labourers increased to 144.3 million. It is indicative of the shift of cultivators between 2001 and 2011 to non-agricultural activities. It is also possible that some cultivators may have joined the ranks of the landless labourer.

The nomenclature of 'agricultural worker' for a cultivator may not be appropriate. It needs to be appreciated, that a cultivator is an entrepreneur, who manages his land or livestock like an industrial entrepreneur. To a cultivator, management of his asset involves decisions relating to input and output, and negotiating several risks associated with largely a biological activity that agriculture is. The cultivator or a livestock keeper, therefore, needs to be recognised as an agricultural entrepreneur. The National Commission on Farmers (NCF), 2007 in its Report considered both land owning cultivators and landless agricultural workers as farmers. However, no specific recommendations were made to improve the welfare of the landless agricultural labourers.

As regards cultivators per se, not all cultivators are currently recognised as farmers in reality. A farmer is largely perceived to be the one who owns cultivable land, whether he is cultivating it himself or not; or even directly managing it himself or not. While majority of the cultivators are land owners too, a substantive number of cultivators are not land owners. And therein arises the problem of exclusion of many an actual cultivator by the currently recognised definition of a 'farmer'.

To all intents and purposes, a farmer is one who owns land and possesses a revenue record that establishes his right, title and ownership. This record of right (RoR) is the 'certificate' that offers him a right to access all benefits – material or otherwise, that the government provides through large number of its schemes, programmes and missions. The institutional credit – both

short term crop loans and long term investment loans are also available based on RoR. The tenants or lessees or sharecroppers are not considered as eligible to avail of institutional credit. The only exception though, is when the farmer becomes a member of a Joint Liability Group (JLG), a group of 10 members. Promoted by NABARD, there are about 1 lakh JLGs in the country, which means a marginal coverage of farmers and cultivated area in the country. Similarly, the relief measures under the Relief Act are also accessible only against RoR.

The vision of the Government is to double the income of the farmers. The DFI Committee focuses on strategy to improve farm incomes, and therefore, does not directly address the issues relating to the welfare of the landless agriculture labourers, who constitute a large section of the rural society. It may not mean much just by including them (144.3 million, census 2011) under the class of 'farmers', as they will need to be addressed separately, since their livelihood issues, while linked to agriculture differ in many ways and are unique to them as a class. However, the strategy recommended by DFI Committee is expected to generate additional job opportunities for the landless labourers too in multiple agricultural activities and contribute to their welfare. Further, the farmers earning higher net incomes can also be expected to pay the agricultural labour at a higher level.

Various benefits like seed kit, fertilizers, pesticides, farm machinery, micro-irrigation, land development, etc. are given to the one who can prove land ownership. As a consequence, the actual cultivator like the lessee, share cropper, tenant, etc. who are in reality substantive in number stand to be excluded from the system of benefits and entitlements. The outcome is, that the objectives of the government intervention, which are all meant to improve the status of agriculture in the country may not be equitable and inclusive.

Purely from the perspective of developing agriculture and ameliorating the condition of the farmers, the actual cultivator also must be recognised as a farmer and rendered eligible to all the benefits under various schemes / programmes / missions, as also institutional credit and relief measures. Under the provisions of Land Reforms, the tiller is considered as owner, precisely to promote agricultural development, for it is believed, that the owner of the land will demonstrate greater commitment to professional management. However, a situation has arisen now, where more than 65 per cent of the landholdings are less than 1 (one) ha. in size. Most in India still perceive land as a valuable asset and the owners may not be willing to give up ownership and tend to cling on to it. Probably, a sense of security and emotional attachment blend together, to enhance the land-centric sentiment among most Indians. It may only be much later in the future, when those whose principle source of income is not from farms and are earning enough from their salaries or business / service, that they may want to dispose off their small pieces of land, helping land consolidation as a sequel.

For the present therefore, it would be practical to **liberalise the definition of farmer** by including both the land owner, and the one not owning but cultivating it as a lessee or sharecropper or in any other way, under the definition of a farmer.

3.2. Norms based Definition of Farmer

In the above context, it is suggested that certain norms be identified to define a farmer, rendering him/her eligible for all agriculture related benefits. Further, the list of farmers can be dynamic, which means that there can be both entry and exit options, based on the actual status of ownership and / or cultivation. Some of the norms suggested are:

- i. Ownership of land and/or actual cultivation.
- ii. Agreement with the land owner to the effect that he/she is a lessee / sharecropper, etc.
- iii. Eligibility for the period of agreement of lease, etc. with the land owner.
- iv. Gender of farmer.

A portal may be developed to enable the owner and lessee, etc. to post their status, accompanied by relevant document(s). A database can be maintained by the local Revenue Officer or Gram Panchayat or the local Agriculture Officer. An annually authenticated village-wise database can be made accessible to the officers of the departments of Agriculture, Horticulture, Animal Husbandry, Fisheries, Banks, Cooperatives, Relief, etc. who are then free to offer eligible benefits to newly defined farmers.

A web enabled application will enable the interested parties to update their status from time to time by using their mobiles or laptops / desktops or when they do not own one, can do so from citizen service centres (CSC) or Gram Panchayats and the like.

Key Extracts

- There exists confusion when defining a farmer and a cultivator. A cultivator would be undertaking farming activities, but may not own land.
- Landless cultivators get excluded from various benefits by the government, which for all intents are designed for farmers (those who possess a revenue record to establish ownership of agricultural land).
- Definition of Farmer, needs to be liberalised so as to include cultivators, lessee sharecropper, etc. This will enable the cultivators to access the support-system that is intended to buttress all those pursuing an agricultural enterprise.
- An online and annually authenticated database may be developed to identify and define a farmer, to render him/her eligible to avail agriculture related support-system.
- A harmonised web-portal to enable interested individuals to upload and update their status as farmers from time to time, will allow the support-system to optimise their offer and reach the benefits to the most eligible beneficiaries.

Chapter 4

Uncontrolled Variables - Production & Market

It is well known, that agriculture being a biologically driven process is dependent on nature, and therefore is vulnerable to production risks. The farmers also suffer from market uncertainties, due to inefficient marketing structure. This chapter examines the nature of these risks and ways to resolve the same, so as to impart greater certainty at both production and post-production stages. This would help the farmers realise stability of income returns from agriculture.

4.1. Agricultural and Industrial Production

The process of agricultural activities across crop production, livestock & dairy, poultry, fishery etc. are all nature-bound and hence, influenced by variables external, that matter to the cultivator in respect of production, productivity, pest and disease management, resource use etc., and are difficult to be regulated unlike in the industrial sector. The latter, which is a mechanically driven process, also depends on various factors of production for the manufacture of its output, these nevertheless, to a greater extent, are amenable to control and change.

Wherever the factors of production and related variables are manipulable, there exists scope to regulate the supply in consonance with the expected demand. This is a big advantage that a manufacturing sector enjoys vis-à-vis a biologically driven activity like that of agriculture. Regulation of supply implies that the production can either be increased by enhancing the capacity utilisation to meet the expected increase in the market demand or it can be reduced if the demand is likely to be subdued.

In contrast, in agriculture which is more an open activity, bound by seasonality, there is a fixed time (limited window) to begin the production operations and once this operation is rolled out it cannot be held back. Seasonal nature is characterised by binary system of 'Yes' or 'No'. When it is time to sow / plant / harvest, the farmers either does it or does not and miss the opportunity. Hence, the farmer is always dragged down by an Hobson's choice. Inability to regulate the supply in accordance with the dynamic changes in the market negatively impinges on the ability of the farmer to monetize his produce appropriately.

Not only is the process of production irrevocable once it is rolled out with the first activity of sowing / planting, but also the crop is subject to multiple vulnerabilities like variations in temperature, rainfall, humidity, etc. Every crop has its own critical stages in production, at each of which water the critical input is highly necessary. If the monsoon fails at this critical stage of crop growth and there is no dependable source of water to meet the obligatory demand, then the crop is bound to suffer in terms of vegetative growth as also its final yield. The weather pattern also influences the probability of infestation by pests and diseases. As seen thus, all kinds of cropping programmes face uncertainty. Likewise other agricultural activities like dairying and livestock, poultry, fisheries etc. are also vulnerable to external weather patterns.

In India, 52 per cent of the country's net cultivable area of 141 million ha. is rainfed. A rainfed area is defined as one where there is no dependable source of water from either surface or

ground, and is therefore, dependent on the monsoon. Further, a rainfed area may lie in one of extremely low rainfall to or high rainfall zones and yet be vulnerable to monsoons.

4.2. Multiple forms of Natural Calamities

Nature wears multiple facets of natural calamities, adversely impacting all types of agricultural activities. These include drought, flood, hailstorm, whirlwind etc. Some areas in India are more prone than others to natural calamities and in result face greater uncertainty of realising a normal yield.

4.2.1. Drought in India

Drought is one of the more critical natural calamities that has been impacting the Indian agriculture. The history of meteorological drought in India is described in box below.

Meteorological History of Droughts in India

During 1871-2015, there were 25 major droughts years, defined as years with All India Summer Monsoon Rainfall (AISMR) less than one standard deviation below the mean (i.e. anomaly below – 10 per cent): 1873, 1877, 1899, 1901, 1904, 1905, 1911, 1918, 1920, 1941, 1951, 1965, 1966, 1968, 1972, 1974, 1979, 1982, 1985, 1986, 1987, 2002, 2009, 2014 and 2015.

The frequency of drought has varied over the decades. From 1899 to 1920, there were seven drought years. The incidence of drought came down between 1941 and 1965 when the country witnessed just three drought years. However, during the 21 years, between 1965 and 1987, there were 10 drought years which are attributed to the El Nino Southern Oscillation (ENSO).

Among the many drought events since Independence, the one in 1987 was one of the worst, with an overall rainfall deficiency of 19 per cent which affected 59-60 per cent of the normal cropped area and a population of 285 million. This was repeated in 2002 when overall rainfall deficiency for the country as a whole was 19 per cent.

Over 300 million people spread over 18 states were affected by drought along with around 150 million cattle. Food grains production registered an unprecedented steep fall of 29 million tonnes. In 2009, the overall rainfall deficiency for the country as a whole was 22 per cent, which resulted in decrease of food grain production by 16 million tonnes. During 2014-15 and 2015-16 large parts of the country were affected by drought causing widespread hardships to the affected population since the calamity encompassed major agricultural States in the country.

Source: Samra, 2004; NRAA, 2015, DAC&FW data.

Poor rainfall in successive years reduces the scope for recharge of ground and surface water resources and soil moisture replenishment. The data vide Table 4.1 below exhibits the extent

of departure of rainfall in kharif season during successive drought years.

Table 4.1 Departure of Rainfall from Normal for Country (SW Monsoon) during successive Drought years (percentage)

Year	Departure from Normal (%)
1965	-18
1966	-16
1985	-17
1986	-13
1987	-19
1999	-4
2000	-5
2001	-8
2002	-19
2014	-12
2015	-14

It is obvious from the data above, that serious droughts in 1966, 1987, 2002 and 2015 were a culmination of the build-up from adverse rainfall events of the preceding years. The periods of 1985-87 and 1999-2002 demonstrate successive years of continued drought.

4.2.2. Causes of recurring drought in India

The causes are largely attributable to the country's unique physical and climate susceptibilities as listed below.

- i. Considerable annual / seasonal / regional variations in spite of a high average annual rainfall of around 1,150 mm.
- ii. A relatively short window of less than 100 days during the South-West Monsoon season (June to September) when about 73 per cent of the total annual rainfall of the country is received.
- iii. Uneven distribution of rainfall over different parts of the country, whereby, some parts bear an inordinately high risk of shortfalls, while others tend to receive excessive rainfall. Even though India receives abundant rain on an average, for the country as a whole, much of the excess water gets lost as run-off which can be harvested to fight drought. The variability in rainfall exceeds 30 per cent in large areas of the country when compared to Long Period Average (LPA), and exceeds 50 per cent in parts of drought – prone Saurashtra, Kutch and Rajasthan.
- iv. Low average annual rainfall of 750 mm over 33 per cent of the cropped area in the country heightens the susceptibility to drought.
- v. Over-exploitation of ground water and sub-optimum conservation and storage capacity of surface water leading to inadequate water availability for irrigation,

particularly in the years of rainfall deficiency. Steady decline in per capita water availability for humans and animals even in non-drought years.

- vi. Out-migration of cattle and other animals from drought hit areas heightens the pressure on resources in surrounding regions.
- vii. Limited irrigation coverage (net irrigated area in the country is less than 50 per cent) exacerbates the impact of drought on account of complete dependence of agriculture in such areas on rainfall.

4.2.3. Geographical spread of drought

As high as 68 per cent of the country's cropped areas is drought-vulnerable. Of this, 33 per cent receives less than 750 mm of annual rainfall and is classified as "chronically drought-prone"; and another 35 per cent of the area receives a mean annual rainfall of 750-1125 mm and is classified as "drought-prone". The drought-prone areas of the country are located mainly in the arid, semi-arid and sub-humid regions of peninsular and western India.

Table 4.2 Cropped Area falling Under Various Ranges of Rainfall in India

SN	Mean Annual Rainfall Ranges	Classification	per cent
1	Less than 750 mm	Low rainfall	33
2	750 mm to 1125 mm	Medium rainfall	35
3	1126 mm to 2000 mm	High rainfall	24
4	Above 2000 mm	Very high rainfall	8

Source: Drought 2002, A Report, Ministry of Agriculture, Government of India

4.2.4. Highly drought prone districts

A study by ICAR under its 'National Initiative on Climate Resilient Agriculture (NICRA)' has brought out that as many as 151 of all the districts in the country are critically or highly vulnerable to drought. Such a situation puts at risk the farmers' livelihood dependent on agriculture.

Further, crop based systems are more vulnerable than livestock activities. It is worth noting, that in the last 34 years, the livestock sector has never registered a negative growth rate, even during the years of drought. The lowest growth rate has been 1 (one) per cent in one drought year. In contrast, crop based agriculture has been subject to negative growth rates many a year. The take away, is that livestock centric agriculture needs priority in drought vulnerable areas.

4.3. Negative Impact of Production Risks

Any kind of risk deters a farmer from making recommended investments necessary to realise optimal yields. A situation of greater certainty always bears a positive impact on any agri-entrepreneur. The losses that a farmer meets from a natural calamity are huge.

Already in the low income bracket, the farmer is pushed to the precipice. His savings if any,

melt soon and the farmer is left with no capacity to meet the subsequent season production investments. The probability of his indebtedness increases.

As discussed in paragraphs 4.1 and 4.2, the risks associated with production are:

- (i) Market related - inability to regulate the supply in accordance with the demand.
- (ii) Production related - exposure to unpredictability and extremities of weather.

4.4. Interventions for regulating production and supply

4.4.1. Price and demand forecast

The prices for farm produce are a function of both local supply and demand situations. They are also influenced by global demand and supply situations, since Indian agriculture is now integrated with global markets. In addition, exogenous socio-political factors also tend to exacerbate the price volatility. Price volatility is very common in the agricultural sectors especially in the whole produce segment. Despite high production, the farmers fail to realise proportionate income returns on account of prices dipping below normal.

Most agri-commodities are subject to 'cobweb' influence (see Chapter 2, Volume IV), which means that there is high degree of correlation between situations of high production and subdued market prices, followed by a reverse situation in the following season. The production is seen to always face a lag of at least one season, as generally the farmers are influenced by the past season's prices. Guided purely by an attractive price for a particular commodity in the previous marketing season, many farmers tend to bring additional area under that crop, only to face a situation of glut and the corresponding price trough in the following season. This results in a reciprocal reduction in production in the next season. Meanwhile, in this duration, the demand is seen to follow a near constant trend, and hence price fluctuation is more influenced by the supply side.

This market unpredictability related income loss to the farmers can be addressed by adopting a system of price and demand forecasting. This will help the farmers to take a rational decision on what to grow and how much to grow. The system of demand and price forecast in India is almost absent. As discussed in Chapter 9 of Volume-IV of this Report, price forecasting system needs to be, and can be adopted. There exist robust econometric models, whose validity has been successfully demonstrated in the field, that manifest in the high degree of correlation between forecasted price and actual spot price.

The Directorate of Marketing & Inspection (DMI) under the Department of Agriculture, Cooperation & Farmers' Welfare can be restructured and re-mandated to own the responsibility of price and demand forecasting. The farmers aided by better predictability of future price and demand, will to a great extent, find answers to their current situation of market risk.

4.4.2. Accuracy of area coverage under various crops – production estimates

The Ministry of Agriculture collects agricultural statistics relating to crop coverage and production estimates for both agronomic (cereals, pulses, oilseeds, fibres, commercial) and horticultural (fruits & vegetable) crops on a regular basis.

For every agricultural year (July-June), the Directorate of Economics & Statistics (DES), Department of Agriculture, Cooperation and Farmers Welfare, Ministry of Agriculture and Farmers Welfare releases four Advance Estimates (AE) followed by Final Estimates of production of major agricultural crops of the country (Annexure-I).

Each of these five estimates is available State-wise and at the national level for the 27 identified crops. The time of release and period covered under each of these estimates are as under:

- The First Advance Estimates are released in September. These cover only kharif crops, when kharif sowing is generally over.
- The Second Advance Estimates are normally released in February of the following year when rabi sowing is also over. The second advance estimates cover kharif as well as rabi crops. They take into account; (i) firmed up figures on kharif area coverage; (ii) available data on crop cutting experiments for yield assessment of kharif crops; and (iii) tentative figures on area coverage of rabi crops.
- The Third Advance Estimates incorporate revised data on area coverage for rabi crops and better yield estimates of kharif crops. These are released in April-May.
- The Fourth Advance Estimates are released in July-August. By this time fully firmed up data on area as well as yield of kharif and rabi crops are expected to be available with the States. As such, Fourth Advance Estimates are expected to be very close to the Final Estimates.
- Final Estimates are released about seven months after the Fourth Advance Estimates in February of the following year. This allows the states sufficient time to take into account even the delayed information while finalising area and yield estimates of various crops.
- No revision in the State level data is accepted after release of Final Estimates.

However, the first advance estimates are largely based on 'eye assessment' made by the states/UTs and are therefore not accurate. Further, since the first advance estimate is released in September, that is after the closure of the kharif season, and the second advance estimate in February is released after the closure of the rabi sowing season, the data sets are not useful inputs for the farmers to be guided in their production plans for both kharif and rabi seasons.

In case of horticultural crops, the responsibility for area coverage and production estimates is that of the Division of Horticulture Statistics in DACFW. This Division collects data from

multiple agencies including DACFW, Directorate of Arecanut and Spices Development (DASD), Directorate of Cashew nut and Cocoa Development and Bee Board. The area estimates are based on *Girdawari* and inputs supplied by the states. The production estimates are mainly based on eye estimations, oral enquiry with farmers, productivity norms as calculated by GCES and Crop Estimation Survey – Fruits & Vegetables (CES-F&W). See Annexure-II for the details. The Horticulture Division releases three Advance Estimates and one Final Estimate as under:

- The First Advance Estimates for the current year are finalised by 15th January of the year.
- The Second Advance Estimates for the current year are finalised by 15th May of the year.
- The Third Advance Estimates for the current year are finalised by 31st August of the year.
- The Final Estimates of the preceding year are released by 15th January.

Presently, there is no uniform methodology for estimating area and production of horticulture crops and it is, therefore, subject to various errors. However, the Division has initiated more robust methodologies as follows:

- CHAMAN (Coordinated Programme on Horticulture Assessment & Management Using geoinformatics).
- Estimate Sensing Methodology implemented by MNCFC (Mahalonobis National Crop Forecast Centre).
- Sample Survey Methodology implemented by IASRI (Indian Agriculture Statics Research Institute).

The quality of data collection and forecast would see improvement when these methodologies are fully validated and adopted as a universal practice. As on date, the horticulture estimates on area and yield, call for greater robustness.

In order to strengthen the advantages of demand and price forecasts, it would be necessary to supplement the same with factual and progressive crop coverage data (both agronomic & horticultural) through the season. A system has to be put in place, that will enable the farmers to access continuously the coverage under different crops across the country in all the cultivation seasons, namely, kharif, rabi and summer.

In all the seasons, the sowing / planting window is limited and normally spreads over a period of 1-1/2 to 2 months. If the farmers can access the progress of area coverage on different crops on a near daily basis, during the window of sowing / planting, they would be able to compare it with the forecasted demand and price for the post-harvest market season, and take a decision on whether it would be rational to take up cultivation of the intended crop.

Today, the information technology combined with geo-informatics makes it possible to monitor the progress more accurately than relying upon eye estimates. For this purpose, a **crop**

coverage area portal can be developed with open access to all the farmers across the country and all related departments, traders and other stakeholders. What is then needed is orientation, education and training of the farmers to diligently upload the data following their sowing / planting on the portal. This can be suitably assisted by the agricultural extension system.

The end-of-day data would demonstrate the progressive coverage under different crops across the country, which would be of great help in taking an informed decision on whether to persist with the intended crop cultivation or to opt for an alternate crop, if the area already covered is likely to end up with the output in excess of the predicted demand.

The data set, when further refined by data analytics, can provide the farmers more incisive and useful signals. For example, total expected supply based on current season's output and carry over stock.

4.4.3. Other interventions to address production, price unpredictability

The advancement in science and technology, including IT and ICT make it possible today for deploying them appropriately at various stages of the agri-value chain and attenuate the vulnerabilities to varying extent.

Some suggestions in this regard are as follows:

- (i) A robust weather forecast system and sharing of data and information on a real time basis with the farmers.
- (ii) Comprehensive drought-proofing of all the 151 districts identified as highly vulnerable or critically vulnerable in a time bound manner.
- (iii) Adoption of varieties, technologies and practices that will promote resistance / tolerance to vulnerable factors (drought, flood, etc.).
- (iv) Sustainable production system on the principles of rainfed agriculture, watershed management, integrated farming system, etc.
- (v) An agricultural production system in accordance with the agro-climatic situation.
- (vi) Adoption of sensor based technologies in water management, soil health management etc. will make the activities more resource efficient.
- (vii) A combination of sensors with robotics and data analytics will build a strong IOT (Information of Things) platform and bring in higher resource use efficiency and help tide over shortages of natural resources like water, etc.
- (viii) Use of protected cultivation systems like shade nets, poly-houses, green-houses, etc. will help in regulating the variations of the climate and protect crop being cultivated from such vagaries. These systems are relatively more useful in case of vegetables, flowers, etc.

- (ix) Deployment of IT & ICT at the multiple touch points along the supply-chain will help in sharing data and information relating to sowing, pests & diseases, weather marketing, etc. in real-time, so that the farmers are better prepared to respond in a rational manner and thereby mitigate associated risks. Empowering the supply chain, with decisive information in its inputs and outputs, will make for a smarter agricultural value system and will allow each integral value chain to optimise their roles in the system.

4.5. Negotiating Market Unpredictability

As discussed in the preceding paragraphs, the supply in agriculture system is relatively fixed, and is therefore, not amenable to regulation in harmony with the changing market dynamics. However, it is possible to make certain interventions post-the-harvest to regulate the release of commodity into the market based on price situation.

One of the major problems that farmers face today is distress sale on account of their weak capacity to withhold their stock, pressed as they are to dispose-off their produce immediately to meet debt and consumption expenses.

Even when some farmers are capable of withholding their stock from immediate sale, they may still not be able to do so due to perishable nature of certain agri-commodities (particularly fruits, vegetables, milk, etc.) and absence of appropriate logistics systems in close proximity.

In order to help the farmers to hold back their produce and decide on its time, place and form of sale, enabling systems, technology and infrastructure should be put in place. Some suggestions in this direction are as follows:

- (i) Enhance availability of post-harvest loans at concessional rates, so that the farmers can avail of pledge loans for a certain period. The pledge loan system warrants a strong network of accredited warehouses in close proximity to the farm gate so that the farmers can transport and store at minimal costs.
- (ii) Strengthen agri-logistics in terms of pack-houses, dry and cold storages, dry and cold multi-modal transportation network. This will help the farmers to precondition, transport and store their commodities, of their own volition, in a safe and secure manner in right time and to places where they can fetch better prices for their produce. The logistics components, identified to be of critical importance, may be given special capital interest subvention to motivate investment and offset shortfall. There will then arise a strong system of connect between production and consumption centres.
- (iii) Processing facilities, both small and large scale, can further help the farmers in realising better value on the surpluses that cannot be consumed in fresh form in both near and far markets. It is, therefore, necessary to strengthen food and non-food processing facilities. Such industries, typically hold and stock

inventories for their processing needs, and can be developed as a channel to facilitate post-harvest loans to farmers.

Volumes III and IV of this Report provide detailed description and recommendations for strengthening the capacity and scope of agri-logistics and agri-marketing infrastructure.

Key Extracts

- There are various uncontrolled variables that effect the cultivation, harvest and post-harvest stages of the farmers' business.
- Information on price and demand forecast can help mitigate some of these aggravating factors. The Directorate of Marketing & Inspection can be restructured to take onus for market intelligence and undertake price and demand forecasting.
- The cropped area and production estimates can be modernised, using geo-spatial tools for more accurate assessments. Farmers and other stakeholders can also supplement the estimates by uploading data on a specially designed crop coverage area portal.
- Suitable orientation to use the information from crop coverage data and demand data, to take incisive decisions on selecting the planned cultivation can be done through the agricultural extension system.
- Comprehensive drought-proofing of the 151 districts identified as highly vulnerable needs to be implemented in a time-bound manner.
- Deploying sensor based technologies, including in combination with robotics and analytics to build a robust IOT platform, will improve resource use efficiency.
- The touch points in the various agricultural supply chains, need to be empowered with shared data related to production, pests, weather, markets, etc., to allow farmers to make best suited decisions in response to changed dynamics. This will contribute to make the agricultural value system more integrated and transparent.
- Post-harvest management and holding capacity of farmers needs to be improved through enhanced availability of post-harvest loans and strengthening the allied logistics and marketing infrastructure.

Chapter 5

Trade Regime and Export Promotion

Policies that affect Agricultural Trade, including export and import of agricultural produce, have tended to ignore the interest of farmers. Trade may be structured to strengthen the farming sector. There is the need to revisit and reorient the trade regime from the national perspective of doubling farmers' income.

Among various factors, farmers' welfare is also hinged to their earning optimal and positive net returns from agriculture. This necessitates realisation of remunerative prices on the produce. Given that an ideal market situation, particularly in the agricultural sector, is difficult to achieve, non-market interventions in support of the farmers become inevitable.

Given production growth and the untapped opportunity from enhancing productivity, marketing opportunity for the produce have to be expanded beyond the domestic frontiers. Higher production will require that the export potential be harvested. Indian agriculture under the WTO regime is already integrated with the global market. Agreed upon market access protocols and Trade Agreements with other countries also ensure the scope for import and export of agricultural commodities.

5.1. Trade Policy used to Control Domestic Prices

A cursory look at the 'Agricultural Trade Policy' and tariff changes over the last decade, will show that there have been frequent and short term adjustments. More currently, they can be called as knee jerk reactions. Some examples are provided in chapter 5 of Volume-IV of the DFI Report. The examples demonstrate that, both on the import and export sides, the policies are changed frequently, interrupting the trade windows and trading relations. Long term market relations are put at risk when trade policy is varied in the short term and is unstructured in nature.

The trade policy for agriculture is approached as a price support and price stabilisation tool, but its use is mainly tilted to favour consumers. On various occasions, a sudden reduction in import tariffs due to an increase in consumer prices is evidenced, and they harm the immediate interests of farmers, since the cheaper imports tend to offset the economic welfare of farmers by causing a dip in market prices.

Similarly in case of exports, trade policy is used as an internal price control mechanism, to adjust tariffs to curtail any increase in consumer prices. The Minimum Export Price (MEP) is used as a tool to restrict or ban the export of a commodity in reaction to rising prices in the domestic market to protect consumer interests once again. In either case, the agenda is to control the supply of an agricultural commodity to the domestic market, to adjust temporary demand-supply imbalances.

The frequent changes in export and import policies are often triggered by concerns of consumers' unease over domestic prices. The effect is a short term shift in supply and market

value, but this in turn, causes disruptions in the production plans of farmers. Such disruption can have long term implications, as they tend to affect next season's cropping plans, resulting in an unhealthy cobweb of production, price and trade.

The agricultural trade policy is not seen to promote agricultural trade, but is mainly used to control prices in the domestic market, in reaction to short term circumstances.

There may be certain benefits in achieving this, but there is need to have an Agricultural Trade Policy that supports and promotes linking Indian farmers with the global market. The agricultural trade policy should be guided by balancing the interest of both the producers and the consumers, in addition to long term food and nutritional security concerns of the country.

5.2. Agricultural Trade Policy to Promote Trade

There is no long term approach to Agricultural Trade Policy in the country, unlike the Foreign Trade Policy announced by the Department of Commerce which usually takes a long term view (3 years at present). As a supply control mechanism, short term adjustments in tariff and export windows tend to disrupt any planning, or relationship building in international trade.

Agriculture is already unpredictable, subject to vagaries of nature on the domestic front and markets uncertainties. A short term view of trade policy only adds to the existing risks and uncertainties.

5.2.1. Stable trade regime

A stable trade regime must be designed to help both farmers and other stakeholders, and must maintain a long term view so as to help build market relationships at the global level. Trade cannot be one-sided and imports must also prevail, as is the case in commodities in deficit, like oilseeds, paper, and others linked to consumer preferences.

A trade perspective over 5-10 years period is suggested. A mid-term planned review of agriculture trade policy is another important recommendation, akin to the mid-term review undertaken for foreign trade policy.

Trade policy as domestic consumer price intervention can be structured on pre-determined signals, declared in a crop specific manner and for periods of the year, so that the trading parameters can be accordingly planned for the long term.

For example, pre-set parameters on basis of production/supply estimates can be declared for particular commodities. At the time of first estimates, if production is expected to be 10 per cent less than the moving average of the preceding three years (for example), import tariff reduction of 5 per cent will be implemented, to allow a synergistic increase in supply, to control expected price rise. The pre-declared and advance information on tariff, will allow local traders to optimise on rates and plan their import volumes. The trigger of 10 per cent is an example and can be varied per commodity. However, the tariff announced should preferably not be

changed for minimum period of 6 months.

Similarly in reverse, if the expected production is higher than 10 per cent of average supply, the import can be suitably restricted. The status would be declared for a minimum of 6 months, unless the supply situation changes by another 5 per cent to the contrary. Using such a pre-determined matrix, the consumers too, will be fully aware of the next planned change in supply, and the associated & expected shift in food item prices. In the diversified consumer market available in India today, consumers have scope to balance their income and expenditure by opting for substitutes.

Example for opening closing imports

Name of Agri-Commodity (Fibre, Crop, Meat, etc.)	Annual/Seasonal Production (moving average)	Estimated Production (current year /season)	Difference (trigger)	Action to adjust domestic supply / consumer price
Example Onion	19.7 mMT	18.5 mMT	6 %	Nil – maintain status quo, monitor next estimates
	19.7 mMT	17.7 mMT	10 %	Open imports for 6 months – adjust import tariff, etc.
	19.7 mMT	16.7 mMT	15%	Restrict imports for 6 months – adjust import tariff, etc.

Different combinations of parameters, specific to commodities, will need to be considered. Such pre-set triggers will allow the stakeholders to make planned adjustments to supply dynamics and accordingly strengthen their links with trading partners abroad.

A permanent inter-ministerial Committee including ministries of commerce, consumer affair and agriculture may be constituted with the mandate to monitor closely the domestic and global price situation for different commodities, and recommend to government the needed changes, keeping in mind the conflicting interests of the producers and the consumers. A beginning to this effect has been made since October 2017, which now needs to be institutionalised as a permanent arrangement.

The above referred committee may be supported by DMI (Directorate of Marketing & Inspection) as its secretariat. The DMI is recommended to take up market intelligence as its mandate, and collect and collate data from different sources to analyse and provide inputs to the Committee. The other institutions that can partner DMI in offering technical backstop to the Committee referred supra are DES (Directorate of Economics & Statistics), and Horticulture Statistics Division, both under DACFW, and Price Monitoring Committee of the Department of Consumer Affairs.

5.2.2. Trade policy to promote exports

Exports should on the other hand be aggressively promoted, and export windows be adjusted

to control consumer prices, only as an extremely unavoidable resort. Export opportunity should not be restricted as controlling outwards trade is limiting the farmers' earning opportunity to domestic demand only.

Government needs to reconsider the approach to agricultural trade policy with mind-set to capture international demand for 'made in India' produce. The policy may be structured such that the agricultural economy has more freedom to build external markets, which is needed to benefit from the plans to enhance production through increased productivity.

Frequent and surprise closure of export windows deprives producers and agri-traders from planning long term targets for international trade. Export bans cause short term excesses, and long term disruption in building export markets.

It is recommended that a long term perspective be adopted to export promotion, and that there are no interventions disabling the associated trade relationships. Trading arrangements take long in planning and negotiating. A trading partnership is entered into, on the assumption that delivery will be made in full and on time (DIFOT). When policies restrict fulfilling a trade, penalties are imposed raising costs, supply chains disrupted and long term partnerships stand to fall. Trust and creditability are critical to trade relationships as elsewhere. In such a situation, global markets are not readily accessible, and this denies India the opportunity to bring its agricultural production to gainful use.

Capturing the international demand is a long drawn out process that requires changes in production and post-production marketing, which are done to suit the target market. Blanket and ad hoc closure to exports hurts the long term interests of farmers and disallows the private sector from building long term relations with the farmers.

The Committee recommends, that in order to enable Indian agriculture to achieve its full potential, the policy approach to agricultural exports be facilitative and promotional in nature, and not be restrictive of trade or be brought into use to intervene control domestic consumer prices. There are some price variations, which are due to other uncontrolled variables as far as the farmer is concerned, that may be allowed as the opportunity advantage of farming.

To support growth in exports of agricultural commodities, special schemes may be devised to provide a combination of credit, input facilitation and stock limit waivers. Such a scheme may be implemented in mission mode and linked to the Agri-Value System Platform proposed in Volume-IV of this Report. The support can be designed as a spearheading program with a window of closure, such that the support for each project ends after a three year window. The window for each project can also be linked to volume and revenue targets, such that on achieving a milestone on each, the level of support is reduced in a staggered manner. The scheme can be designed to exclude some sensitive commodities and / or be region specific.

The Committee recommends an aggressive strategy for developing international agricultural

trade. The aim should be to raise agricultural exports about three times by 2022-23, to reach a target of USD 100 billion in exports in value terms. On the other hand, in volumetric terms, the target should be to double the total volume of agricultural commodities exported in the same period.

It is also recommended to strengthen the India Embassy system to align with an aggressive agri-trade policy. The post of Advisor (Agri-trade), initially in ten selected export markets, may be created in Embassies or High Commissions to focus on developing trade in all kinds of agricultural goods. A short supply chain having direct linkage with farmer groups should be the preferred option for such trade. Further the basket of commodities exported should be broad-based and reach beyond cereals and meat, which today account for the bulk of the exports.

Key Extracts

- Agricultural Trade Policy is applied mainly to control supply to the domestic market triggered by consumer prices.
- Imports may be adjusted, at pre-set triggers, to correct price fluctuations where deemed necessary. Commodity specific price or production parameters may be determined so that importers of agricultural commodities can independently monitor the triggers accordingly.
- Exports may not be used as a price control mechanism, but be promoted aggressively to allow agricultural growth and steady access to international demand.
- Establish an institutional mechanism for Agricultural Trade Policy, including a permanent inter-ministerial Committee, which should aim to facilitate and promote ease in doing business, rather than be restrictive and disruptive to business planning.
- Initiate the Agri-Value System Platform in mission mode with special schemes that converge credit, input facilitation, post-harvest connectivity and stock limit waivers, to support growth in exports of agricultural produce and products.

Chapter 6

Restrictive Policies – Liberalisation and Simplification

It is generally believed, that liberalization of the input and output management aspects of agriculture will help farmers gain access to alternate options for choosing inputs and marketing. This chapter discusses some important issues in this regard.

6.1. Why Liberalisation?

The production system is a function of deployment of various inputs. Of the several inputs deployed in agriculture, some of the more important ones are seeds, fertilizers and pesticides. The latter two include both inorganic and organic based. The cost of cultivation / production is determined amongst others by the quality of the inputs that the farmer purchases and the price at which he makes the purchases. The shift of farming from the traditional / conventional system to the modern has linked agriculture to marketing more than ever before.

A large part of the agricultural production system today is driven by market forces. The farmer purchases most of his/her input materials like seeds, nutrients and pesticides from the market. Hence, both quality and cost of inputs become critical, if the overall cost of cultivation is to remain rational and help increase the net farm income.

As regards post-production management, the environment for handling and monetising the agricultural outputs has to be conducive enough to encourage capture of optimal value and enhance the farmers' reach into markets.

An open and liberalised environment for manufacturing and distributing the inputs is likely to introduce competition and offer alternate options to the farmers to make a choice. It is also likely to incentivise innovations for introduction of new and more suited types of inputs, and also make them available to the farmers at a more reasonable cost, as a result of competition. However, some regulation will be required to ensure that these critical inputs are available at right time, in accordance with right quality and at rational price. There has to be room for checking any probability of malpractice. After all, these inputs are critical to crop and livestock production and therefore essential in nature.

Output management encompasses rules relating to trade & stock limits, and scope for free market. Hence the need for a more liberal regime of stock limits and policies that facilitate market participation by a wider stakeholder base.

There is a close linkage between free trade and stock limits. In a context where all produce offered for disposal by the farmers is not procured by government agencies, private sector participation becomes advantageous. This entails the need to facilitate alternate types of markets and alternate forms of ownership. A pre-requisite to private trade is liberalised stock limits. Therefore, the control orders relating to storage and Acts & Rules in respect of marketing need to be revisited, for introducing liberalisation.

This chapter in the following paragraphs examines the restrictive environment that has largely

described Indian agricultural production and marketing system, and suggests the aspects of reforms needed.

6.2. Reforms in Critical Inputs and Markets

There are 3 (three) critical inputs, that need to be addressed for making them available to farmers at cost-competitiveness and in adherence to quality standards. These are:

- Inputs
 - Seeds
 - Fertilizers
 - Pesticides
- Market Reforms

The structural bottlenecks in respect of these, and the reforms needed to liberalise for a more efficient performance are examined in the following paragraphs.

6.3. Seeds are the seeds for growth

Seed constitute the starting point of a crop production system and the vigour & quality of seed circumscribes the limits of output can one can harvest. Of course, it is equally important that a conducive growth environment is provided for the seed to express its genetic potential wholesomely. India's seed industry has grown appreciably in size and level of performance in the past five (5) decades. Both private and public companies / corporations are involved in production of seeds.

Table 6.1 Major policy intervention relating to seed sector

SN	Policy Intervention
1	National Seeds Corporation (NSC), 1963
2	Seeds Act, 1966
3	Seed Rules, 1968
4	National Seeds Programme (NSP), I, II, &III (1976-1995)
5	Seeds (Control) Order, 1983
6	New Seed Policy 1988
7	New Industrial Policy 1991
8	PPV &FR Act, 2001
9	Seed Policy, 2002
10	Revision of NPSD, 2011
11	Sub Mission (NMEAT) on Seed, 2012
12	Seeds (Control) Amendment Order, 2014 (enhanced license fee)
13	Seed (Amendment) Rules, 2015 (all forms revised)

The public organisations include National Seed Corporation (NSC), State Seed Corporations (SSCs), Cooperative Institutes and State Departments of Agriculture etc. The private sector encompasses around 500 seed agencies, which include national and multi-national companies and other seed producing / selling agencies.

6.3.1. Seed Production System

The Indian seed programme mainly recognizes three (3) generations of seed, namely:

- Breeder's Seed
- Foundation Seed
- Certified Seed

The system also provides for quality assurance in seed multiplication chain to maintain the programme of the variety, as it flows from breeder to the farmers. These three (3), are explained below:

Breeder Seed

Breeder seed is the progeny of nucleus seed of a variety, and is produced by the originating breeder or by a sponsored breeder. There has been a steady increase in the production of breeder seed over the years. Breeder seed production is the mandate of the Indian Council of Agricultural Research (ICAR) and is being undertaken with the help of;

- i) ICAR Research Institutions, National Research Centers and All India Coordinated Research Project (AICRPs) of different crops.
- ii) State Agricultural Universities (SAUs)
- iii) Sponsored breeders recognized by Seed Corporations.
- iv) Non-Governmental Organisations, Krishi Vigyan Kendras (KVKs) etc.

Procedure for allocation of Breeder Seed: The indents from various seed producing agencies are collected by the State Departments of Agriculture and submitted to the Department of Agriculture and Cooperation (DAC&FW), Government of India. The DAC&FW in turn compiles crop-wise information and sends to the Project Coordinator/Project Director of the respective crops in ICAR for final allocation of production responsibility to different SAUs/ICAR institutions. The indents are compiled and forwarded to ICAR at least 18 months in advance, to enable timely and necessary arrangements. For proper evaluation of the breeder seed production programme, monitoring teams have been constituted and reporting proforma devised. The monitoring team consists of the breeder of the variety, the concerned Project Director or his nominee and representative of NSC. The production of breeder seed is annually reviewed by ICAR-DAC&FW in a specially convened meeting.

The actual production of breeder seed by different Centres is intimated to DAC&FW by ICAR, on receipt of which, the available breeder seed is allocated to all the indenters in an equitable manner. In the case of varieties which are relevant only to a particular State, the production responsibility assigned to the SAUs/ICAR institutions located in the State.

Foundation Seed

Foundation seed is the progeny of breeder seed. The responsibility for production of

Foundation seed is entrusted to the NSC, State Seed Corporations, State Departments of Agriculture as also private seed producers, possessing the necessary infrastructure facilities. Foundation seed is required to meet the standards of seed certification prescribed in the Indian Minimum Seeds Certification Standards, 2013, both at the field and laboratory testing stages.

Certified Seed

Certified seed is the progeny of Foundation seed, and must meet the standards of seed certification prescribed in the Indian Minimum Seeds Certification Standards, 2013. In case of self-pollinated crops, certified seeds can also be produced from certified seeds provided it does not go beyond three generations from Foundation seed stage-I.

Procedure for production and distribution of certified/quality seeds: The production and distribution of quality/certified seeds is primarily the responsibility of the state governments. Certified seed production is organized through State Seed Corporations, Departmental Agricultural Farms and Cooperatives, etc. The distribution of seeds is undertaken through a number of channels i.e. departmental outlets at block and village level, cooperatives, outlets of seed corporations, private dealers, etc. The state government effort is supplemented by NSC which produces varieties of national importance. NSC markets its seeds through production on its own marketing network and including its dealer network.

The production of certified seed by NSC is organised through its own farm or through contract growing arrangements with progressive farmers. The private sector also play an important role in the supply of quality seeds of vegetables and crops like hybrid maize, sorghum, bajra, cotton, castor, sunflower, paddy etc.

The requirement of certified/quality seeds is assessed by state governments on the basis of the area sown under different crop varieties, area covered by hybrid and self-pollinated varieties as well as the seed replacement rate (SRR) achieved. The Ministry of Agriculture & Farmers' Welfare periodically assesses the requirement and availability of seeds through a detailed interaction with state governments and seed producing agencies at the bi-annual Zonal Seed Review Meetings and the National Kharif and Rabi Conferences. The DAC&FW facilitates tie-up arrangements with seed producing agencies to ensure that the seeds requirement is suitably met extent possible. **With the collective efforts of public and private sectors the availability of quality seeds in the country has increased from 14 lakh quintals in 1962–63 to over 419 lakh quintals in 2017-18.**

It is seen from the above, that only a close co-ordination among different agencies responsible for production of different generations of seeds can ensure the availability of right quantities of the needed crop seeds and varieties. In a way, the breeder seed which is the originating point determines the basis of the final quality of seed made available to the farmers. In order to produce the required quantities of breeder seeds in consonance with the production plan, it is very critical that indents are compiled & shared with ICAR, at least 18 to 24 months in advance of the sowing season. While DAC&FW takes the responsibility of compiling the indents from

different state governments, it is the latter, who should be able to assess their requirements two (2) years ahead of the production season, and share it with DAC&FW.

The implication is, that the broad cropping plan should be prepared by the states in time, which unfortunately is a weak link as of now. Hence, the state governments need to be made more sensitive to the importance of assessing and estimating their breeder seed requirement.

6.3.2. Seed Certification System

Seed certification is a process designed to maintain and make available to the farmers supply of high quality seeds and propagating materials of notified varieties of crops ensuring their traceability, the physical identity and genetic purity. Under this process, a state seed certifying agency gives official recognition to seeds produced of a variety under a limited generation system. Seed certification is a legally sanctioned system for quality control of seed multiplication and production. There are 25 State Seed Certification Agencies in India established under section 8 of Seeds Act 1966.

Seed Certification is carried out in six broad phases listed as under:

- i) Verification of seed source, class and other requirements of the seed used for raising the seed crop.
- ii) Receipt and scrutiny of application.
- iii) Inspection of the seed crop in the field to verify its conformity to the prescribed field standards.
- iv) Supervision at post-harvest stages including processing and packing.
- v) Drawing of samples and arranging for analysis to verify conformity to the seed standards.
- vi) Grant of certificate, issue of certification tags, labelling, sealing, etc.

The production of certified seeds is the final link in the prolonged chain of seed production system, and is disbursed across the country and is undertaken in the open fields. It therefore requires rigorous supervision and monitoring so as to ensure that the procedures laid down are strictly adhered to. There is vast scope for deploying technologies like sensors, drones, etc. for diligence of production and adherence to the standards. As of now, there is left much desired in the rigour with which certified seed production is monitored.

Considering that seed production can happen both in public and private sectors, it would be useful to tap the vast scope that exists in creating enterprise based models for seed production. This can generate large number of self-employment opportunities for the youth - farmers who can be gainfully engaged in both seed production and distribution system. In Volume-VII of this Report, the potential of using seed production to create jobs has been discussed.

6.3.3. Seed Export / Import

The export and import of seeds and planting material is governed by Foreign Trade Policy 2015-2020 announced by Director General Foreign Trade (DGFT), and is discussed below:

Export of seeds and planting materials has been liberalised for all crops with the following exceptions:

- i) Breeder or Foundation seeds or seeds of wild plants
- ii) Seeds or planting material of onion, berseem, cashew, nux vomica, rubber, pepper cuttings, sandalwood, saffron, neem, forestry species, red sanders, russa grass, tufts and seeds of tufts

The export of these seeds (i & ii above) is restricted and is only allowed on case-to-case basis under license issued by DGFT which relies on the recommendation of DAC&FW.

The provisions regarding import of seeds and planting material are as under:

- (a) Import of seeds/tubers/bulbs/cuttings/saplings of vegetables, flowers and fruits is allowed without a license in accordance with import permit granted under Plant Quarantine (Order), 2003 and amendments made therein.
- (b) Import of seeds, planting materials and living plants for research purpose by ICAR, etc. is allowed without a license in accordance with conditions specified by the Ministry of Agriculture & Farmers' Welfare.
- (c) Import of seeds/tubers of potato, garlic, fennel, coriander, cumin, etc. is allowed in accordance with import permit granted under PQ Order, 2003.
- (d) Import of seeds of wheat, rye, barley, oat, maize, rice, millet, jowar, bajra, ragi, other cereals, soybean, groundnut, linseed, palmnut, cotton, castor, sesamum, mustard, safflower, clover, jojoba, etc. is allowed subject to the New Policy on Seed Development, 1988 and in accordance with import permit granted under PQ Order, 2003.

The EXIM Policy reiterates that all imports of seeds and planting material would be regulated under the Plant Quarantine Order 2003. Import licenses would be granted by DGFT only on the basis of recommendations of DAC&FW. A small quantity of the seeds sought to be imported is given to ICAR, or farms accredited by ICAR, for trial and evaluation for one crop season. On receipt of applications for commercial import, DAC&FW considers the trial /evaluation report on the performance of the seed, and its resistance to seed/soil borne diseases.

DAC&FW is required to either reject or recommend the application to DGFT for grant of import license within 30 days of receipt. Further, all importers have to make available a small specified quantity of the imported seeds to the ICAR at cost price for testing/accession to the gene bank of National Bureau of Plant Genetic Resources (NBPGR). The import of seeds has

to be cleared/rejected by Plant Protection Adviser (PPA) after quarantine checks within three (3) weeks. The rejected consignment has to be destroyed. During quarantine, the imported consignment is kept in a bonded warehouse at the cost of the importer. While importing seeds and planting material, it has to be ensured that there is absolutely no compromise on plant quarantine procedures. Every effort has to be made to prevent the entry into India of exotic pests, diseases and weeds that are detrimental to the interests of the farmers.

An EXIM Committee has been constituted in the Seeds Division of DACFW to deal with application for exports/imports of seeds and planting materials in accordance with the New Policy on Seed Development and EXIM Regulations. The Committee meets every month and examines the applications and furnishes recommendations to PPA/DGFT with respect to license / permit for import/export of seeds and planting material. DAC&FW has recently developed an online system for receiving application for export/import of seeds, and also communicating its recommendations to the EXIM Committee. This has reduced the drudgery associated with the need to submit 20 copies of application in the prescribed format.

6.3.4. Recommendations for improving the seed sector

There exists lot of scope in effecting improvements to the existing seed production system in particular, and seed sector in general. Some following suggestions are made in this context:

i) Need for higher Seed and Varietal Replacement Rate

For achieving the desired levels of Seed Replacement Rate (SRR), adequate seed of good variety has to be produced. Each state needs to prepare a State Seed Plan to meet the region – specific requirements. The list of recommended varieties must be revisited and finalized in consultation with the scientists of the State Agriculture University, ICAR Institutes in that region, Crop Coordinators, State Agriculture Department officials and the seed producing agencies. Seed production programme should be organized in each State under a comprehensive and integrated State Seed Plan appropriate to different regions. The states should ensure production, multiplication and replacement of seed to increase VRR and SRR progressively, particularly in respect of regionally important crops/varieties. Varietal Replacement Rate (VRR) is as important as SRR.

ii) Replacement of older varieties with newer varieties

A review of existing list of released and notified varieties reveals that many old varieties (more than 15 years) still find place in the recommended package of practices. Continued use of old varieties is non-productive, and should be replaced by new ones, and must be brought into seed chain system on priority. SRR does not ensure high productivity if the variety is old and has developed vulnerabilities to external factors. A rigorous exercise to weed out all old varieties should assume priority.

iii) Promoting hybrid technology

Promotion of hybrids/ HYVs of major field crops should receive a high priority, so as to bridge the productivity gap and increase production. In this context, both public and private sectors

have to play a major role, as seen in the case of maize. For accelerating hybrid seed production, the present system of receiving indents of notified hybrids by the public/private sector needs revision by including larger number of indents for the parental lines of the hybrids.

iv) Public-Private Partnership (PPP) Models

Partnerships between the public research institutions and private sectors are desired in R&D, as also production and distribution of seeds to the farmers. A collaborative technology park for carrying out research for development of new varieties may be established by adopting PPP models.

v) Use of Intellectual Property Rights (IPRs)

The facility of IPR for new and innovative technologies can incentivise investments in R&D in both public and private sectors. Public sector research system should also protect its varieties through PPV & FR Authority and generate the revenues which can be ploughed back into the system as R and D investments.

vi) Stronger enforcement

The Seed Law Enforcement wing of state governments needs to be strengthened. The Seed Inspectors have to be well trained for effective enforcement of various provisions of Seeds Act, 1966, Seeds (Control) Order 1983, Environment Protection Act, 1986 and Consumer Protection Act, 1983. They will need continuous upgradation of knowledge to be effective in checking spurious seeds. In addition, there is need to deploy suitable technology like bar coding etc. Adequate number of seed testing laboratories are also needed.

vii) Strengthening of Seed testing facilities

Most State seed testing laboratories suffer from inadequate manpower and poor infrastructure facilities. They are required to be strengthened both in terms of manpower as well as technical capabilities. Their performance has to be monitored periodically with reference to the preciseness and reproducibility of the test results.

viii) Uniform procedure in the country for seed licensing

Under the Seeds (Control) Order 1983, every seed dealer has to obtain the license from the State Licensing Authority. Under Clause 5 of the Seed (Control) Order, a licensing authority after making such enquiry as it thinks fit can grant a license to an applicant. This provision is interpreted differently by the state governments, seeking varied nature of information/documents which is not a business-friendly environment for those companies doing business in more than one state. **It would be useful if central government develops a Model Guideline and Procedure for the states to adopt the same.**

ix) Enhancing export of seed

India has the potential to become a leading player in seed business if it can tap the demand in developing world. Many of these countries have limited availability of hybrid seeds and the Indian crop germplasm has high potential of adaptability in these countries. This is a huge

business opportunity available to the Indian seed players. The present share of India in global seed market is less than 2 percent, which can be easily scaled up by harvesting the market in African, SAARC and South-East Asian countries. India can achieve the target of 10 percent of the global trade by 2020, as envisaged in the National Seeds Policy 2002. Some of the Indian / MNC seed companies are already doing business in some of these countries, which can be further expanded. For this to happen, the seed industry will need to be facilitated by simplifying the procedures for obtaining export permits etc. Further, the EXIM policy has to be steady over reasonable period, for private traders to establish long term business relationships.

x) Seed Quality Assurance

Seed quality assurance requires considerable investment in terms of proper infrastructure, equipment and competent human resource. Seed certification agencies, have to be adequately equipped and made more efficient for certification of quality seeds. The Seed Testing Laboratories should be strengthened and accredited by the International Seed Testing Association (ISTA). Also, adequate infrastructure for seed processing must be created by state seed corporations and private seed agencies.

i) Revamping the business strategy of Public Sector Seed Corporations

Re-structuring and revamping the public sector seed producing undertakings is also required for product diversification/ upgradation and for improving their governance, core competence and competitiveness. State Seed Corporations should be reformed/re-organized/restructured to make them more vibrant.

ii) Seed Bill, 2004

The Seed Bill, 2004 is currently awaiting Parliament approval. The provisions of variety registration in the Seed Bill will be useful in promoting variety-linked quality seeds.

6.4. Liberalising fertilizer sector

6.4.1. Background

As per Fertilizer Control Order, fertilizer is defined as “any substance used or intended to be used as a fertilizer of the soil and / or crop specified under chemical fertilizers, bio-fertilizer and organic fertilizers categories”.

The Indian fertilizer sector continues to be one of the most regulated segments of the country's economy. Almost every aspect of fertilizer business in India is controlled by policies, be it investment, feedstock, distribution or sale price.

Fertilizer Control Order

Fertilizer Control Order (FCO) derives its power from section 3 of the Essential Commodities Act, 1935. It initially came into force in 1957 to regulate sale, price and quality of fertilizers. Recognising several changes in fertilizer technology, production and distribution system, and the need to make the provisions more stringent with respect to quality control, by the 'FCO

Review Committee' set up by the Central Government reviewed FCO, 1957 and the now in force FCO, 1985 issued on 25.09.1985 came into force with immediate effect.

6.4.2. FCO - key function areas

- Registration of all fertilizer manufacturers, importers and dealers.
- Laying down specification of all fertilizers chemical (general- NPK, water soluble, liquid & customized), bio-fertilizers and organic fertilizers.
- Packing and labelling on fertilizer bags.
- Guidelines for appointment of enforcement agencies, sampling and analysis techniques of fertilizer samples, setting up of quality control laboratories.
- Prohibiting the manufacture and sale of non-standard/spurious/adulterated fertilizers.
- Penal provision includes imprisonment from 3 months to 7 years; offence declared as non-bailable besides entailing administrative action of suspension / cancellation of dealers / manufacturers' certificate.

6.4.3. Role of Governments in fertilizer sector

i. Government of India

At GoI level, two departments- Department of Agriculture, Cooperation & Farmers Welfare (DAC&FW) and Department of Fertilisers (DoF) are involved in setting standards for quality, regulation of sale and distribution of fertilisers. Central Fertilizer Quality Control and Training Institute (CFQC&TI), an attached office of DAC&FW lays down testing protocols for the chemical fertilizers and quality control of the same. Similarly, National Centre for Organic Farming (NCOF), another subordinate office of DAC&FW caters to the revision of standards and testing protocols for bio and organic fertilizers and their quality control.

The mandate of the Department of Fertilizers is to ensure adequate and timely availability of fertilizers to the farmers at affordable prices through planned production and imports, and distribution of fertilizers in the country. It also plans for self-sufficiency in urea production.

ii. State Governments

The states are suitably empowered to draw samples of the fertilizers anywhere in the country and take appropriate action against the sellers of non-standard fertilizers. The penal provision includes prosecution of offenders and sentence, if convicted, upto seven (7) years of imprisonment under the ECA, 1955 besides cancellation of authorization certificate and other administrative action. The DoF makes deductions along with penal interest on the quantity of the fertilizers for that have been reported as non-standard by the state governments.

6.4.4. Way forward – some recommendations

The fertilizer sector policies were framed in 1970s with the twin objective of encouraging fertilizer consumption; and fostering growth & development of the domestic industry. Both these objectives have been well served as seen from higher fertilizer consumption and food

production; and large fertilizer production capacity. However, many deleterious impacts are also seen, wherever the use has been indiscreet & imbalanced. Consequently, the demand today is for soil health management, judicious use of fertilizers, sustainable farming, etc. The cost and quality are also a concern. Hence, the need for a revisit of the fertilizer sector policies and it is in this context that some of these are discussed below:

i. Promotion of customized fertilizers: The customized fertilizers (CFs) are multi-nutrient carriers designed to contain macro, secondary and/or micro nutrients, from inorganic and/or organic sources. The guidelines for production of CFs were formulated in March 2008 under clause 20-B of FCO, 1985. However, the progress in production and consumption of CFs has been slow despite their agronomic benefits in improving yield and farm profits. Since 2008, only 3 companies, namely, TCL, NFCL and NFL have taken up production of CFs, and their annual/cumulative production about 74,000 metric tonnes (MTs) during 2015-16. Under the present scheme of soil health card (SHC), the soil fertility status of all the farm holdings is tested and corrective measures conveyed to the farmers. Although different types of fertilizers like straight, complex, mixture, fortified etc. exist as on date, the future would be one of customized fertilizers which are crop & area specific in nature, and hence more efficient. As on date, customized fertilizers for 6 crops in 128 districts have been developed based on SHCs. The need is to promote more of these to gradually replace the mixtures in future.

ii. Simplification of renewal / approval of new grade of CFs: The procedure for renewal/approval of CFs can be simplified and time period reduced by adopting single seasonal, multi-locational and multi-crop trials in place of 2 (two) seasonal trials as in vogue today. Another option is to adopt CFs confining to international standards of fertilizers or by mutual agreement. The approval of grade may be made at least 6 months prior to the next season's date of sowing. The proposal of new grades of fertilizer may be taken into consideration with the Expert Technical Committee and Central Fertilizer Committee simultaneously. This will save time. The cost of the product be fixed with minimum margin of profit to make it cost effective to farmers. The quality of the product may be specified with prescribed standards containing total nutrients as well as forms of nutrients with minimum guaranteed of nutrients uniformly.

iii. Procurement of subsidised fertilizers for making customized fertilizers: The production and sale of customized fertilizers may come under stress, as there is no provision for procuring subsidized fertilizers for use as raw material in manufacturing customized fertilizers. The facility of procurement of subsidized fertilizers for production of CFs may be considered.

iv. Specifications for growth promoters, seaweed based products etc.: There is a proliferation of growth promoting / growth regulating products - PGRs/PGPs or many other such products which are yet to be clearly recognised either as fertilizers or insecticides. These products need to be regulated and may appropriately be included under FCO or Central Insecticides Act, as toxicity/bio-safety tests are a pre-requisite before allowing their use in agriculture. It is also a fact that CIBRC (Central Insecticide Board for Registration and

Certification) has already registered some of the PGRs under the Insecticide Act. A committee under the chairmanship of DG, ICAR has been constituted to look into the issue and its recommendations can guide the final process.

v. Strengthening of quality control labs at central and state level: As on date there are 84 quality testing labs for chemical fertilizers and 24 labs for bio and organic fertilizers at state level. Similarly at Government of India level, CFQCTI (Central Fertilizer Quality Control and Testing Infrastructure) with its 3 branches at Kalyani (Mumbai), Chennai and NCOF, Ghaziabad (with its 8 regional centres at Bengaluru, Bhubaneswar, Panchkula, Ghaziabad, Imphal, Jabalpur, Nagpur and Patna) cater to the quality testing requirements. There is a need to strengthen these labs and make at least the referral labs NABL accredited for ensuring high standards.

vi. Reducing the time taken for testing of samples: The stipulated time period for testing of the sample and communicating the result to the dealer/manufacturer/importer is 57 days under the FCO. This can be reduced to 25 days by amending the concerned provisions of FCO. This is understood to be under active consideration.

vii. Imbalanced use of primary nutrients: Selective decontrol of prices of phosphatic (P) and potassic (K) fertilizers in 1992 and then selective implementation of Nutrient Based Subsidy (NBS) scheme for these fertilizers in 2010 has resulted in huge distortion in prices of different products at the farmers' level. For example, price ratio of DAP:Urea which was about 2:1 in 2009-10 now stands at about 4:1. Amongst other reasons, this is one cause of imbalanced use of primary nutrients (N, P & K). There is a case for revising the fertilizer pricing policy to provide a level playing field to all the fertilizers. Farmers are more likely to be influenced positively by the SHC recommendations. For example, Indian soils which were known to be rich in potassium (K) are now suffering from deficiency due to its mining over the last 4 decades without replenishing it.

viii. Micro-nutrients need more support: The present pricing and subsidy policies need change to support micro-nutrients. For example, the additional MRP allowed for zincated urea containing 2 per cent zinc is only Rs.542 per metric tonne (MT) of urea which does not adequately cover even the cost of raw material. Similarly, complex fertilizers fortified with 0.5 per cent zinc content are given additional subsidy support of Rs. 500 per MT of product. There is a similar treatment in case of fertilizers fortified with boron (Bo). Such an inadequate and non-remunerative compensation for fortifying fertilizer products with micro-nutrients has hindered production of fortified urea and fortified complex fertilizers. In addition, GST on micro-nutrients is 12 per cent compared to 5 per cent on other fertilizers. The regulatory environment should become more conducive to use of micro-nutrients.

ix. Development of innovative products: In recent times, Ministry of Agriculture & Farmers' Welfare has streamlined the procedure for approval of new fertilizer products. It has helped to include expeditiously new products under FCO. However, fertilizer pricing and subsidy policies need to be such as to promote development of markets and use of new and

more efficient products. For example, it is well known that use efficiency of nitrogen is only in the range of 30-50 per cent. There are number of additives and coating agents available which can enhance the use efficiency of urea. An additive of urea and sulphur can address the sulphur deficiency. However, under the present controlled regime, additional cost of these value added products is not allowed to be recovered except for coating with *neem* oil. Hence, a policy and pricing revision is in order.

x. Neem Coated Urea (NCU): Coating of entire quantity of urea production with *neem* oil was made mandatory w.e.f. 25th May, 2015. Later on imported urea was also notified to be compulsorily *neem* coated. Earlier, only a part of urea was permitted to be coated with *neem* oil. An additional amount of Rs. 268 per metric tonne has been permitted to be charged from farmers for *neem* coated urea. NCU has been a highly progressive initiative of the government. Apart from checking unauthorised diversion of urea for non-agricultural purposes, its use in agriculture has resulted in saving due to use efficiency and increased productivity. It is, therefore considered good to continue providing proportionate cost recovery facilitation, on neem coated urea.

6.4.5. Way Forward

To sum up, there is need for a re-think on fertilizer related policy and pricing policy, with a singular aim of making available most efficient fertilizer products. This in supplement with soil test based nutrient recommendation holds great opportunity for sustaining the soil health, reducing cost of cultivation and increasing yield levels. Simultaneously, both quality and cost of the products need to be taken care of.

- Promoting development of innovative products by providing them a level playing field. Farmers are not responsive to new products because of substantive price difference between subsidised and non-subsidised fertilizer products.
- The fertilizer subsidy policy should be such as to encourage balanced use of primary, secondary and micro-nutrients.
- Secondary and micro-nutrients need special support, may be by placing of them on NBS platform on the lines of P and K.
- In the interest of balanced use of fertilizers, and sustained soil health management, the transition should happen from general fertilizers to specific fertilizers. An appropriate policy framework and education of farmers, are needed.

6.5. Pesticide Regulation in India – Constraints and Suggestions

6.5.1. Pest management – current provisions and scope

As a result of food poisoning arising from contamination of foodgrain with insecticides in late 1950s & early 60s, there were a number of unfortunate many deaths in the States of Kerala and Madras (now Tamil Nadu). The Government of India appointed Kerala and Tamil Nadu Food-poisoning Cases Enquiry Commission to enquire into and report the circumstance under which the foodstuffs came to be contaminated and the measures needed to be taken against such

recurrence. The Commission's recommendations were accepted by the Government, following which it appointed an Inter-Ministerial Committee to suggest measures to give effect to the recommendations. The Inter-Ministerial Committee suggested certain short-term and long-term measures. The long-term measures envisaged the enactment of a legislation to regulate manufacture, sale, storage, transport, distribution and use of insecticide including herbicides, plant growth regulators (PGRs) and fungicides in the country. The Insecticides Act, 1968 and the Insecticides Rules, 1971 thus came to be adopted.

A brief about the Insecticides Act, 1968

Herbicides, insecticides & fungicides broadly known as 'pesticides' are one of the essential inputs in sustaining agricultural production and these are regulated under the provisions of the Act and Rules. The Act comprises 38 sections with 46 facilitating rules. Broadly, the Act provides for,

- i) Mandatory licensing in order to ensure infrastructural facilities and safety in manufacture and handling of pesticides.
- ii) Monitoring of pesticide quality to ensure their effectiveness, when used in the manner prescribed.
- iii) Measures to check import, manufacture, distribution, sale, etc. in contravention of law.
- iv) Restricting or banning of pesticides to ensure public safety.
- v) Penal provisions to discourage violation of provisions of the Act or the Rules by the companies or individuals.

6.5.2. Regulations and Controls

A pesticide is subject to regulation at various stages under the provisions of the Insecticide Act and these are as follows:

i) Registration process

A substance exhibiting insecticidal, herbicidal, fungicidal & related properties, is necessary to be included in the Schedule to the Act to qualify as an insecticide (broadly, pesticide). So far, 870 such molecules have been included in the Schedule to the Act. Such inclusion is done by the central government on the recommendation of the Central Insecticide Board (CIB), which too is constituted by the government through a Gazette notification under section 4 of the Act. The Board advises the central and state governments' technical issues arising from the administration of this Act. The array of issues include risks to human beings or animals and safety measures necessary to prevent such risks; and manufacture, sale, storage, transport and distribution of the insecticides. The primary concern in regulation is safety of human and animal population.

Any person desiring to import or manufacture any herbicides/ insecticides/ fungicides/ PGR is required to make an application to the Registration Committee (RC), constituted by the central government under section 5 of the Act and obtain a registration under section 9. The main function of the Registration Committee is to scrutinize the formulae of pesticides and verify

claims regarding their efficacy and safety to human beings, animals and environment. The RC has the powers to adopt its own procedure in conduct of its business. The RC frames guidelines for different categories of registration, so as to avoid arbitrariness in scrutinising applications and achieving satisfaction with regard to efficacy and safety of pesticides before granting registration, i.e. before permitting their use.

As per recommendation of the Joint Parliamentary Committee (JPC) on pesticide residues in food and safety standards for the soft drinks, fruit juice and beverages, no registration for use of pesticides in agriculture is granted without fixing of Maximum Residue Limits (MRLs) except in case of certain exemptions. Registration Committee grants three 93) following types of registrations under section 9 of the Act:

- (i) Provisional registration on the basis of minimum data for two years for first time introduction of pesticides under section 9 (3B) to facilitate complete scientific data generation;
- (ii) a regular of "original" registration under section 9 (3) based complete scientific data as per the guidelines of the Registration Committee; and
- (iii) a repeat or "me too" registration for the same pesticide on same conditions under section 9 (4) as already granted under section 9 (3). Registration for import or manufacture for the purpose of export only is also granted under section 9 (3) on fast track mode to facilitate exports, wherein no scientific data is sought.

Registration of pesticides is on such conditions as may be laid down by the Registration Committee and can be modified from time-to-time. A pesticide can be refused registration, if the claims on its efficacy or safety are not supported by scientific data, and a registration, if already issued can also be cancelled in the interest of public safety. No person can import or manufacture a pesticide in contravention of the provisions of the Act or the Rules.

Registrations for bio-pesticides are also granted under section 9 (3B) and 9 (3) for commercialization to encourage their use and promote environment-friendly integrated pest management (IPM) approach to plant protection. As on date, 279 technical, along with their 600 formulations have been registered for use in the country, of which 18 are bio-pesticides with formulations. **There is no repeat or "me too" registration for bio-pesticides as chemical equivalence cannot be established, for they are culture-based products.**

ii) Manufacturing license

Once the registration has been obtained, it is also necessary to obtain a license from the state government (where the business is proposed to be conducted) to manufacture, stock, distribute and sell the product. The RC has already formed guidelines for the minimum infrastructure needed for manufacture of technical grade pesticides, their formulations & bio-pesticides. However, for issuance of license for stocking, distribution, retails sale or commercial pest control operations, registration is not a pre-requisite.

iii) Quality control

The Act makes the central and state governments jointly responsible for monitoring the quality of pesticides. Both can appoint Insecticide Inspectors to inspect manufacturing, stocking or sale premises at any reasonable time to ensure compliance to the conditions of registration and licensing, and also take copies of records besides sample of products manufactured, stocked, distributed or sold by them and have them tested/ analysed as per the specifications approved by the RC. Interfering with the duties of an Insecticide Inspector is a punishable offence under the Act. The first analysis of a sample is carried out by an Insecticide Analyst, who can be appointed by the central or state government, and in case of its non-conformation to the relevant specification and challenge, there is a provision for appellate testing/ analysis at the Central Insecticides Laboratory (CIL), whose results are conclusive evidence of the facts stated therein. There are 68 SPTL (State Pesticide Testing Laboratories) across the states with an analysis capacity of about 71,000 samples per annum. There are two laboratories at Chandigarh & Kanpur under the control of central government to supplement the resources of the states.

6.5.3. Existing penal provisions

Any person, who contravenes any provision of the Act or the Rules is liable to administrative action, viz. suspension or cancellation of license, etc. and punishment as per the penal provisions laid down under section 29 of the Act. It envisages fine upto Rs.10,000 to Rs.50,000/- in case of first offence, as well as imprisonment varying from six months to two years in case of certain categories of offence, including publication of name and address of the offender in the newspapers in case of frequent commitment of offences by the same person.

6.5.4. Current status & use of pesticides

A wide range of compounds including insecticides, fungicides, herbicides, rodenticides, molluscicides, nematicides, plant growth regulators, bio-pesticides, botanicals and the like have been termed as pesticides. Among these, organo-chlorine (OC) insecticides have been used successfully in pest management. The introduction of other synthetic insecticides- organo-phosphate (OP) insecticides in 1960s, carbamates in 1970s and pyrethroids in 1980s; and the introduction of herbicides and fungicides during 1970s-1980s have aided in controlling the pests in both foodgrain and horticultural sectors.

There has been a steady growth in the production of technical grade pesticides in India, from 5,000 metric tons (MTs) in 1958 to 102,240 MTs in 1998. The annual production capacity of pesticides in the country is more than 1,50,000 MTs (Industry source) with more than 219 technical grade/ manufacturing Units, and over 4000 formulation Units.

The total number of pests infesting major crops has increased significantly since the 1940s. For instance, the number of pests which are harmful to crops such as rice have increased from 10 to 17; and from 2 to 19 in case of wheat. This underscores the importance of a comprehensive approach to pest management in the interest of the country's agri-production. The most recent example is the large scale whitefly infestation of Bt cotton crop in North India in the year 2015-

16, which resulted in a decline of cotton area in Punjab & Haryana by 27 per cent in 2016-17.

6.5.5. Constraints in the implementation the Act

The provisions of the Insecticide Act are implemented jointly by central as well as state governments and their role and responsibilities are defined under the Act. The experience with this Act show the need for amendments for greater clarity, resolution of constraints, ease of doing agri-business and effective enforcement to protect the safety concerns relating to both human and animal world. Some issues in this context are discussed below:

- i. Registration of new molecule takes about 3-4 years. In fact, the average time required in practice is about 5-6 years. Time needs to be brought down to 2.5 to 3 years, so as to promote innovations and alternatives to the farmers.
- ii. Lack of R & D initiative on new molecule by Indian Pesticide Industry.
- iii. Lack of data protection – causing delay in farmers getting access to new and green chemistry pesticides in comparison to developed world.
- iv. Most of the manufacturing units lack equipments required for Good Manufacturing Practices (GMP).
- v. Limited quality control infrastructure - hardly one sample from one metric tonne of pesticides.
- vi. Need for improving enforcement to ensure safety standards & measures in the interest of industry workers and environment.
- vii. Lack of safe and appropriate storage conditions at stock/ sale points.
- viii. Illegal import and sale of pesticides – enforcement needs up-gradation.
- ix. Need for better education/ training of farmers about safe & judicious use of pesticides.
- x. Non-use of plant protection equipments (PPE), exposing the users to health & life hazards.
- xi. Use of non-label pesticides is creating problem of residues in export; besides adversely affecting human health.
- xii. Lack of adequate regulatory mechanism at the level of use.
- xiii. Lack of proper use of application technology for herbicides.
- xiv. Empty container management is emerging as a challenge. Its safe disposal and incineration need a systems to be put in place, and farmers educated about it as part of 'Swachha Bharat'.
- xv. Post- registration feedback mechanism is absent.
- xvi. Inadequate mechanism for post-registration evaluation under field conditions & re-registration.
- xvii. There is a necessity of inserting a provision of compensating the farmer in the event of crop loss/animal loss/death of self on account of usage of a pesticide,

and it is proved that it was no fault of the user. Simultaneously, a more stringent penal provision is necessary.

- xviii. Life time registration validity.
- xix. Lack of stringent panel provision.
- xx. Lack of provisions for compensation of farmers in the event of crop loss/ death.

6.5.6. Proposed Pesticide Management Bill (PMB)

A new Bill now under examination would probably address the constraints and suggestions for improvement listed in the preceding section. While the new approach is Integrated Pest Management (IPM), the usage of pesticides will continue as a component of the pest management bouquet. It is, therefore, important that pesticides, comprising a range of products, are available to the farmers. Their quality, safety and effectiveness deserve focus. The proposed Bill should facilitate:

- i. Incentivise Research and Development (R&D) activities by the pesticide industry within the country.
- ii. Encourage competition all products and reduce dependence on imported formulations.
- iii. Promote 'Make in India' and reduction of dependency on imported formulations. This will reduce input cost substantively, besides creating local jobs.
- iv. Aim at increasing export of Indian agri-inputs. Export by Indian industries (both domestic and MNCs) will help reduce the cost of local products (on account of economy of scale and adoption of best practices by the industry to become globally competitive). This is beneficial to the farmers.
- v. Facilitate access to farmers to new molecules from across the world.
- vi. Enable a robust retail network, managed by qualified dealers, so that they are able to provide extension service apart from just selling pesticides to the farmers.
- vii. Provide for a strong enforcement through a pro-active partnership between centre and state officials. The intervention needed is orientation & training of officials and strengthening of laboratory infrastructure. Suitable penal provisions that will deliver proportionate, effective and in time justice to the affected party will hold the key.

6.6. Agricultural Market Liberalisation

6.6.1. Reforms in wholesale agricultural markets

In 2017, Government of India formulated the Model Agricultural Produce and Livestock Marketing, (Promotion and Facilitation) Act, 2017, known in short as APLM Act. This Act, as in its name, is less about regulation and more to do with promotion and facilitation of marketing for reaping higher efficiency.

Provisions are incorporated to attract new players and make the marketing system more competitive by doing away with the monopolistic and oligopolistic tendencies in the present

agricultural markets, set up under the provisions of the State APMC Acts.

The distinguishing features of the Model APLM Act, 2017 are:

- (i) Abolition of fragmentation of market within the State/UT by removing the concept of notified market area in so far as enforcement of regulation by Agricultural Produce and Livestock Market Committee (APLMC) is concerned (State/UT level single market).
- (ii) Full democratisation of Market Committee and State/UT Marketing Board.
- (iii) Dis-intermediation of food supply chain by integration of farmers with processors, exporters, bulk retailers and consumers
- (iv) Clear demarcation of the powers and functions between Director of Agricultural Marketing and Managing Director of State/UT Agricultural Marketing Board with the objective that the former will have to largely carry out regulatory functions, while the latter will be mandated with developmental responsibilities under the Act.
- (v) Creation of a conducive environment for setting up and operating private wholesale market yards and farmer consumer market yards, so as to enhance competition among different markets and market players for the farmer's produce, to the advantage of the latter.
- (vi) Promotion of direct interface between farmers and processors/ exporters/ bulk-buyers/ end users so as to reduce the price spread bringing advantage to both the producers & the consumers.
- (vii) Enabling declaration of warehouses/ silos/ cold storages and other structures/ space as market sub-yard to provide better market access/ linkages to the farmers.
- (viii) Giving freedom to the agriculturalists to sell their produce to the buyers and at the place & time of their choice, to whom so ever and wherever they get better prices.
- (ix) Promotion of e-trading to enhance transparency in trade operations and integration of markets across geographies.
- (x) Provisions for single point levy of market fee across the State and unified single trading licence to realise cost-effective transactions.
- (xi) Promotion of national market for agriculture produce through provisioning of inter-state trading licence, grading and standardization and quality certification.
- (xii) Rationalization of market fee & commission charges.
- (xiii) Provision for Special Commodity Market yard(s) and Market yard(s) of National Importance (MNI).
- (xiv) Providing a level playing field to the licensees of private market yard, private market sub-yard, electronic trading and direct marketing vis-à-vis the APLMCs and

removing the conflict of interest that the latter are likely to practise, if both development and regulatory functions are centred in the same authority.

The provision for declaring warehouses / silos / cold storages or other such structure or place as market sub yards is made to provide better market access / linkages to farmers. This development will help integrate the warehouses / silos / cold storages etc., into the online e-platform. In turn, this will help to facilitate operationalisation of warehouse receipt system and capturing of information for a responsive market information system.

Under the new legislative Model Act, APMC will not be the regulator of private markets and licensee of such markets can collect the user charges and retain with him, thus, making it an economically viable proposition. A wider competition base, and the proposed caps on market fees will bring efficiency in supply chain, build transparency in trade operations and an equitable environment in marketing. The new model Act also has provision for promoting online or spot (e-national agriculture market) market platforms and ensure that all these measures are revenue neutral for States.

The Model APLM Act 2017 provides the states to adopt an approach that facilitates liberalisation on the output side of agriculture. The various provisions made for private markets is with intent of “**ease of doing business**”, as it provides for level playing field both for APMC market and private market.

States are recommended to adopt or adapt the Model APLM Act, 2017, to initiate necessary changes in agriculture marketing and to encourage a single national agriculture market.

6.6.2. New market architecture

To facilitate small & marginal farmers to integrate with organised marketing structure, primary retail markets in close proximity of their farm gates are essential. There exists scope to upgrade the existing 22,000 (approx) *haats* in the country into aggregation platforms and enable villages to link directly with wholesale markets, domestic and international. This initiative can be expected to answer the current challenges of transacting small lots of marketable surpluses, at low cost and from a position of bargaining strength that comes from farmers-collectives into FPOs. The upgraded *haats* should be kept outside the ambit of APMC and designed to continue to serve local direct retail, with the added function of aggregation, assaying, packaging, and wholesale dispatch to terminal consumption points. The activities and functions of such aggregation cum marketing hubs with the associated logistics are described in Volumes III and IV of this Report. These proposed markets should be placed under the Directorate of Agriculture so that they are developed to bring strategic advantage to all sub-sectors of agriculture (including horticulture, livestock and fisheries), and for market-led operations.

6.6.3. Liberalising stock limits

A structural limitation arises when stock limits disallow wholehearted inclusion of the private sector in agricultural trade. Volume-IV of this Report recommends ways of involving the

private sector in procurement and trade of agricultural produce, initially in case of notified commodities. To facilitate such private sector participation, and to build on the opportunity to develop international trade, conditional exemption in stock limits needs to be considered. This could include conditional exemption for private sector agencies that procures notified commodities at MSP rates directly from farmers, with associated autonomy on international trade free of any variable export window limitations. It is expected that liberalisation of stock limits, coupled with freedom to link with international markets, will provision for an economic case to viability increase farm productivity and production.

A special Task Force may be constituted to evaluate business models with liberalised stock limits, such that it will relieve market distress of farmers, while promoting various opportunities to capture a larger share of the global demand.

Key Extracts

- Large part of the agricultural production system is already driven by market forces, and reforms are needed to ensure farmers have a greater choice of inputs, at right quality and rational costs.
- The Seed chain, from production to supply, including development of new varieties can be liberalised. A series of recommendations are proposed in this chapter.
- The fertilizer sector policies were framed at the time when the need was intensive farming. These need a revisit in light of soil health management, sustainable farming and the need to be judicious to lower input costs. A series of reforms are suggested.
- The pesticide regulations need to be rationalised and a series of recommendations are made, including the need for checks and balance of Inspectors.
- The output market environment needs to be liberalised to invite private sector participants. States need to modernise their agricultural market architecture and legislate the Model APLM Act 2017.
- Upgrade the existing 22,000 (approx) *haats* into aggregation platforms, keeping outside the ambit of APMC, to link farm gate organically with wholesale terminal markets, national and international. The upgraded *haats* should be designed to continue to serve local direct retail, with the added function of aggregation, assaying, packaging, and wholesale dispatch to terminal consumption points.
- A special Task Force may be constituted to evaluate appropriate business models with liberalised stock limits, such that it will relieve market distress of farmers, while promoting other opportunities to capture a larger share of the global demand.

Chapter 7

Infrastructure constraints

The availability of infrastructure, directly effects the way farmers go about their business of cultivation and marketing of their output. The infrastructure development undertaken needs to converge on some common outcomes, with the agenda to uplift and promote agriculture as a sustainable enterprise.

The status of infrastructure, 'in' and 'for' agriculture, plays a prominent role in the pace of change that can be achieved in agriculture. Investment in basic support infrastructure, such as roads, irrigation, electricity, etc., is critical to achieving of the desired higher growth rates. This support infrastructure is the back-bone for other infrastructure components in agriculture, such as markets and the associated agri-logistics.

The basic support infrastructure not only facilitates production and productivity, but also provides the platform to build backward and forward linkages, between farms and markets. Without such facilitation, the farmers and the nation stand to lose on the gains made through productivity enhancement and production growth. Investment in infrastructure is evidently important to enhance the technical and financial viability of farming, from angles of both agri-business economics and sustainability.

In Volume-II of this Report has been placed the target investment rate, summarised in Table 7.1. The projected capital requirements on public accounts are higher than on private accounts, highlighting the important role of the government in the agricultural sector. The public investment 'for' agriculture is the sum total of agriculture, irrigation, rural roads & transport and energy.

Table 7.1 Future Public and Private Investments

	Private Investment in Agriculture			Public Investment 'for' Agriculture		
	2015-16 (Base year - current investment)	2016-17 to 2022-23 (additional over 7 years)	Total Investment (base year plus additional)	2015-16 (Base year - current investment)	2016-17 to 2022-23 (additional over 7 years)	Total Investment (base year plus additional)
At 2015-16 prices	61,000 Rs. crore	78,424 Rs. crore	1,39,424 Rs. crore	1,17,100 Rs. crore	2,29,904 Rs. crore	3,47,004 Rs. crore
At 2004-05 prices	29,559 Rs. crore	46,298 Rs. crore	75,857 Rs. crore	64,022 Rs. crore	1,02,269 Rs. crore	1,66,300 Rs. crore
Annual growth rate	9.15% (2002 to 2012)	12.5%	--	12.45% (2000 to 2013)	16.8%	--

Note: Private investment by farmers, estimated at all India level; Public investment estimated for 20 select states; Public investment 'for' agriculture is sum total of agriculture, irrigation, rural road-transport and energy heads.

The data shows that public investments have been rising, and in 2015-16, the growth of public investment under all four heads was 12.45 per cent. However, the required growth rate for public investment is estimated at 16.8 per cent per annum. This glass ceiling has not yet been broken at the national level.

There are examples like the state of Madhya Pradesh and Gujarat, which having made higher investment in recent years in irrigation, were able to register high growth rates in production and productivity. Likewise initiative needs to be taken in all the states across the country as well. It is simultaneously, important to note that, investment in any one area is not sufficient without proportionate investments in other related activities. For example, the resulting increase in production from irrigation, needs associated investment in roads and transport, and energy to enable the output to be suitably market linked. Therefore, a systems approach is recommended to maximise the outcome for greater capital use efficiencies.

Absence of infrastructure is a basic constraint and needs to be addressed. It must also be understood, that private corporate sector investment also follows public expenditure in rural roads and energy. Data shows that the bulk of private sector investment in agriculture has happened by farmers themselves. This investment is largely for their enterprise related activities like land development, small irrigation etc. There is need to incentivise private investments by the corporate sector, so that common facilities like agri-logistics, processing and such linkages come into existence as examined in Volume-III of this Report.

Public investment in rural connectivity (roads, transport, electricity, communication) allows for a growth in the traffic of agricultural produce, from farms to markets. Greater involvement of the corporate sector is desired to organise and integrate the flow of agricultural goods and commensurate value. This optimal blend, in turn, organises the overall input and output supply chain making for an optimised agri-value system. The current measures of marginal effects, from public investment in rural roads-transport, energy and communication, on farmers' income, may not be fully capturing the growth from associated investment in agri-business, marketing, and the growth in productivity that also accrues.

The accelerated momentum in public investment needs to be increased to achieve the targeted rate of 16.45 per cent, spread over the various heads in agriculture. Volume-II of this Report presents the strategy for public and private investment to be followed when making plans at state and district levels. A holistic approach to fill the gaps and bring convergence in the resources available across different public sector agencies, as also in the private sector should be adopted by the states. For example, investment in irrigation and energy must be met with commensurate investment in roads and in modernising marketing infrastructure. An apt measure of outcome to adopt is the growth in income or the total quantity of production trafficked.

The data analysis has shown that private investment by farmers belonging to the states in the eastern region is much lower relative to their counterparts in the northern region. This may also be due to comparative shortfall in the reach of rural roads and energy. A preference is also visible that households have invested in house improvements, which is undertaken at the expense of investment in agriculture.

A good strategy to adopt is to have private investment targets linked to public investment

spending. Currently, the added investment in the seven years after 2015-16, by public and private sectors, is Rs. 102,269 and 46,298 crores respectively (a ratio of 1 : 2 approx.). Apart from ongoing private investment by farmers, there is little investment by corporate sector. Since, corporate private investment would, to a significant level, be linked to availability of basic infrastructure, the States can have a target equivalent to at least 10 per cent of the public investment made in agriculture. This will drive emphasis on making public investments in appropriate supporting infrastructure, as needed by the private sector to plan and make their own investment in agri-business projects.

Public investment measures can include factors or indicators that link to increased corporate sector investment in agriculture, especially in agri-business areas (market upgradation, agri-logistics, agro-processing, etc.). This will also bring about an increase in the marginal effects of public investment and lead to greater use efficiency of public capital invested.

This Committee has recommended a Division of Investments and Enterprise as part of restructuring and reorganising of Divisions in the Ministry of Agriculture and Farmers' Welfare. A similar approach is suggested to the States. It must be noted that guiding public investments 'for' agriculture and promoting investments in agricultural enterprises and will be vital to achieving the agenda of doubling farmers' income. It is noted that currently the scheme implementing agencies, whose achievements are guided by financial and physical targets, are also loaded with related policy formulation responsibilities. This, at times tends to disallow the necessary holistic intent and outcome based approach in policy making. Segregating implementation activities from policy making, will help make the policies more outcome oriented and allow for better monitoring of the implementation. Tasking a separate division with the charge of integrating investment policies 'in' and 'for' agriculture will be beneficial way forward and provide suitable impetus to capital formation in agriculture.

7.1. Key Extracts

Key Extracts

- Public investment in infrastructure is vital to achieve the target growth rates in farmers' income. Investment in irrigation, rural roads-transport and energy is also critical to attract larger private sector investment in agriculture.
- Public expenditure can be coordinated into organically linked investment heads so as to make the environment attractive to private corporate investment
- Suitable focus on investment 'in' and 'for' agriculture is envisaged by setting up a dedicated Division for Investment & Enterprises, as part of restructuring and reorganising of the Ministry of Agriculture & Farmers' Welfare.
- There is need to segregate implementing agencies from policy making responsibilities, to develop result oriented plans and outcome based monitoring of implementation.

Chapter 8

Climate Change – compounding agricultural risks

Climate change is a harsh reality, and is already evidenced in a shift observed in some cropping patterns. Climate has direct impact on cultivation, including farm profitability and the long term changes in weather patterns will also affect associated food security.

8.1. Background

Agriculture continues to be fundamentally dependent on the weather and will remain sensitive to short term variations in weather and to seasonal, annual and long-term changes in climate. Climate change is not just the warming of air temperature, but the linked long term alteration in established weather patterns. The change manifests initially in weather disruptions such as un-seasonal rains, winds, floods, droughts, extreme warming or cooling and other incidents. Over the long run, it can cause a drastic shift in the agro-ecology with flora and fauna forced to adjust their life cycles or turn extinct.

There are many examples of how extreme weather events have impacted farmers in the short term, such as when (to mention a few):

- lakhs of poultry died in May and June 2003 in Andhra Pradesh due to heat wave;
- high rainfall in 1998 & 2005 (> 1500 mm) affected kharif and late kharif crop of onion and damaged rabi nursery;
- cold wave in north in 2006 caused frost and ice damage to crops;
- flowering occurred on already bearing mango trees in Bengaluru in February 2010; and
- heat wave causing lower milk yield from cattle and fish mortality in shallow water ponds.

These and many such instances on record, are occurring more frequently and un-predictably, and are seen as indicators of changing atmospherics. When such extremes in weather become more frequent or a norm, then the impact is permanent on agriculture. Scientists all over the world agree that climate change is occurring, and its full impact is yet to be realised.

Most northerners in India will share how over the past decade, the winter is setting in late and the spring has almost become non-existent. Summers are becoming warmer and such changes are borne out by significant statistics. The Himalayan Glaciers, which get a substantial part of their moisture from summer monsoons have retreated. Changes in farming are also observed, like the traditional orange growing area of Nagpur having shifted northwards into Rajasthan; and how apple & strawberry growing is said to have migrated to higher elevations in the Himalayan hills. Studies indicate that the rise in average air temperatures have prevented achieving expected yields in wheat and rice, despite increasing fertilizer application. Critical growth stage of rabi crops are facing higher temperatures, shortening crop duration as a result.

Long term shift in weather patterns, or climate change, will also bring about a shift in pathogen and pest populations & infestation zones, a changed situation in water availability and various

other associated biological variations. The previous categorisations of agro-climatic zones will change (in fact some changes are already visible) and entire agricultural economies will undergo a transition. Such a transition has to be planned for.

8.1.1. Climate change forces a mirror on past strategies

As part of the drive for a green revolution, the kharif season got dominated by paddy, sugarcane and cotton. Provided safety through price support by the government, these were considered cash crops, and they quickly took over the area that was traditionally devoted to millets and pulses (which were more suited to the local ecology). The crops are irrigation heavy, and access to ground water and other irrigation was increased, which resulted in farmers shifting from semi-arid cereals to cash crops which also require a heavy dose of chemical fertilizers. The regions' ground water got depleted and soil stressed.

Sugarcane is an example in particular. With advocacy by industrialists and interest shown by the cooperative sector, Maharashtra developed a wide network of sugar mills, creating a ready market for farmers. This influenced them to take up sugarcane cultivation, a water-intensive crop, in areas not naturally endowed with water. Growing sugarcane in rainfall vulnerable regions, made these areas more vulnerable when rains were not as expected. The same areas traditionally grew millets and oilseeds, which required less water. Cultivation of paddy in semi-arid Punjab is another example, which with changes in glacial melt and already depleted ground water, will be increasingly vulnerable to changes in weather patterns.

Now, as a result of climate change, including erratic or changed rainfall patterns, these regions, where cropping patterns were changed in disharmony to natural ecology, are facing higher vulnerability and stress. Similar examples can be seen where drought prone regions in Andhra Pradesh have taken to papaya and citrus, and Himachal Pradesh is producing exotic vegetables at the cost of traditional crops like legume.

Climate change effects have brought forth some of these past errors and omissions and hastened the learning curve. These learnings can be used for good, to plan a shift from unsustainable cultivation practices of the recent past. The motivation of the Paramparagat Krishi Vikas Yojna, is to counter such incidents, where insufficient knowledge and forethought now requires a course correction.

The impact of climate change, current and expected are constantly debated and should be well known to the involved. Temperature will effect yields of crop and livestock, water will impact production and productivity, extremes will cause crop damage, nutrient quality of soil will get impacted, pests will change zones, bees will be hurt, et al. Areas which could not grow certain crops will find new life and areas currently under cultivation may get depleted (due to inundation from rising sea levels or due to lack of water).

Agriculture continues to be fundamentally dependent on the weather and will remain sensitive to short term variations in weather and to seasonal, annual and long-term in climate.

8.2. Way forward for agriculture under changing climate

Inter-governmental Panel on Climate Change (IPCC) in their Fifth Assessment Report (AR5) has stated that warming of the climate system is unequivocal. A report published by the World Bank¹ analyses the global impact of climate change, including in South Asia. This assessment is buttressed by studies undertaken by CRIDA (Central Research Institute for Dryland Agriculture) and others in the ICAR network. The August 2017 Report (39th) of the Standing Committee on Agriculture (2016-17)², deliberated on climate change concerns in regards to Indian Agriculture.

The impact of climate change is well established from various reports. These include, partial gains in productivity in some crops due to CO₂ rise, but decrease in productivity in many others due to temperature stress. Possibly some improvements in yields of chickpea, rabi maize, sorghum and millets; and coconut in west coast. Horticulture will be severely affected due to changes relating to flowering pollination and weather linked yield losses. Loss of arable lands is expected where sea level rises will inundate coastal and river delta areas. Milk production and reproductive function of livestock will be adversely affected with temperatures rises, the highest in case of crossbred cattle and the lowest in case of indigenous breeds. Fishery spawning and maturity will be curtailed and birds are likely to suffer.

These and many others, including the impact on soil health, glacial rivers, fisheries, etc., are discussed in Volume-V and VI of this Report.

Climate change concerns have brought to forefront, the agenda of sustainability in agriculture and is narrowing the boundaries under which agriculture operates, thereby adding great responsibility on the science behind agriculture. It is understood, that climate change will impose and enforce changed farming practices, and this will require constant and monitoring of various interventions planned. Care must be taken that practices that are made attractive by short term financial gains are not at the cost of long term welfare of the farmer or the environment. Crop diversification, more efficient water use, and improved soil management practices, together with the development of drought-resistant crops can help reduce some of the negative impacts. There is a need to approach climate change with dedicated focus, not only from the perspective of protecting farmers' welfare, but from also from the view to safeguard food and nutritional security of the nation.

8.3. Impact of Climate change and change management

Agriculture a biologically controlled activity is totally dependent on climate. It is over the millennia that the current global agricultural systems have evolved as shaped by nature. The changes effected to these naturally evolved agricultural systems by science and technology, particularly in the last two centuries have made only marginal and cosmetic changes to the

¹ World Bank. 2013. *Turn Down the Heat: Climate Extremes, Regional Impacts, and the Case for Resilience*. A report for the World Bank by the Potsdam Institute for Climate Impact Research and Climate Analytics.

² "Comprehensive Agriculture Research based on Geographical Conditions and Impact of Climatic Changes to ensure Food Security in the Country", Thirty Ninth Report of Standing Committee On Agriculture - Lok Sabha Secretariat (2017)

creations of the nature-scientist. In consonance with the climatic parameters inclusive of rainfall, temperature, humidity, etc., agricultural systems & sub-systems have taken shape. The basic principles of natural evolution have created the appropriateness of different agricultural sub-sectors to varying climatic conditions. This could be water guzzling paddy which may be more suited to semi-temperate climates and millets in arid and sub-arid tropics; or template horticulture on the upper reaches of the Himalayas and dryland horticulture in the sub-tropics; or buffalo based dairying in hot and humid climates of the Deccan Plateau and Sahiwal cow in North India; and so on their forth. Similar patterns would be visible across the continents.

Further, in accordance with the principles of survival of the fittest, the agricultural fauna and flora have also adapted themselves to the geographical situations. Thus has evolved the stable agricultural system of today catering to mankind's basic requirements of food, fodder, industrial raw material etc. It would be more appropriate to say that the agriculture system ever since it originated about 10,000 years ago and transitioned man from hunting to settled stage sowed the seeds of the first civilization. Since then there at best have been only marginal or insignificant changes "in principles" season-bound to the 'in principles' season-bound agricultural practices. The mankind including in India has adopted and shaped his civilization around agriculture.

Agriculture has defined the contours of India's civilization and culture and nurtured the same through centuries. Agriculture has served as the anchor of the majority of India's population dependent as they are on farming for their livelihood. Any basic change in the stability of the agricultural system is bound to impact the farming community in several ways.

With climate change implications resulting in shift in seasons and cropping systems, the life of a farmer, relating to both his profession and cultural life, can be expected to face an unsettled environment. The changes are likely to be substantive, impinging upon the farmers directly, calling upon the need for major re-adjustments. The agricultural practices, which are a natural habit formed not just within a farmer's lifetime but over generations, transferred like inherited traits would be hard to change. The demand for change would be at both mental and operational levels. A farmer's ability to adjust himself to the new environment would be challenged. There would be demand for appropriate skills and resilience. At the simplest level, the farmer would now be required to change the cropping pattern because of shift in season and consequential and new response system in respect of seeds, farm practices, farming equipments & machinery etc. In short, the new challenges would amount to "change management".

The Change Management would involve a certain period of transition from the existing to the new system and it is during this period of transition that the challenges of moving smoothly to a new situation will have to be dealt with by the farmers. The ability of the farmers to manage this fundamental change will depend upon his level of information, knowledge, skill, attitude and above all financial strength. Considering that more 86 per cent of the agricultural households are small and marginal, the fiscal space available to them to cater to the change demands is severely restricted. The levels of literacy and general awareness are also a concern.

Obviously the change management under such circumstances is going to be difficult and would require the Government to provide them both support and counsel. It would, therefore, be necessary that a comprehensive plan and a time bound roadmap are designed and adopted by all government agencies to guide and handhold the farmers through this difficult process of change. The small & marginal farmers, as also the landless agricultural labour would require special attention. This would mean adoption of a package of mitigation and adaptation measures for guiding climate change induced impact on agriculture and farmers.

In this regard, the National Action Plan on Climate Change (NAPCC) comprising, inter alia, eight National Missions in specific areas of Solar Energy, Enhanced Energy Efficiency, Sustainable Habitat, Water, Sustaining the Himalayan Eco-system, Green India, Sustainable Agriculture and Strategic knowledge for Climate Change was released in June 2008.

8.4. Key Recommendations

The National Mission on Sustainable Agriculture (NMSA) derives its mandate from the NAPCC. However, global scientific knowledge on climate change and related technologies is updated regularly. The strategy and components of the NMSA may be reviewed with an option to revise every two years, so that its various planned interventions are most appropriate and the best available technologies are adopted.

In view of climate change and other ecologically diverse changes that have occurred there is a need to revisit and map anew the agro-ecological regions and climatic zones in the country. This will help provide fresh direction in respect of all other sustainable strategies and practices.

Science will play a big role to mitigate effects of climate change and greater focus needs to be laid on R&D to develop technologies, such as biotic stress resilient crop varieties and livestock breeds. Widespread dissemination of climate change concerns and economic impact may be undertaken in participation with KVKs and the ATMA network.

Key Extracts

- More rigorous monitoring of climate change and technologies to mitigate adverse impact is needed. The agricultural system, including farmers has to be prepared for possible shifts in practices and habits that have developed over generations.
- The NMSA strategies may be reviewed periodically to maintain relevance with best available technologies and new scientific developments on climate change and agro-ecological regions and climatic zones be re-categorised.
- The expected transition in cropping system, crop selection, livestock care and adoption of new technologies has to be extensively propagated.

Volume XIII-B
Governance Framework

Chapter 9

Farmers' Welfare

The term 'welfare' is practically understood across the world, as taking care of the weaker. It refers to a set of support systems that governments offer to their citizens to ensure equitability and general well-being. While at the generic level, it is well explained by Economists, Sociologists and Political Scientists, the term 'farmers' welfare' is yet to be defined appropriately. Now, that the Government is speaking of agriculture not just as a profession or enterprise, but in terms of farmers, the human element assumes greater importance. This chapter deals with the paradigm of 'farmers' welfare' and the approach and set of interventions needed to achieve the general well-being of the farmers.

9.1. Understanding Welfare

The term 'welfare' has a long history and has been a subject of discussions across various disciplines including economics, sociology, political economy, psychology, etc.

The Oxford dictionary defines welfare as:

- i. The health, happiness, and fortunes of a person or group.
- ii. (a) Statutory procedure or social effort designed to promote the basic physical and material well-being of people in need.
(b) North American: Financial support given to those who are unemployed or otherwise in need.

The Merriam Webster dictionary defines welfare as:

- i. the state of doing well especially in respect to good fortune, happiness, well-being, or prosperity
- ii. (a) aid in the form of money or necessities for those in need;
(b) an agency or program through which such aid is distributed

Welfare in terminology can be defined as a minimal level of well-being and provision of social services and support for citizens and other eligible residents who do not possess sufficient current means to satisfy their basic needs. In most developed countries, welfare is mainly provided by the government from tax revenues, and to a lesser extent by NGOs, charities, informal social groups, religious groups, and inter-governmental organisations.

Development also contributes to the welfare of people. For example the building of rural road networks or electrification leads to an improved status of well-being and brings greater opportunities for the region to fare well in their living. In such a case, the development empowers the people to progress and live better.

Social Welfare: Social welfare is defined a little more definitively in the lexicon. It is seen as the social well-being in terms of health and economic matters as well as the organised social services provided to the disadvantaged.

The Oxford dictionary defines social welfare as:

“The well-being of a community or society, especially with regard to health and economic matters”.

The Merriam Webster dictionary defines social welfare as:

“Organised public or private social services for the assistance of disadvantaged groups”.

The provision of social services to the disadvantaged or to the population in general, seems to be the relevance here. For example, the availability and access to the basic amenities of the times like food, hospitals, schools, etc. are inferred.

Social Security expands on this concept, especially in welfare states, by providing all inhabitants with various social services such as universal healthcare, unemployment insurance, student financial aid (in addition to free education upto a certain level), and others. In its 1952 Social Security (Minimum Standards) Convention (nr. 102), the International Labour Organisation (ILO) defined the traditional contingencies covered by social security.

‘The *welfare*’ as terminology possesses different connotations in different countries. For example, the general term for an action programme in support of the well-being of the poor in United States is called a *welfare programme* and the general term for all such programmes is simply called as *welfare*. In the United Kingdom, the term *welfare* means not only the minimal help of people in need but also services traditionally called *benefits* and *social security* and this holds good in most of the English speaking countries except the United States. The term is even used to include government help in finding employment.

The welfare support offered by the governments to the people has had long history. In the Roman Empire, the first emperor Augustus provided the *Cura Annonae* or grain dole for citizens who could not afford to buy food every month. Early welfare programmes in Europe included ‘English Poor Law of 1601’, which gave parishes the responsibility for providing welfare payments to the poor. This system was substantially modified by the 19th century Poor Law Amendment Act, which introduced the system of workhouses.

However, it was predominantly in the late 19th and early 20th centuries, that an organised system of state welfare provision was introduced in many countries including Germany, Britain etc. The national insurance system was introduced in Great Britain in 1911. During the great depression (1929), when emergency relief measures were introduced under President Franklin D. Roosevelt’s ‘**New Deal**’ the focus was mainly on a programme of providing work and stimulating the economy through public spending on projects, rather than on cash payment.

The various interventions referred above in different countries at different points of time in world history demonstrate the wide canvas of the concept of *welfare*. As seen, it may include

distribution of food to the poor, providing houses to the weaker section, offering insurance support to the poor at concessional premium payments, and creating job opportunities by reserving public spends on projects. In modern India, the basket of welfare has included all these and many more. In all these interventions, economics linked support is provisioned to allow the beneficiary to attain a better state in the standard of living.

Economics Definition of Welfare: Alfred Marshall a pioneer neo-classical Economist redefined his field of study by attempting the *welfare definition of economics*. This definition enlarges the field of economic science to a larger study of humanity. In his view, economics studies all the action that people take in order to achieve economic welfare. In his words “**man earns money to get material welfare**”. It is on account of this, that economists since Marshall have described his definition as *welfare definition of economics*. This definition widens the scope of economic science by emphasising a combined study of wealth and humanity, rather than wealth alone. In his well-known book, ‘*Principles of Economics published*’ in 1890, Marshall defined economics as follows:

“Political Economy or Economics is a study of mankind in the ordinary business of life; it examines that part of individual and social action which is most closely connected with the attainment and with the use of material requisites of well-being”.

Some recent economists such as Lionel Robbins have criticized the above definition by saying, that Marshall’s definition of material welfare excludes non-material welfare like services of doctors, lawyers, teachers, engineers, etc. which also promote human welfare. However, this argument of Robbins has been countered by others by highlighting that Marshall’s definition of ‘material’ includes both goods and services.

Broadly, economic welfare is the level of prosperity and standard of living of either an individual or a group of persons. It refers to that part of social welfare that can be fulfilled through economic activity.

Economic welfare is measured in different ways depending on the preferences of those measuring it. Factors used to measure the economic welfare of a population include: GDP, literacy, access to health care, and the like.

Ministry of Agriculture & Farmers’ Welfare: The erstwhile Ministry of Agriculture was renamed by the government, appending the phrase “Farmers’ Welfare”. The term ‘*welfare*’ used here, is translated from the phrase Kalyaan (from कृषि एवं किसान कल्याण मंत्रालय). This is not merely a name change, but indicates the government’s agenda to add focus on farmers, and not on agriculture as a sector alone. In any enterprise or organisation, the human resource is more important than all other resources. In agriculture, farmer is the human resource.

How the notion of *kalyaan* is interpreted by development agencies, is important to how they drive the associated programmes. Would it be appropriate to link *kalyaan* only to social

services? Or is this more about economic welfare, associated with long term well-being, to be achieved by empowering farmers with the right knowledge, tools and facilitation. Has the concept of *kalyaan* been lost in translation? It is important to understand 'welfare' from the perspective of empowerment and not limit the interpretation in relation to gratuitous patronage or *daan*. Farmers too have repeatedly expressed they seek opportunity to progress in economic terms, and not a dependence in perpetuity. This is also evidenced in recent demands by farmers to find optimal value at markets, and support in optimising their business opportunity.

As heads of farming enterprises, like all business owners, farmers seek facilitation to achieve growth through support to mitigate uncontrolled risks, enabling market access and a business environment that is not restrictive. Economic well-being is expected to lead to self-reliant living, a higher standard of life and a state of contentment. However, the rural backdrop is typically remote from other kinds of development, and therefore farmers' welfare would also need to integrate delivery of social services, of rural welfare programmes such as for health, medical facilities, pension schemes, etc. Farmers' welfare would therefore not find wholesome acceptance in economic terms alone, but would include aspects of social support system.

Social welfare is not the same as standard of living but is more concerned with the quality of life that include factors such as the quality of the environment (air, soil, water), level of crime, availability of essential social services, as well as the spiritual aspects of life.

9.1.1. The need to emphasise on farmers' welfare

It is well recognised that:

- i. Farmers are engaged in producing food and non-food commodities to meet the nation's requirement
- ii. Farmers are engaged in agriculture as a livelihood, and are self-employed. They are to that extent releasing the government of an obligation of providing alternate jobs to a large population.
- iii. Agriculture which is a biological process is highly risk prone along its entire chain.
- iv. Farmers constitute a singularly largest professional section of the society.

These four factors create a case for considering farming and farmer as a special category, warranting priority attention to the status of their welfare. Hence, it is important that the term "farmers' welfare" is well defined and a set of comprehensive support systems adopted, that would guarantee their specific well-being.

9.2. Defining Farmers' Welfare

The above definitions and explanations drive home a point, that economic status would constitute a critical component in defining "farmers' welfare". In a socialist country like India, economic welfare of any individual or a class of people, including that of the farmers, is catered to by governments through various schemes that offer direct support besides creating or

facilitating generation of job opportunities. For example, these include wage employment guarantee schemes (MGNREGA), pension schemes (old age pension, widow pension etc.), free education upto a certain stage, food subsidy under public distribution system, welfare of children and mothers under ICDS, free primary health services, developmental schemes under different departments (including agriculture), life and non-life insurance (crop insurance under PMFBY is a good illustration). **The implication is that both personal incomes and governmental support determine the intensity and extent of welfare that is available to the people of India including the farmers.**

9.2.1. Farmers' Income

As discussed in detail in Volume-II of this Report, there are no standardised and fixed interval measures of farmers' income in India. One of the more acceptable estimates of farmers' income is the NSSO's Situation Assessment Survey (SAS) vide 59th and 70th Rounds. As per 70th Round of SAS conducted during the period of July 2012 to June 2013, the average income of an agricultural household was Rs. 6,426/- and the average monthly consumption expenditure was Rs. 6,223/-. This leaves a paltry saving of just Rs. 203/-.

Notwithstanding various welfare and social welfare support systems of governments (central and state) available to the farmers, the average monthly income of Rs. 6,426/- in the agricultural year 2012-13 is not good enough considering that the average monthly consumption expenditure (MPE) of an agricultural household is also high. It is not possible for an average agricultural household to meet various other additional expenses that the family would need to on account of education, health, entertainment, social obligations (like marriage ceremonies at home). It is in fact such expenses that drive a farmer to borrow from the private moneylenders at usurious rates of interest.

With no adequate savings, the borrower-farmers unable to make timely repayments ship into a debt trap. Such precipitous situations lead to negative social implications including loss of face, anxiety and stress. The consequential state of mental tension cannot but compromise the well-being of a farmer. The logical conclusion is, that promotion of a farmer's welfare warrants generation of adequate income which can cover all nature of consumption expenditure and leave savings that can:

- (i) cater to higher human needs like entertainment, travel, culture, etc.;
- (ii) meet unforeseen family expenses arising from exigencies;
- (iii) generate surpluses that can be ploughed back into agriculture by way of infrastructure, technologies and management practices for high productivity and production.

It is this virtuous cycle that can create a happy environment and a state of well-being.

9.2.2. Farm household income status

The society, that a farmer lives in today may be predominantly rural, but is vastly different from the one that existed a few decades ago. The rural India is a society in transition, and the mix and ratio of professional classes is undergoing a change. The non-agricultural professional class is more substantive than before and the corresponding income differences are visible too. Apart from the income that an agricultural household derives from farm and non-farm sources, it is important to note as brought out in Chapter 2 of this volume, that:

- the size class of land determines the total monthly income;
- the size class of land influences the ratio of income derived from farming;
- the size class of land indicates the extent of access to institutional credit;
- the size class of land determines, whether the family is able to balance the monthly income and expenditure; and
- the size class of land determines the net invest in productive assets.

Considering that 65 per cent of the farmers belong to the marginal category (≤ 1 ha of land holding), the income status as during the agricultural year 2012-13 (SAS) is a matter of concern. The average monthly income of an agricultural household has a direct bearing on the welfare of farmers. As brought out in Table 2.2, Chapter 2, the following 3 (three) classes are not able to balance their monthly total income and monthly total consumption expenditure.

Table 9.1 Farm-household Income and Saving

SN	Size class	Total monthly income	Total monthly consumption expenditure	Net saving per month
1	<0.01	4561	5108	-547
2	0.01 – 0.40	4152	5401	-1249
3	0.41 – 1.00	5247	6020	-773

Figure in Rs

Source: Calculation based on Table 2.2 data.

The size class of holdings above 1 ha are able to generate higher monthly total income than monthly consumption expenditure. However, what is important to note is the wide variation in monthly total income amongst different size class holdings. As seen from table 2.2 the monthly income varies from Rs. 4,561 (<0.01 ha) to Rs. 7,348 (1.01-2.00 ha) to Rs. 41,388 (10+ha), as against an average of Rs. 6,426 for all sizes.

Income comparison between farmers and non-farmers:

Since a farmer is a part of the composite society, his well-being depends upon not only his own absolute income, but also his relative income. Apart from inherent sense of comparison, that does influence the state of mind, the income variations do impact the costs of various goods and services accessible in one's immediate society. This section, therefore, examine the inter-professional income comparisons with reference to the farmers.

Firstly, as per 2011 census as high as 22.50 per cent of the farmers lived below poverty line. Secondly, it is often felt that disparity between farm income and non-farm income is rising (Chand 2008) and that those working outside agriculture are progressing much faster than those who work in it. A paper by Chand et al³ provides an empirical basis to this.

Table 9.2 Disparities in Agriculture and Non-agriculture Income

Year	Farm income per Cultivator (Rs.) F	Wage earning per agricultural Labourer (Rs.) L	Income per non-agricultural Worker (Rs.) N	Ratio L:F	Ratio N:F
1983-84	4,286	1,467	12,786	0.34	2.98
1987-88	5,653	2,201	18,036	0.39	3.19
1993-94	12,365	4,784	37,763	0.39	3.05
1999-2000	24,188	8,938	78,565	0.37	3.25
2004-05	26,146	10,043	1,06,688	0.38	4.08
2011-12	78,264	32,311	2,46,514	0.41	3.15

Source: Estimates and Analysis of Farm Income in India, 1983-84 to 2011-12, Ramesh Chand, Raka Saxena, Simmi Rana, EPW: May 30, 2015, Volume No. 22.

The data vide Table 11.2 interprets as follows:

- In 1983-84:
 - A cultivator earned three times of what a labourer earned.
 - A non-agriculture worker earned three times the income earned by a farmer or his family members engaged in agriculture as their main activity.
- In the next five years:
 - The income of a cultivator increased at a lower rate compared to that earned by an agricultural labourer and a non-agricultural worker.
 - There was thus a small decline in the disparity between farm income per cultivator and the income of a labourer.
- Between 1987-88 to 2004-05:
 - A cultivator continued to earn two and half times the income of a labourer in agriculture.
- By 2011-12:
 - The disparity further fell when the income of a cultivator declined to 2.4 times the wage earnings of a labourer.
- 1983-84 to 2004-05:
 - The disparity in income of a cultivator and non-agricultural worker increased from 1:3.15; and a non-agricultural worker earned 3.15 times the income of a cultivator in 2011-12.

³ Estimates and Analysis of Farm Income in India, 1983-84 to 2011-12, Ramesh Chand, Raka Saxena, Simmi Rana, EPW: May 30, 2015, Volume No. 22

Acceleration in growth of agricultural output and a decline in the number of cultivators, between 2004-05 to 2011-12, checked the rising disparity between the incomes of farmers and non-farmers.

In sum, from the above it can be concluded that the cultivator relative to non-agricultural worker earns much less. And, that the relative income status of a cultivator can be improved if agriculture is able to register robust annual growth and the terms of trade are oriented in favour of the sector. It would help keeping in mind that equitability is as important as the level of one's income.

9.2.3. Maslow's Need Hierarchy and Farmers' Welfare

It would be appropriate to take note of Maslow's need hierarchy theory to examine its appropriateness in defining welfare approach to farmers. According to Maslow, the well-known psychologist, human being has a hierarchy of needs and he aims to fulfil them. These in ascending order are as follows:

- Food security
- Biological security
- Social security
- Recognition
- Self-actualisation

For the farmer in this case to move up from the food security to the stage of self-actualization, he needs to have adequate income, apart from a supportive and positive societal environment, that he lives in.

9.2.4. DFI's Definition of Farmers' Welfare

After deliberating upon the definitions & explanations of welfare adopted in different parts of the world and in different contexts, and after examining the well-being framework of farmers in India, the DFI Committee defines farmers' welfare in two different ways as follows:

“Farmer's welfare refers to a state of his general well-being, wherein an agricultural household aided by its own farm and non-farm incomes and social security support is able to satisfy economic, social and psychological needs of all its members, besides the investments, required for sustainable agricultural operations”.

“Farmers' welfare can be said to have been achieved, when a farm-family is able to generate adequate, stable and sustainable incomes from farm and non-farm enterprises, which is not only sufficient to meet the multiple needs associated with human dignity, but is also left with savings that can be shipped back into farming as investments”.

9.3. Indicators / measures of farmers' welfare

In the light of the above discussions, a farmer's welfare can be defined / calculated in terms of:

- both absolute and relative average income;
- availability and accessibility to social security system – education, health, etc.;
- facilitating the farmer in moving up Maslow's need hierarchy beyond social security.

Some of the measures suggested are:

- average monthly income and consumption expenditure and the resultant saving / surplus;
- income spread amongst agricultural households belonging to different size classes of land holding;
- comparative monthly income of agricultural households vis-à-vis other professional classes;
- relative monthly income of agricultural households vis-à-vis the national average of the whole population;
- percentage of farmers below poverty line.

Some additional measures of welfare suggested for adoption are:

- average size of indebtedness and access to institutional credit;
- average amount of investments in creating productive assets;
- average rate of literacy; and
- state of health of the family [life expectancy at birth, Infant Mortality Rate (IMR), Material Mortality Rate (MMR)]

Measuring farmers' income and farmers' welfare – standardised methodology and interval:

As of now, there is no fixed interval estimates of farmers' income. In the absence of a standardised approach, reliance for evaluating the state of farmers' income is sample survey based estimates of NSSO (2002-03 and 2012-13 agricultural years); and estimates by researchers. These are not only not enough, but also do not meet the requirement of monitoring the change in farmers' income in the light of the vision of doubling farmers' income by 2022. It is, therefore, suggested that:

- A comprehensive parametric based scale be developed to measure farmers' income and welfare (economic and social parameters be incorporated).
- The interval of measure should be annual, based on a sample survey; and five yearly, based on universal survey.

9.3.1. The approach to farmers welfare

Section 12.1.1 mentions the four factors that create a case for warranting special attention on farmers' welfare. To ensure that such intention is achieved and is inclusive, a broad approach is suggested as follows:

i. Income enhancement – as brought out in chapter 2, para 2.2, the size class of land holding has a bearing on income, investments in productive assets and access to institutional credit, and infers that greater attention is needed for this class of farmers. Yet, in adopting the strategy for doubling farmers' income, the relative growth among the landless, small and marginal farmers; and the relatively less developed regions should be pegged at higher level.

ii. Social security cover – all farmers eligible for coverage under ongoing welfare & social welfare schemes of the government (centre & state) should be given priority. As an urgent intervention, it is suggested that the District Administrations / Zilla Parishads should be advised to take up a campaign approach to ensure 100 per cent coverage as per applicable criteria. A farmers' digital data base needs to be maintained for purpose of continuous monitoring.

iii. Access to Institutional credit – all farmers, particularly the small and marginal farmers must be supported to avail themselves of institutional credit in respect of:

- short term crop loans;
- medium and long term investments; and
- warehousing based post-harvest loans

iv. Risk cover – vulnerability to nature and unpredictability of markets are the core threats to farmers' income, stability and welfare. Appropriate risk covers should be made available to the farmers at low premium rates covering

- crop and livestock insurance (PMBSY is a Model example for scale-up and replication);
- accidents and professional risk insurance; and
- health insurance.

v. Access to Knowledge – all farmers need to be empowered with knowledge and technology support. Timely, relevant and applicable information can enable the farmer to take incisive decisions to counter the various uncontrolled variables and optimise on their resource use. The knowledge base needs to cover:

- accessibility to above support systems;
- planning and managing production in sustainable manner;
- planning and managing post-production and marketing; and
- preparing and counselling for contingencies on farm and home.

A system of health check-up facility and educational loans for the children at easy rates of interest also deserve consideration as part of farmers' welfare.

Key Extracts

- *Kisan Kalyan* is correlated to empowerment leading to social and economic wellbeing. Welfare in context of farmers' income is to do with ease of doing agri-business.
- Both personal income and government support determine intensity and extent of all aspects welfare that is available to farmers.
- Farmers' welfare must aim to result in a virtuous cycle that creates a progressive environment and state of overall wellbeing.
- All farmers are not equal, and priority may be given to the small and marginal and in relatively less developed regions.
- Indicators and measures of farmers' welfare are suggested, and a comprehensive parametric based scale be developed to measure and monitor farmers welfare.

Chapter 10

Planning and Review – Institutional Arrangement

The agricultural sector enjoys both breadth and depth. This is its strength, for it can facilitate building supplementary and complementary relations amongst different resources and realise thereby their use optimization. Simultaneously, its strength is its weakness too, for the complexity emanating from pluralistic stakeholders, multiple resources and uncontrolled external variable warrant a strong institutional system from the village to the national level to achieve the set goals and listed objectives.

10.1. Introduction

As per constitutional arrangements, agriculture is a state subject. Hence, both production and marketing are primarily viewed as the responsibilities of a state machinery. The world has always recognised the importance of a vast market. Hence the globalisation the world experiences. India as a nation with its enviable geographical expanse, facilitative agro-climatic basket and elephantine consumer base should not fail to recognise the advantage of pan-India production and marketing design. After all, there always is an inter-play of several vectors across the states, as also across the nations influencing overall growth and development.

This entails a continuum of planning, implementation, review and monitoring between the Gram Panchayat and Krishi Bhawan, via the District and State headquarters. This is however not to suggest, that agriculture should be moved out from the state jurisdiction. It is only to emphasise that dismantling of state-bound mind-set in production planning and boundaries in marketing would help the farmers take a more rational decision vis-à-vis both production plans and market access. Against this understanding, following institutional systems are suggested – one led by the political leadership, another by the bureaucratic executive and the third as a domain authority.

- i. Three-tier system for planning, reviewing and monitoring.
- ii. Four-tier arrangement for convergence of resources, coordination of efforts and synergy of execution.
- iii. Omnibus agricultural regulatory authority for dispute resolution of all issues.

10.1.1. Three – tier system

The Department of Agriculture, Cooperation and Farmers' Welfare (DAC&FW) has already advised the state governments vide its letter, dated, 22.3.2017 to put in place the following systems at state and district levels and has issued Guidelines to this effect. The main objectives to be achieved by these Committees are as follows:

- i. Focus on increasing the net income from each unit of farm by reducing the cost of cultivation / production, increasing per unit yield and higher market return on the farmers' produce.
- ii. Make efforts to offer security to farmers against unpredictable nature of agriculture through comprehensive crop insurance, unified insurance package (UIP), speedy &

- efficient delivery of relief entitlements and the like.
- iii. Enhance access to institutional credit, both by increasing the volume of credit and also by better targeting.
 - iv. Supplement the farmers' income, particularly during off-season times by creating an enabling environment for generating alternate off- farm activities.
 - v. Build farmers' resilience and prepare them to negotiate unpredictable nature of farm activities and low level of income by coverage under various welfare schemes of the Government.
 - vi. Check every probability of farmer-suicide by working to remove indigence and vulnerability among the farming community.
 - vii. Improve Governance with a view to achieving efficiency and transparency in delivery of agricultural services.

Composition and Terms of References of the Committee

Composition of Committees

A. District Level Review and Monitoring Committee

- | | |
|--|---------------|
| 1. Minister In-charge of the District | Chairman |
| 2. Member of Parliament (Lok Sabha) (in case of more than one MP (LS) from one district, State Government will decide one to be Co-chairman and remaining MP(LS) will be member) | Co-Chairman |
| 3. Chairman, Zila Parishad | Vice Chairman |
| 4. Members of Legislative Assembly (MLAs) and Members of Legislative Council (MLCs) representing the district | Members |
| 5. Chief Executive Officer, Zila Parishad | Member |
| 6. Special Deputy Commissioner/ Joint Collector/ Additional District Magistrate-Incharge of Revenue | Member |
| 7. District Head-Incharge of Health and Family Welfare | Member |
| 8. All District Heads-Incharge of Agriculture, Animal Husbandry & Dairy, Fishery Development, Soil Conservation/Water Shed Development and Sugar | Member |
| 9. District Heads-Incharge of Major, Medium and Minor Irrigation | Member |
| 10. District Heads-Incharge of Electricity/Energy | Member |
| 11. District Heads-Incharge of Cooperation & Agriculture Marketing | Member |
| 12. Secretary of the District Central Cooperative Bank (DCCB) | Member |
| 13. District Manager, Lead Bank | Member |
| 14. District Manager, NABARD | Member |
| 15. District Head-Incharge of Public Distribution System (PDS) | Member |
| 16. District Head-Incharge of Welfare (SCs/STs/OBCs) | Member |

17.	District Head-Incharge of Social Welfare	Member
18.	District Head-Incharge of Women and Child Development	Member
19.	District Head-Incharge of Mid-Day-Meal Scheme	Member
20.	Two Representatives of Agriculture & Allied Universities/ICAR/ Central Agriculture Universities preferably from the centre/ institution operating in the District (to be nominated by the Chairman, as per availability within District)	Member
21.	Project Coordinator, KVK in the District	Member
22.	Two progressive farmers recommended by Project Coordinator, KVK in the District	Member
23.	Deputy Commissioner/Collector/DM	Member Secretary

B. State Level Review and Advisory Committee

i.	Chief Minister	Chairman
ii.	Minister of Agriculture	Vice Chairman
iii.	Ministers Incharge of Finance, Agriculture, Horticulture, Animal Husbandry & Dairying, Fishery Development, Agricultural Marketing & Cooperation, Food/ Agro-Processing, Sugar, Sericulture, Energy, Welfare, Social Welfare, Women & Child Development	Members
iv.	All Members of Parliament (Lok Sabha and Rajya Sabha)	Members
v.	Chief Secretary	Member
vi.	Addl Chief Secretary/Development Commissioner / Agriculture Production Commissioner (APC)	Member
vii.	Principal Secretaries/Secretaries- Incharge of Finance, Revenue and Disaster Management, Agriculture, Horticulture, Animal Husbandry & Dairy, Fisheries Department, Agriculture Marketing, Cooperation, Sugar, Sericulture, Energy, Welfare, Social Welfare, Women& Child Development	Members
viii.	Convener, State Level Bankers Committee	Member
ix.	Chief General Manager, NABARD	Member
x.	One Vice Chancellor each representing Agriculture, Horticulture, Animal Husbandry, Dairy and Fisheries (nominated by the State Government as per availability)	Members
xi.	Two Representatives from State Level Farmers' Associations	Members
xii.	Director/Project Director, ICAR - Regional	Member
xiii.	Two progressive farmers recommended by Director/Project Director, ICAR - Regional	Members
xiv.	Two Women representatives working in the domain of welfare in the State	Members
xv.	Development Commissioner/Agriculture Production Commissioner/Principal Secretary (Agriculture) (to be decided by the State Government)	Member Secretary

Interval of Meetings

Both the District level and State Level Committees may conduct meetings at least three times in a year i.e. in the months of January, May and September. State Level Committee meeting may follow the District Level Committee meetings, so as to benefit from the data, information and recommendations of the District Level Committees. The State Governments may also make necessary changes to the suggested composition of the Committee at both District and State Levels, as felt necessary.

Agenda for Review:

a. Growth and Development

- i. Physical and financial progress under various schemes of Agriculture, Horticulture, Animal Husbandry & Dairy, Sericulture and Fishery Development – central sector programmes, centrally sponsored and state programmes, etc.
- ii. Physical and financial progress under externally aided projects, special-projects, missions etc. relating to Agriculture, Animal Husbandry and Dairy, Fishery Development, Sericulture.
- iii. Convergence of resources for development of agriculture and allied sectors (funds available under Rural Development and Panchayati Raj, Tribal Welfare and Development, Water Resources, RKVY, RIDF, Special Projects etc.)
- iv. Weather and crop situation.
- v. Promotion of integrated farming, organic farming, rainfed agriculture, rainfed horticulture, agro-forestry etc.
- vi. Status of reservoirs and availability of water for irrigation for agriculture.
- vii. Status of Farmers Produce Organisations (FPOs) etc. to promote efficiency in input and output management.
- viii. Promotion of ancillary enterprises like bee keeping, mushroom cultivation, poultry etc.

b. Input management

- ix. Review of various inputs (seeds, fertilizers and pesticides) with respect to availability, access, quality and enforcement.
- x. Institutional credit – cooperatives and commercial banks, JLGs.
- xi. Farm mechanization (since labour substitution is important to achieve cost efficiency and timelines in operation).

c. Marketing

- xii. Procurement operations – FCI, NAFED, States Procurement Agencies, CCI, Milk Cooperatives etc. Interventions in cases where commodity prices fall below MSP.
- xiii. Marketing operations – APMCs, Direct Sale, National Agriculture Marketing.
- xiv. Payment of sale proceeds by sugar factories to the sugarcane growers.

d. Welfare

- xv. xv. Coverage under Crop Insurance – PMFBY, WBCIS and UIP. Payment position w. r. t. claims.
- xvi. Status of coverage of farmers and their families under a bouquet of welfare activities including PDS, Pension, Health Insurance, ICDS, Mid-Day Meal Scheme etc. operated by both Central and State Governments.
- xvii. Cases of farmers' suicides, if any and other vulnerabilities among farmers and relief/compensation offered & steps taken to prevent eventualities.

e. Relief measure

- xviii. Activities under NDRF/SDRF releases and relief measures undertaken.

f. Governance

- xix. Adoption of Direct Benefit Transfer (DBT) in delivery of services related to agriculture and allied sectors.

- g. Any other issue** that is relevant to welfare of the farmers and growth of agriculture sector.

Based on the illustrative list of agenda as above, the State may like to adopt an agenda appropriate to their situation. While the District Level Committees should focus on implementation, state level committee may like to focus on providing policy, coordination and budgetary support.

C. National Level Policy and Planning Committee

The suggested composition of this Committee is as follows:

Minister Agriculture and Farmers' Welfare	-	Chairman
Minister Rural Development and Panchayati Raj	-	Member
Minister Food and Consumer Affairs	-	Member
Minister Water Resources	-	Member
Minister Commerce	-	Member
Minister Food Processing	-	Member
Minister Forest, Environment and Ecology	-	Member
Minister MSME	-	Member
MoS in charge of DACFW	-	Member
MoS in charge of DAHDF	-	Member
MoS in charge of DARE	-	Member

The Committee should also have on board all the Secretaries of the above mentioned ministries / departments and Additional Secretary in charge of Policy and Farmers' Welfare / DFI in the DACFW may serve as the member-convenor. The chairman may however include or co-opt anyone else including experts as members.

The broad terms of reference for the Committee are suggested below:

- i. Review of production plan, progress and status for the DFI period and the year.
- ii. Review policy framework including trade regime to achieve comprehensive reforms and liberalization.
- iii. Review status of money-pool from budgetary allocations & extra-budgetary allocations at individual ministry / department level and collective level (based on delineation 'for' agriculture related activities).
- iv. Review and promote coordination among all concerned ministries & departments and institutions thereunder.
- v. Review and facilitate convergence of resources from government, private and CSR (Corporate Social Responsibility) sources and recommend conducive policy framework for accelerating the pace of capital formation in agriculture
- vi. Review the growth of GVA in agriculture, status of targeted income growth of farmers and their welfare at large.

The ICAR-NIAP (National Institute of Agricultural Economics and Policy Research), New Delhi which has been identified as the Knowledge Partner by DACFW in preparing the DFI strategy may provide the technical backstopping to this body. The Committee may meet at least twice year, just before the annual Kharif and Rabi conferences, so that the states and UTs are provided inputs on national goals and implementation strategy apart from policy framework.

It is also important to use the well-established system of Kharif and Rabi conference to develop greater synergy in planning and implementation between the Centre and the States/UTs. However, the Conference outcomes can be made more comprehensive, relevant and meaningful if all the departments that handle various agricultural sub-sectors at the state and UT levels are invited. Today it is mostly centred around State Agriculture Departments, that have their mandated crops limited to cereals, pulses, oilseeds and commercial crops like sugarcane, cotton & jute. It is important to integrate all other state departments including horticulture, animal husbandry, fishery, sericulture, marketing and cooperation.

10.1.2. Four-tier arrangement for effective implementation

Following and in harmony with the decisions of the three-tier institutional mechanism as discussed in the preceding section, a robust system for ensuring effective coordination in implementation is necessary at all appropriate levels. The following system is suggested:

National level: Agricultural Development and Farmers Welfare Group.

The system of domain-dedicated "Group of Secretaries (GoS)" introduced over the last 3 years has proved to be very effective in breaking thought barriers and mainstreaming annual strategic interventions. This system can be institutionalised with following composition.

Secretary DACFW	-	Chairman
Secretaries of DAHDF, DARE, RD, PR, WoRD,	-	Member

Fertilizer, Food, Consumer Affairs and Commerce
Joint Secretary in charge of Policy and FW in DACFW - Member-Secretary

The Chairman may be authorised to co-opt or invite heads of various organisations, experts and officers of member departments to participate in the meetings.

The broad terms of reference of the Group are suggested below:

- i. To finalize and review national plan for production and income for the DFI period and the year.
- ii. To effect convergence of institutions & manpower and promote harmony of approaches & interventions.
- iii. To review, monitor and guide the progress as per goals and objectives.

The Committee may meet at least once in a quarter and more as decided by the members.

At the State Level: Agricultural Development and Farmers' Welfare Group

The Group can be chaired by the Development Commissioner / Agricultural Production Commissioner of the State. The composition of the Committee can be on lines similar to the suggested national committee. The vice chancellors of the State Agricultural Universities (SAUs) may be taken as regular members, while keeping open the option of co-opting and inviting anyone else as needed.

At the District and Block Levels

ATMA (Agricultural Technology and Management Agency) can serve the purpose of preparing "Comprehensive District Plan (CDP) based on "Block Action Plans (BAPs)". ATMA should work in close coordination with the proposed "District Agri-Value System Platform" (Volume-IV of DFI Report), so as to couple production and post-production plans in a seamless way. Both district and block level action plans should be market-led, so that the farmers are enabled to grow what can sell in the market and what can fetch relatively higher market price for their produce.

Another important aspect of effective delivery is to ensure that the multiple sub-sectors of the larger agricultural sector are given due emphasis and the approach is to priorities those sub-sectors that (i) possesses high growth potential; (ii) bear low hanging fruits; and (iii) engage larger section of the agricultural society.

As observed by the DFI Committee in this Report, farm income has to be buttressed with non-farm income. Therefore, the action plans should examine and adopt ways of using the natural resources generated on farm and in the common properties like forests, waste lands, fodder reserves, water bodies, etc. for promoting enterprise. Also, in the larger interest of the agricultural sector, the interests of the landless agricultural labour should also be addressed and catered to through the Block and District Action Plans as far as possible.

It is also necessary for the District Committee to achieve harmony any synergy among different plans that are prepared. Some of these include:

- SREP (Strategic Research Extension Plan) of ATMA
- C-DAP (Comprehensive District Action Plan) of RKVY – RAFTAR
- (DIP) District Irrigation Plan of PMKSY.
- NICRA (National Initiative of Climate Resilient Agriculture) of ICAR
- Comprehensive Drought Proofing District Action Plans of NRAA (National Rainfed Area Authority).
- Agri-Value System Platform (proposed in Volume-IV of this Report)

All these plans should respect the bottom-up approach, beginning with village and block level action plans.

The District Level Committee should be guided by the following:

- i. Convergence of different action plan to achieve commonality of objectives.
- ii. Resource plan for optimization of all resources available across the government departments and in other sectors – NGOs, private, CSR etc.
- iii. Manpower plan to achieve optimal deployment through coordination of efforts.
- iv. Technology plan – directly relating to agricultural activities and ICT.

10.1.3. Agricultural Dispute Resolution Authority

The government may consider an authority for agricultural dispute resolution. This proposed Authority would serve as a fast track redressal mechanism for matters such as disagreements relating to crop insurance, land leasing, contract farming, and other implementation issues. This will offer an alternative to disputes in various areas that effect the farmers' economic activities. The Authority could be omnibus and quasi-judicial, and hence do away with the need for individual authorities for agricultural matters like contract farming, land lease, etc.

Key Extracts

- The existing planning and review mechanism needs to be strengthened with an institutional arrangement that includes both the state and central machinery.
- A three-tier planning, review and monitoring Committee is recommended at District level, State level and National level.
- A four-tier arrangement for coordination and convergence in implementation is recommended, which includes Block level to include a bottom-up approach.
- Establish an omnibus agricultural authority to resolve disputes relating to contract farming, land lease, crop insurance and other implementation disputes.

Chapter 11

Grassroots Level Participation

All technologies, policies, advocacies, schemes, programmes and missions are meant to reach the farm and co-opt farmer in the process of change. What therefore marks the efficiency and effectiveness of the agricultural delivery is the strength of the cutting edge system at the farm level

11.1. As Strong as the Weakest

As put concisely by Leibig in his “Law of the Minimum”, the strength of a chain is the strength of its weakest link. It holds good in governance, administration and management relating to agriculture sector too. Take the case of average yields across various crops and sectors in India. The high global ranking of India in terms of volumes of production is more a function of area or number (e.g. of bovines). However in terms of productivity, there is so much to catch up.

The average gap between the FLD (farm level demonstration) and farmer field level yields varies from 28 to 63 per cent depending upon the crop. If one measures the farm yield against the research plot claim, the scene only worsens. This illustrates, that notwithstanding the high yield potential of a variety at the research station, most of it does not manifest at the farmer's field level on account of several reasons, and therefore in this case, it is the farm and farmer who constitute the weakest link. In the final analysis, the strength / potential of the ‘variety’ is equivalent to that of the farm and farmer.

The delivery pipeline should therefore focus on identifying various constraints and challenges, which if surmounted will enhance the capacity of the weakest link and improve the efficiency of the delivery system. The challenge as identified and elaborated in the preceding volumes can be categorised under: **technology, manpower, material, finance, knowledge and human resource**. The most sensitive and critical of all these is the ‘end-user’ the farmer. Hence, intense involvement of the farmer in the process of decision making and implementation can enhance the capacity of the weakest link.

In the opinion of the DFI Committee, the farmer also needs to be reoriented and capacitated in respect of the following:

- Awareness, knowledge and skill
- Openness to new ideas and technology
- Perception of agriculture as an enterprise – transition from subsistence (production-dominant) to commercial (market-centric) practice
- Willingness to join interest groups like FPO, value chain platform, FLG, cluster etc.

The government's public extension system (PES) in particular has to make this transformation its mission. The corollary is that the PES itself has in the first place undergone a basic shift in its orientation, skill and commitment. It calls, therefore, for a total overhaul of the extension machinery as examined and suggested in Volume-XI of this Report.

11.2. Co-opting the Farmers

It is a common complaint of the farming community, that they are not adequately represented in making decisions that concern their interests.

At the macro-level, it is presumed that the elected representatives of the people (of whom farmers are a dominant sub-section) represent the farmers' interests. There is no denying, that they do, as is manifested in several legislations at parliamentary and state assembly levels.

Thanks to 73rd Constitutional Amendment, the decentralised democracy has taken decision making process closer to the farmers through the system of Panchayat Raj Institutions (PRIs). In fact, these PRIs at the district (Zilla Parishad), taluk / block (Taluk / Panchayat Samiti) and village (Gram Panchayat) levels are closely and intensely engaged in agriculture related decision making, more specifically with reference to implementation.

There are also state / national level Boards, Cooperatives and Corporations, that have places reserved for those representing interests of the farmers.

Then there are Gram Sabhas, Watershed Committees, Forest Management Committees, Milk Societies, PACSs (Primary Agriculture Cooperative Societies), APMCs (Agricultural Produce Marketing Committees), WAUs (Water User Associations) and the like which are further decentralised institutions, that operate right at the cutting edge operation & maintenance.

There are innumerable other non-formal or more correctly voluntary-in-nature based grass-root level bodies. Some such examples are SHGs (Self Help Groups), JLGs (Joint Liability Groups), Commodity Interest Groups (CIGs), FPOs (Farmer Producer Organisations – both cooperatives and companies), etc.

Not to forget are the pressure groups of farmers. These are mostly the farmers associations with varying degree of ability to influence decision making at government level, besides creating an opinion in the society.

Despite these plethora of formal and informal institutions, organisations and platforms, a large majority of the farmers feel that they are not well represented in decision making and that their interests are not well protected. The challenge therefore lies in evolving systems that will facilitate wider and more genuine participation from all type of farmers.

11.2.1. Gram Panchayats as delivery institutions

Gram Panchayats (GPs) are the lowest level, decentralised and integrated developmental institutions headed by peoples' representatives, and supported by field level bureaucracy. Hence, they constitute the most appropriate centres for dovetailing developmental and welfare programmes. Since the 73rd Constitutional Amendment, these centres are getting consolidated, capable of shouldering multifarious responsibilities. Rural development activities, including wage employment initiatives under MGNREGA are channelled through GPs. Agriculture

sector is the basic and most expansive development intervention that relates to the majority of the rural society.

It is, therefore, both appropriate and important to make GPs responsible for agricultural development encompassing planning and execution. The village level action plan should be prepared at GP level and integrated into Block Action Plan (BAP).

It is possible to make GPs robust and active Centres of Agricultural Planning and Execution. Convergence of resources, manpower and efforts is possible. The major advantage is the critical partnership between elected representatives & field officials, who together can interface with the farmers meaningfully. With use of IT and ICT, the GPs can become more effective in service as the fulcrum of two way communication between farmers and higher levels (Block and District units).

Gram Panchayats can serve as single window centres for delivery of extension services. The experience of Karnataka in the form of *Ryotu Sampark Kendras* (RSKs) is encouraging. At these places, the Extension Officers of various departments of agriculture, horticulture, animal husbandry etc. besides experts from SAUs meet at fortnightly interval and offer single window service to the farmer. These Centres also cater to input demand including seeds, etc.

11.2.2. Gram Panchayats as Centres of welfare

Farmers' welfare deserves special emphasis. In relation to this, the care of both land owing / cultivating farmers and landless agricultural workers should become the mandate of Gram Panchayats (GPs). In discussing the governance framework, some of the critical welfare responsibilities of the GPs can be as follows:

i. Coverage under welfare schemes – these include old age pension (OAP), widow pension (WP), public distribution system (PDS), crop and livestock insurance, girl-child benefits, ICDS, etc.

ii. Counselling for stress management – risk and unpredictability associated with agriculture result in precipitate livelihood situations for the farmers. Economic stress gets mixed with social pressures for the farmers living in a close knit rural environment. Unlike in urban centres, where anonymity provides a dubious seclusion for a family under stress, it works reverse in rural society, where nothing can be hidden. The farmers in such circumstances who stand exposed are highly vulnerable. They need counselling to bring them to see reason and attain homeostasis (inner balance).

The Gram Panchayats are the most appropriate in donning the role of a counselling Centre. These centres can become substitute for the traditional social support system, which ironically is increasingly becoming scarce in villages, while not preventing the exposure of real or perceived ignominy, say for example of indebtedness.

iii. Guidance for transition management – migration to urban and industrial centres will always exist. The migrants take time to rehabilitate themselves in the new setting and also face challenges of acclimatisation. It may be useful to handhold such migration at GP level. Some basic support includes documenting and maintaining their new address, offering them skill for professional engagement and social skills for acclimatisation.

The skill imparted can be useful to take to a small enterprise in the village itself or enable him to seek a skilled job in the place of migration. More importantly, the GPs. should be able to provide social security to the family members staying back in the village. This assumes critical importance, when migration is under distress and the state of indigence of women, aged and children left behind requires sensitive & timely support through available welfare activities.

iv. Maintenance of farmers' database - centralised database of farmers needs to be maintained. As also discussed vide para 3.2 of chapter 3 of this Volume, inclusiveness of farmers warrants norm based definition of a farmer. Further, the database should contain minimum data of all the family members including names, age, gender, education, farm size, other assets (livestock etc.), non-farm sources of income, total income, welfare coverage, etc. The database will be used for monitoring income and welfare of individual farm families.

This facility for continuous updation of farmer database can be assigned to the Gram Panchayats. Maintenance of databased with changing status of each farm family can be an important responsibility of the GPs.

11.2.3. Direct participation of farmers

With increasing awareness and negotiation skills, the farmers, and the youth in particular are eager to participate in the decision making process. Gram Sabhas provide a good platform for intense deliberations and decentralised decision making.

Deeper penetration of IT network and mobile usage (both smart & basic), make it possible for virtual interaction. With deployment of portals, IVRs, skype and video-conferencing facilities, the intensity of farmers' participation can be deepened. It is important to take advantage of technology, that bears the capacity to neutralise hierarchy, break down barriers, jump decision making stages and create a friendlier & hassle free and flat & horizontal partnership.

As a resolution of the challenges of operational efficiency of small and marginal farms, FPOs / VPOs have been suggested in Volumes III, IV, VIII, IX and more. It is worth aiming to scale up formation of large number of FPOs / VPOs across the multitudes of small and marginal farmers. As a collective group, including as cooperatives, the farmers get a voice that can be deployed effectively to be heard in decision making.

The FPOs can further be federated at district, state and national levels based on common interests. This will make it easy for decision making institutions from the lowest to the highest levels to engage the farmers in a systemic manner. It is difficult to practise direct democracy in a country with vast geography and dense demography. There is thus an added advantage of promoting FPOs as alternatives to promote participative governance.

Key Extracts

- For more inclusive grassroot level participation of farmers, Gram Panchayats can be made responsible for agricultural development. Village level action plans should be prepared at Gram Panchayat level.
- Farmers must be facilitated to take advantage of IT network to break bottleneck of hierarchy and to allow a more user-friendly and horizontal partnership with government.
- For decentralised decision making, the Gram Sabhas provide a platform for deliberations that included direct participation of farmers. Such participation can be expanded and made location agnostic through greater deployment of portals, IVR and video conferencing facilities.
- Gram Panchayats (GPs) are optimally positioned to become last mile outreach centres for various welfare schemes, including pension, insurance, girl-child benefits, stress counselling, etc.
- GPs can be developed as Centres of agriculture planning and execution, as well as for welfare monitoring and transition management.
- FPOs in their various formats, can be federated into larger regional entities so as to engage farmers with common interests in participative governance.

Chapter 12

Investments, Subsidies and Inflation Management

Capital investments and subsidies on inputs and services bear a correlation with productivity and production in agriculture. While these two interventions mostly relate to production segment, inflation management relates to pricing and marketing of the agricultural produce, post the harvest. All these three aspects are important in policy formulation vis-a-vis agriculture, and more particularly the income of farmers. Hence the importance of an examination.

I

Investment Pattern in Irrigated and Rainfed States

12.1. Introduction

Investment is important for holistic growth and development of any economic activity. In agriculture too, it is key to sustained output growth. There has been a significant increase in investment in Indian agriculture (when both public and private investments are considered together) in the post-reform period, compared to that in the pre-reform period. In the 1990s, the time when Indian economy embarked upon the phase of liberalisation, the growth of public investments was however not very encouraging. There was subsequently a change in the trend in the 2000s. Since 2003, the government has been injecting funds into the agricultural sector at an accelerated rate, which to an extent defies the notion of 'neglect of agriculture' built up during the 1990s (Bathla, 2014).

Table 12.1 Classification of states as per irrigation status

Rainfed States	Irrigated States	Mixed	
		Arid + Rainfed	Coastal + Rainfed
Assam Chhattisgarh Himachal Pradesh J&K Jharkhand Karnataka Madhya Pradesh Telangana Uttarakhand	Bihar Haryana Punjab Uttar Pradesh West Bengal	Gujarat Rajasthan	Andhra Pradesh Kerala Maharashtra Odisha Tamil Nadu

Source: Saxena et al (2001)

Investment at state level assumes importance in the context of weaving a policy, that promotes policy balanced regional development. India is home to diverse agro-ecological systems. However, agriculture in the country is still largely rainfed and vulnerable to vagaries of monsoon. But few regions/states in the country like Punjab, Haryana and western Uttar Pradesh, as also other states with large river systems have been able to bring a large proportion of their cropped area under assured irrigation, and these for the purpose of analysis have been grouped under Irrigated States and other categories are defined by the status of irrigation available for agriculture (Table 12.1).

12.2. An Examination of Capital Investments

This section investigates pattern of public and private investments in agriculture in differently categorized states, vide Table 12.2.

12.2.1. Public investment

The nature and magnitude of public investments in agriculture are generally explained by the priority of the government towards the sector. The public sector investment is key to creation of irrigation, roads and power infrastructure. The share of public GCFA (gross capital formation in agriculture) has always been lower than that of private GCFA, at nearly one-fourth of the total investment in agriculture.

Table 12.2 Public expenditure in agriculture and irrigation (Rs. '00 crore) and percentage share of capital expenditure (2004-05 prices)

States	Agriculture		% of Capital Expenditure		Irrigation		% of Capital Expenditure		Annual Rate of Growth: 1981-2014	
	TE 1984	TE 2014	TE 1984	TE 2014	TE 1984	TE 2014	TE 1984	TE 2014	Agric ulture	Irriga tion
Andhra Pradesh & Telangana	5.4	28.5	1.6	1.3	15.9	114.7	57.2	57.3	4.6	7.1
Assam	4.0	12.1	5.7	1.3	3.4	10.9	74.3	61.8	2.1	2.6
Bihar-Jharkhand	4.7	26.6	6.8	5.6	11.9	28.0	72.8	65.1	4.0	2.0
Gujarat	4.0	27.9	24.4	16.3	13.2	47.8	52.9	86.5	5.5	3.9
Haryana	2.4	14.4	2.9	26.1	6.3	11.0	56.4	40.6	--	2.0
Himachal Pradesh	2.6	8.0	8.6	5.0	0.5	3.4	58.4	48.6	3.3	7.5
Jammu & Kashmir	2.0	10.3	6.4	27.0	1.8	4.6	67.4	49.0	4.9	3.7
Karnataka	4.6	48.1	2.9	2.8	9.6	34.5	56.9	88.1	7.3	4.6
Kerala	3.4	24.5	11.2	7.5	3.9	5.5	72.8	47.2	5.6	0.8
MP-Chhattisgarh	10.8	56.8	6.5	3.2	11.7	38.0	80.2	84.2	5.0	3.8
Maharashtra	18.3	54.9	3.4	17.2	20.1	66.3	62.6	73.9	3.1	4.9
Odisha	3.8	22.6	11.6	3.0	7.8	17.4	84.4	64.4	4.6	2.5
Punjab	2.4	7.6		2.3	5.1	9.0	58.4	26.9	--	1.6
Rajasthan	2.6	17.8	8.0	9.0	8.8	12.7	57.0	36.3	5.3	1.7
Tamil Nadu	7.9	37.3	12.6	13.3	4.2	14.2	39.8	62.3	4.3	4.3
UP-Uttarakhand	6.3	37.9		12.2	22.9	47.9	53.1	38.4	6.0	2.1
West Bengal	5.1	15.1	10.0	12.4	4.3	9.6	37.0	42.3	3.0	2.8
Total- 20 states	90.4	454.2	6.5	9.6	151.0	477.8	61.0	63.8	4.6	4.0

Source: Bathla et al. (2017) based on Finance Accounts, GoI.

Source: DFI Estimates

The public investment trends over the decades have varied, characterised by a higher rate till the 1970s, a significant decline during the 1980s, marginal recovery during the 1990s and a significant improvement in the 2000s (Gulati and Bathla, 2002). To gain a clear understanding of the investments at national and state levels, state-wise spending in agriculture and irrigation has been delineated for the two time periods as in Table 12.2. These two time periods are Triennium Ending (TE) 1984 and TE 2014. Based on the data available from Finance Accounts

of Government of India, the analysis has been made for 20 major states. In case of states, which have undergone division, names of the reorganised states have been indicated in the Table.

The data in Table 12.2 above highlights existence of large variations among states as regards the share of agriculture in capital expenditure. It declined in most of the states in Triennium Ending (TE) 2014 from the previous considered period, but there was a marked increase in case of Haryana, J&K and Maharashtra. Further, there was a marginal increase in the states of Tamil Nadu and West Bengal. For the 20 states as a whole, the share of agriculture as a percentage of capital expenditure increased from 6.5 (TE 1984) to 9.6 (TE 2014). The investment in irrigation accentuated in few states like Gujarat, Karnataka, Madhya Pradesh, Maharashtra, Tamil Nadu and West Bengal. In respect of other states, it declined. However, all the 20 states taken together, there was an increase in irrigation investment as a percentage of capital expenditure. It rose from 61 per cent (TE 1984) to 63.8 per cent (TE 2014).

Table 12.3 Public expenditure per hectare (Rs.) at 2004-05 prices

State	Agricultural R&D/Ha		Irrigation/ha	
	TE 1984	TE 2014	TE 1984	TE 2014
Andhra Pradesh-Telangana	164	1838	1376	10106
Assam	573.7	2183	686	2128
Bihar-Jharkhand	239.9	2432	1347	3071
Gujarat	191.2	1620	1332	4561
Haryana	285.5	1281	1481	2910
Himachal Pradesh	2043	5351	803	5626
J&K	780	4969	1959	4646
Karnataka	160.6	1770	920	3646
Kerala	705.7	4398	1600	2193
MP-Chhattisgarh	137.6	762	615	1891
Maharashtra	210.8	1560	1093	3790
Odisha	259.9	2301	1222	3719
Punjab	317.6	1049	1082	1868
Rajasthan	61.4	532	553	713.8
Tamil Nadu	571.6	4341	729	2150
UP-Uttarakhand	182	1195	1265	2537
West Bengal	297.3	1264	596	1037
Total (20 States)	222.4	1532	1012	3206

Source: Based on Finance Accounts and Bathla, Joshi and Kumar (2017).

Note: TE indicates triennium ending

Given the large variations in the size of states and also population in each, it would be more pertinent to assess the expenditure on these services on a per unit basis. There are large inter-state variations in agricultural R&D spends with the highest being Rs. 4,968 per hectare in J&K, and the lowest at Rs. 531 per hectare in Rajasthan (Table 12.3). During TE 2014, in respect of Andhra Pradesh, it was the state of Andhra Pradesh that spent the maximum amount

(Rs. 10,105 per hectare) while Rajasthan, spent the least at Rs. 714 per ha. It is seen that the developed states relatively spent more on roads, rural energy, education and health, which stems from their higher spending power linked to higher economic growth.

12.2.2. Private investment

The private investment comprises investments by household sector as well as the corporate sector. So far, the major share of investment is accounted for by the household sector and the score in case of corporate sector as a percentage of private sector investments is as low as 2-3. While public sector investment has been a primary contributor to capital formation in agriculture through creating irrigation, roads and power infrastructure, the role of private sector is important too and its role is gaining recognition in moving the agriculture to next stage of development.

Table 12.4 furnishes state-wise fixed capital expenditure in farm business (FCEFB - synonymous with private investment in agriculture and allied activities) per rural household at 2004-05 prices over the period. Three states, viz., Haryana, Bihar and Tamil Nadu experienced a significant decline in the share of investment in agriculture in gross investment. This also points to an increasing expenditure on residential land or other investments by the rural households, which may have been undertaken at the expense of farm investments.

Table 12.4 State-wise private investments per rural household (Rs.) at 2004-05 Prices

Type	States	1981-82		1991-92		2002-03		2012-13	
		FCEFB	FCEFB/ GCE	FCEFB	FCEFB/ GCE	FCEFB	FCEFB/ GCE	FCEFB	FCEFB/ GCE
Irrigated	Bihar	186	9.82	142	15.68	73	6.53	172	6
	Haryana	2029	27.73	1429	10.93	2646	18.75	2593	10.75
	Punjab	3245	36.19	1940	29.14	2091	23.21	4720	37.49
	Uttar Pradesh	769	18.86	703	17.05	831	19.63	2253	29.82
	West Bengal	232	10.31	194	9.73	119	3.87	263	4.15
Rainfed	Assam	248	13.84	80	6.37	119	10.65	303	14.86
	Himachal Pradesh	496	12.29	783	11.72	1228	6.63	3412	19.01
	J & K	538	7.62	520	14.17	711	9.13	1475	9.69
	Karnataka	1045	19.19	1902	38.67	586	17.43	2430	19.09
	Madhya Pradesh	664	22.02	1589	40.1	353	18.73	3019	40.63
	Telangana	--	--	--	--	--	--	1013	14.6
	Jharkhand	--	--	--	--	76	6.53	300	8.59
	Chhattisgarh	--	--	--	--	272	12.49	1685	26.68
	Uttarakhand	--	--	--	--	1170	21.76	1451	23.19
Arid+ Rainfed	Gujarat	1405	39.08	781	23.37	1220	29.56	3163	38.93
	Rajasthan	1134	23.42	1677	33.83	1605	23.25	3442	23.59

Type	States	1981-82		1991-92		2002-03		2012-13	
		FCEFB	FCEFB/ GCE	FCEFB	FCEFB/ GCE	FCEFB	FCEFB/ GCE	FCEFB	FCEFB/ GCE
Coastal+ Rainfed	Andhra Pradesh	687	20.3	533	21.55	484	16.12	1287	17.25
	Kerala	686	8	658	7.73	703	5.09	2188	7.16
	Maharashtra	1129	28.95	1367	31.51	1015	22.46	2674	26
	Odisha	181	8.42	134	7.42	327	10.81	350	11.16
	Tamil Nadu	634	20.63	791	20.51	620	11.89	626	5.21

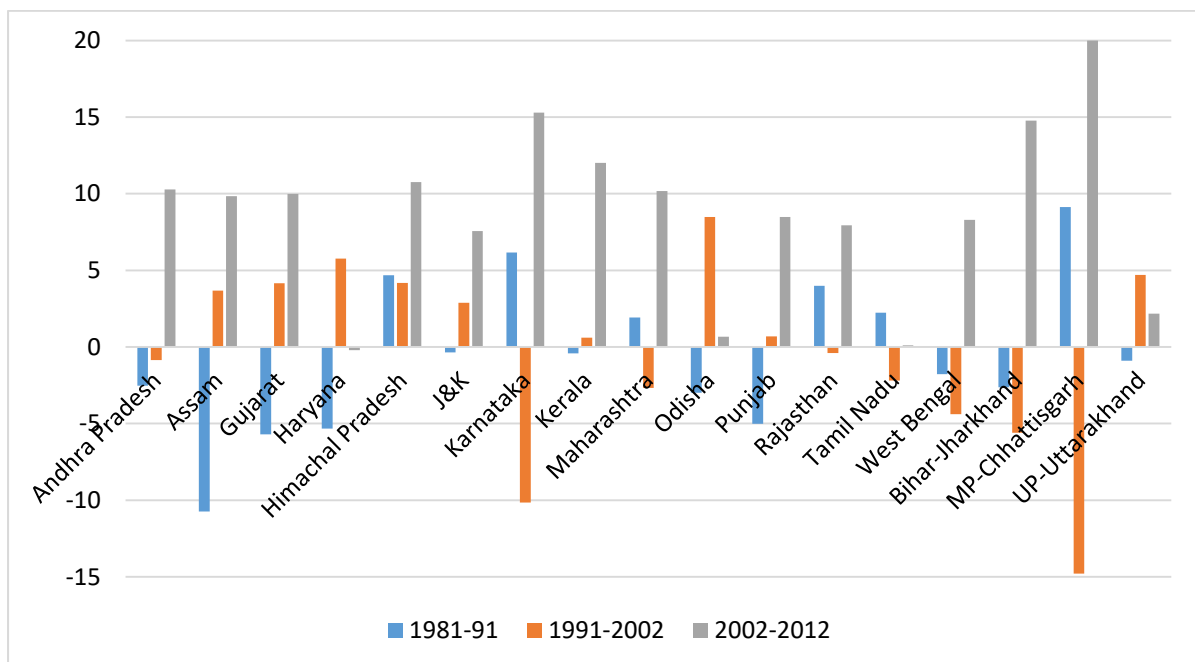
Note: GCE-Gross capital expenditure

Source: DFI Committee Estimates

Figure 12.1 presents the annual rate of growth in private investments during the different periods of 1981-91, 1991-2002, and 2002-12. With a few exceptions, most of the states recorded negative rates of growth in private investment during the 1980s and 1990s. This confirms a deceleration in its growth reported at the national level, followed by revival during the subsequent decade i.e. 2002-12. The impressive investment in the states of Madhya Pradesh in agriculture during the recent period (2002-12) coincides with the much applauded record growth rate of agricultural sector in the state. It demonstrates the correlation between capital investment in agriculture and growth rate.

With exception of few states like Odisha and Tamil Nadu, massive public investments in irrigation, provision of input subsidies, favourable terms of trade, and increased flow of credit seem to have pushed up private investments in almost all the states, where agriculture is mostly rainfed and heavily monsoon dependent.

Figure 12.1 Annual rate of growth in private investment per rural households at 2004-05 prices



Source: DFI Committee Estimates

The composition of private investments in agriculture sector shows, that in majority of the states, investment has primarily happened in livestock and farm machinery & transport segments (Table 12.5). However, it is noteworthy here that few states where farming is mainly rainfed, a significant proportion of the investment has been channelized into irrigation. Further, it is seen that farmers in the hilly regions tend to spend less on irrigation structures and more on land improvement. This is understandable considering the topography of the region.

Table 12.5 State-wise percentage share of components of private investment in rural households, 2012-13

Type	States	Land Improve-ment	Orchards	Irrigation	Farm machinery & transport	Farm Buildings	Others	Livestock
Irrigated	Bihar	0.15	17.04	5.5	36.15	9.61	3.18	28.37
	Haryana	3.26	0	22.99	43.61	0.74	0.11	29.29
	Punjab	3.04	0	10.2	63.86	1.21	0.82	20.87
	Uttar Pradesh	2.31	0.15	3.26	73.37	0.84	0.28	19.8
	West Bengal	1.06	1.91	4.99	41.85	12.32	0.46	37.41
Rainfed	Assam	3.35	3.19	8.9	40.3	20.38	1.92	21.96
	Himachal Pradesh	17.02	4.42	32.56	6.07	23.28	0.09	16.56
	J & K	3.99	16.27	0.41	13.54	2.33	0.18	63.27
	Karnataka	10.5	0.01	46.09	17.74	1	0.31	24.35
	Madhya Pradesh	13.84	0.05	33.01	31.87	0.73	4.24	16.26
	Telangana	8.98	0.05	33.43	21.76	2.78	0.06	32.94
	Jharkhand	2.96	3.55	9.34	40.47	18.24	3.26	22.18
	Chhattisgarh	2.15	1.35	3.42	70.73	1.46	0.48	20.41
	Uttarakhand	20.45	1.01	4.9	19.75	2.62	13.29	37.97
Coastal+ Rainfed	Andhra Pradesh	10.61	0.08	9.59	27.53	4.58	0.02	47.6
	Kerala	4.38	3.33	12.24	60.69	1.56	5.59	12.2
	Maharashtra	17.39	5.17	33.73	21.09	2.68	1.3	18.65
	Odisha	19.5	0.41	20.07	27.02	11.74	1.71	19.55
	Tamil Nadu	5.54	0.8	47.78	17.94	16.8	1.03	10.11
Arid+ Rainfed	Gujarat	9.33	0.18	23.64	36.54	6.15	1.08	23.09
	Rajasthan	5.37	0.46	30.16	25.46	5.98	0.46	32.11

Source: DFI Committee Estimates

II

India - Subsidies in Agriculture

12.3. Subsidies in Agriculture and Implications

Subsidies are amongst the most powerful instruments for influencing or balancing the growth rate of production and trade in various sectors and regions. Subsidies also play an important role in correcting the existing inequalities in the society, when used to protect interests of the weaker sections. In India, agriculture is of prime importance since around half of the labour force is still engaged in this sector. Despite several measures since independence, average rural incomes are still far behind average urban incomes. The input support through subsidy in fertilizer, credit, electricity and output support via MSP based procurement operations constitute some important interventions. These subsidies have been consistently deployed by the government to protect the interests of farmers.

During the last three decades in particular, subsidies provided by Government of India have shot up substantively from Rs 12,158 crore in the year 1990-91 to Rs 2,43,811 crore in 2015-16. The percentage share of fertilizer subsidies in the total basket of subsidies increased from 36.41 in 1990-91 to 51.4 in 2000-01, and declined thereafter to the level of 29.9 in 2015-16 (Figure 12.2 and Table 12.6.). This decline in percentage could be on account of bringing phosphorous (P) and potassium (K) under NBS (Nutrient Based Subsidy), and higher procurement cost arising from substantive increase in MSP for various notified crops including wheat, paddy & pulses. Further, with adoption of National Food Security Act, PDS (Public Distribution System) has become more universal entailing higher quantum of food subsidy.

The ratio of poverty is higher in rural areas, where agriculture continues to be the dominant economic activity, notwithstanding some structural changes in the rural economy over the last about a decade.

Table 12.6 Subsidies in Indian budget across various categories/heads (Rs crores)

Year	Interest Subsidy	Fertiliser Subsidy					Total Subsidies	GDP at Current Market Prices (2004-05 Series)	Total Subsidy as % of GDP	Annual Growth Rate of Subsidies	
	Total Interest Subsidy	Interest Subvention to Farmers	Indigenous	Imported	Decontrolled	Total Fertiliser Subsidy	As %age of Total Subsidy				
1996-97	1222	-	4743	1163	1672	7578	48.9	15499	1419277	1.1	
1997-98	78	-	6600	722	2596	9918	53.5	18540	1572394	1.2	19.6
1998-99	1434	-	7473	333	3790	11596	49.2	23593	1803378	1.3	27.3
1999-00	1371	-	8670	74	4500	13244	54.1	24487	2023130	1.2	3.8
2000-01	116	-	9480	1	4319	13800	51.4	26838	2177413	1.2	9.6
2001-02	210	-	8044	47	4504	12595	40.4	31210	2355845	1.3	16.3
2002-03	750	-	7790		3225	11015	25.3	43533	2536327	1.7	39.5
2003-04	170	-	8521		3326	11847	26.7	44323	2841503	1.6	1.8
2004-05	564	-	10243	494	5142	15879	34.6	45957	3242210	1.4	3.7

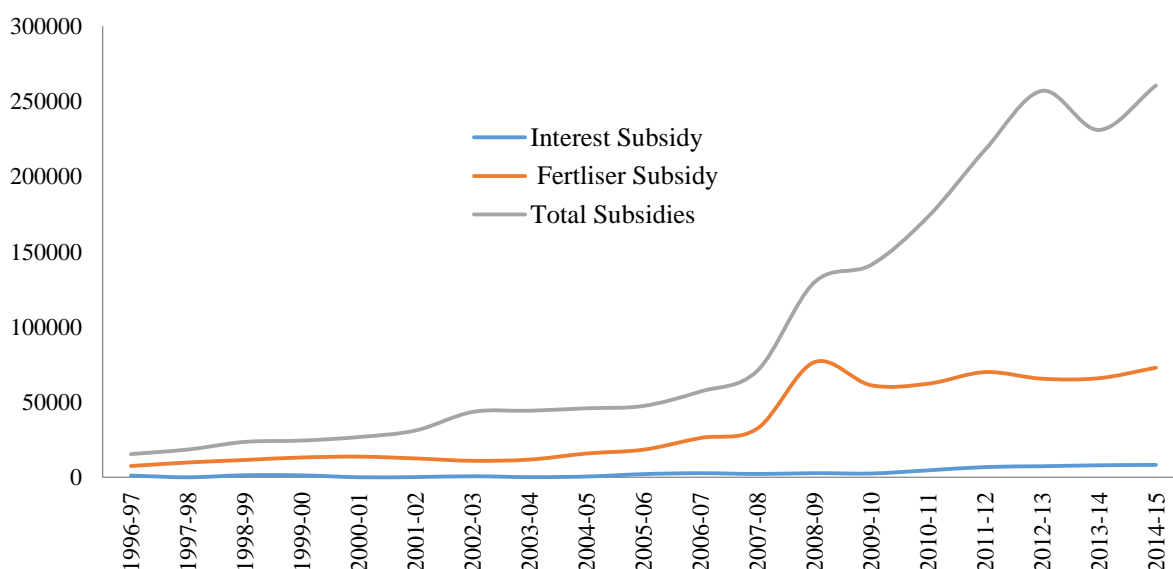
Year	Interest Subsidy	Fertiliser Subsidy					Total Subsidies	GDP at Current Market Prices (2004-05 Series)	Total Subsidy as % of GDP	Annual Growth Rate of Subsidies	
	Total Interest Subsidy	Interest Subvention to Farmers	Indigenous	Imported	Decontrolled	Total Fertiliser Subsidy	As % age of Total Subsidy				
2005-06	2183	1700	10653	1211	6596	18460	38.8	47522	3692485	1.3	3.4
2006-07	2809	1100	12650	3274	10298	26222	45.9	57125	4294706	1.3	20.2
2007-08	2276	1677	12950	6606	12934	32490	45.8	70926	4987090	1.4	24.2
2008-09	2829	1600	17969	10079	48555	76603	59.1	129708	5630063	2.3	82.9
2009-10	2601	2011	17580	4603	39081	61264	43.3	141351	6457352	2.2	9.0
2010-11	4680	3531	15081	6454	40766	62301	35.9	173420	7795314	2.2	22.7
2011-12	6868	4868	20208	13716	36089	70013	32.1	217941	8974947	2.4	25.7
2012-13	7416	5400	20000	15133	30480	65613	25.5	257079	10159884	2.5	18.0
2013-14	8061	6000	21000	15545	29427	65972	28.5	231084	10020620	2.3	-10.1
2014-15	8313	6000	36000	12300	24670	72970	28.0	260658	12876653	2.0	12.8

Source: Budget Documents

India is among one of the largest producers and consumers of fertilizers in the world. Initially fertilizer subsidy was introduced to ensure its availability to farmers at an affordable price, and enable adequate returns on investments.

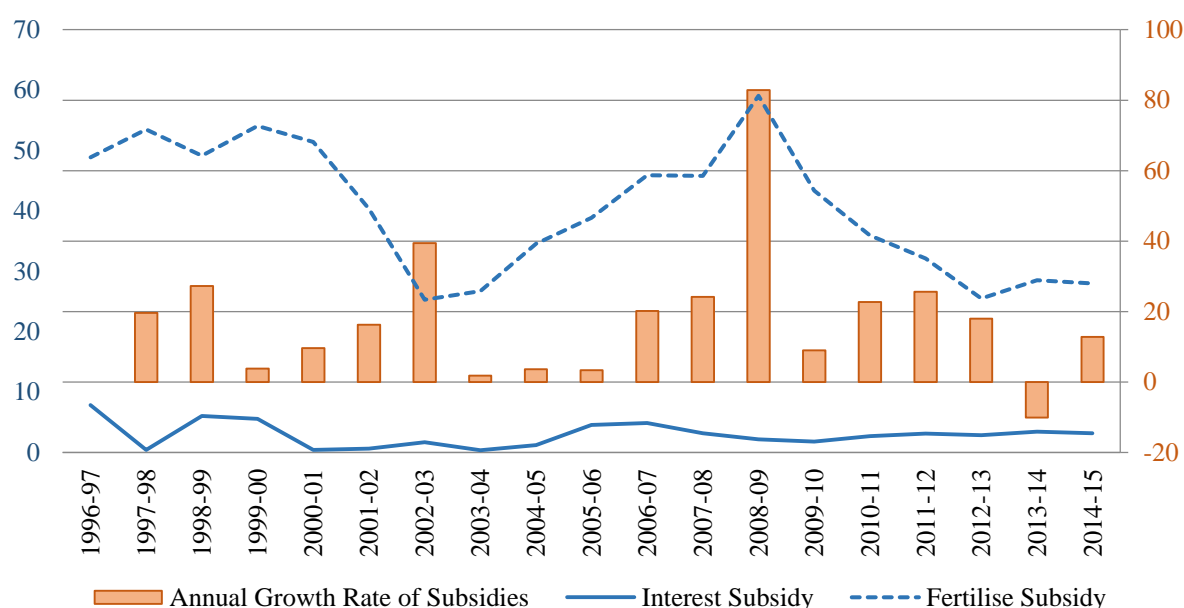
However, over the years the financial obligation on account of fertilizers subsidy has increased substantively, resulting in enormous charge on government exchequer.

Figure 12.2 Trends in different subsidies across different heads (Rs crores)



Source: Budget Documents

Figure 12.3 Trends in interest and fertilizer subsidies (as percent of total subsidies)



Source: Budget Documents

At both national and state levels, fertilizers subsidies on fertilizers have increased in absolute terms, and a lot of variation is also seen in percentage share. The fertilizers subsidy per hectare of gross cropped area (GCA) in different years is shown in Table 12.7. It depicts an increase from Rs.1,363 in 2006-07 to Rs.3,578 in 2014-15, registering a rise of more than 100 per cent in absolute terms (Table 12.7). Some states like Odisha, Chhattisgarh and Uttarakhand show an increase of more than three times in the amount of subsidy per hectare, compared to other states, where the increase is lesser at around 2.5 to 3 times in terms of absolute numbers per hectare.

Table 12.7 Fertilizers subsidy (Rs) per hectare of gross cropped area

Rainfed States	1999-2000	2006-07	2009-10	2014-15
Assam	206	656	1367	1947
Chhattisgarh	-	922	2234	2933
Himachal Pradesh	277	628	1309	1603
Jammu & Kashmir	703	925	2257	2593
Jharkhand	457	1017	2766	2047
Karnataka	682	1447	3699	4151
Madhya Pradesh	334	726	1795	2094
Uttarakhand	-	1433	3080	4310
Irrigated States				
Bihar	774	1682	4153	4868
Haryana	1,164	2131	4937	5533
Punjab	1,454	2606	5479	6066
West Bengal	931	1716	3991	4201
Uttar Pradesh	981	1776	3875	4533

Rainfed States	1999-2000	2006-07	2009-10	2014-15
Arid+ Rainfed				
Gujarat	651	1445	3756	3658
Rajasthan	322	527	1142	1487
Coastal+ Rainfed				
Andhra Pradesh	1096	2348	5638	6222
Kerala	455	867	2296	2215
Maharashtra	637	1212	3136	3327
Odisha	314	545	2180	2679
Tamil Nadu	1,104	2332	4969	4697

Source: States category based on Saxena et al (2001), data compiled from various issues of agricultural statistics at a glance.

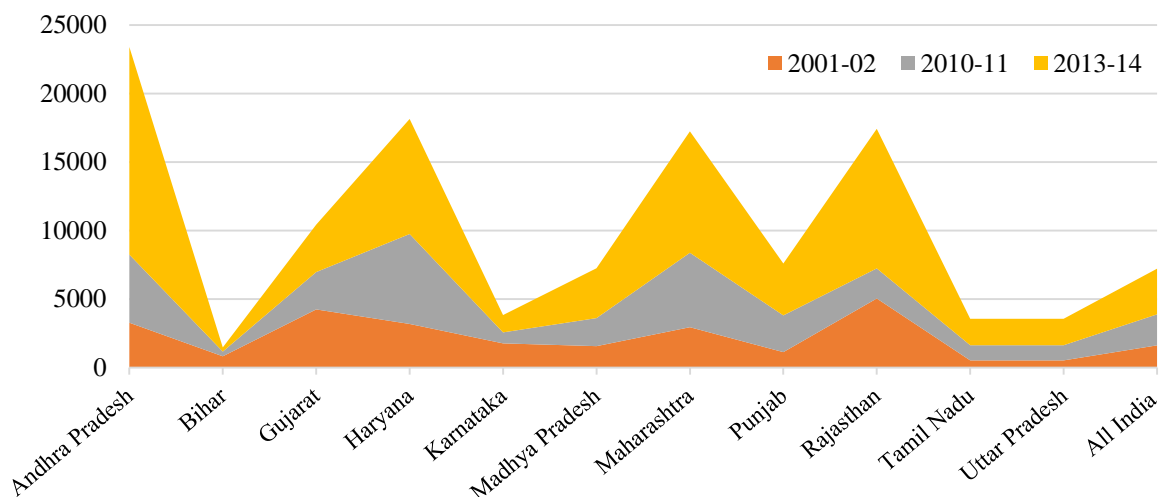
Sale of fertilizers at highly subsidized price incentivized the farmers, to use a critical input, that was important to realise higher per unit yields, particularly in case of high yielding varieties of paddy & wheat grown under irrigated system. This has helped in achieving high foodgrain output in the country. However, studies in the recent years suggest that during the last few years, the marginal response of crop productivity to additional fertilizer usage across different states has fallen sharply, leading to near stagnation in agricultural productivity and concomitantly agricultural production. It has also been reported that low price on urea relative to potassium & phosphorous has led to imbalanced use of soil nutrients.

Since the year 2008-09, P and K have come under NBS system, which means that the quantum of subsidy offered by the government is fixed, and the MRP (Maximum Retail Price) is not regulated. However, urea continues to benefit from fixed MRP, and the subsidy (the difference between MRP and manufacturing/importing cost) being fully borne by the government. Disproportionate ratio in application of NPK (in deviation of recommended dosage) causes multi-nutrient deficiency resulting in less than desired growth of crop productivity.

Now, taking up the critical need of power (electricity) in agriculture, it is observed that in absolute terms, the power (electricity) subsidy in terms of rupees per hectare of gross cropped area has increased in all the states except Bihar, Gujarat and Madhya Pradesh. The value has also increased at all India level by more than two times (Figure 12.4). A comparison of the year 2001-02 with the year 2013-14 brings out that, in Andhra Pradesh the subsidy amount quadrupled whereas in case of Maharashtra, Punjab Tamil Nadu and Uttar Pradesh the amount tripled (Table 12.8).

Initially the power subsidy was offered to help the farmers to use ground water and secure their production. It is now seen, that paddy and wheat have come to garner major share of power subsidy as also that of fertilizer subsidy, especially in irrigated states like Bihar, Haryana, Punjab, Uttar Pradesh and West Bengal, where more than 60 per cent of the total gross cropped area is under these two resource guzzlers. In fact, in case of Punjab more than 80 per cent of the gross cropped area is under wheat and rice (2014-15). This reflects lopsided support through subsidies in favour of limited crops and further benefitting largely irrigated areas.

Figure 12.4 Power subsidy for agricultural consumers (Rs. per ha of gross cropped area)



Source: Various issues of Annual Report on The Working of State Electricity Boards & Electricity Departments (Power & Energy Division) Planning Commission Government of India.

The subsidised power from state governments has resulted in indiscreet use of water along with urea resulting in overuse of these two inputs in many places. This has brought about deterioration of soil health in various irrigation command areas besides depletion of water table, including in the Indo-Gangetic Plains.

Table 12.8 Power Subsidy for agricultural Consumers (Rs. per ha of gross cropped area)

Irrigated States	2001-02		2010-11		2013-14	
	Rs.	% All India	Rs.	% All India	Rs.	% All India
Bihar	822	2	345	1	303	0
Haryana	3181	7	6566	10	8401	8
Punjab	2946	8	5433	10	8866	10
Uttar Pradesh	521	4	1108	6	1930	8
Arid+ Rainfed						
Gujarat	4244	15	2726	8	3461	7
Rajasthan	1126	8	2683	16	3788	15
Coastal+ Rainfed						
Andhra Pradesh	3274	14	4972	16	15159	18
Maharashtra	1562	11	2046	11	3641	13
Tamil Nadu	5042	10	2195	13	10190	9
Rainfed States						
Karnataka	2253	9	1507	4	3062	6
Madhya Pradesh	1765	11	802	4	1266	5
Other States						
	-	2	-	3	-	2
All India	1620	100	2263	100	3334	100

Source: Various issues of Annual Report on The Working of State Electricity Boards & Electricity Departments (Power & Energy Division) Planning Commission Government of India.

It is in this context, that a more rational way of using the subsidies is needed with a view to spreading the support to larger number of crops, sub-sectors, geographies, rainfed & irrigation

systems and farmers. Increase in irrigated area (by tapping ground water) through subsidised electricity in states like Punjab and Haryana has led to assured incomes, but also to groundwater depletion, income inequality, and unsustainable agriculture.

12.3.1. Food subsidies in India

The subsidy obligations of Government of India on account of foodgrains have increased significantly over the last two decades from Rs. 6,066 crore in 1996-97 to about Rs. 1,22,676 crore in 2014-15, an increase of over 20 times. Since 1996-97, food subsidy as a percentage of total subsidy grew from 39 per cent to 57 per cent in 2003-04, and thereafter declined to 47 per cent in 2014-15 (Table 12.9). The government's foodgrain policy is mainly carried out by the Food Corporation of India (FCI). It is the FCI or its selected state government agencies, who acquire paddy and wheat from farmers at the notified minimum support price (MSP). The Government of India utilizes the procured wheat and rice under Targeted Public Distribution System (TPDS) and other welfare schemes and for maintaining the buffer stock of foodgrains so as to ensure food security. The quantum of wheat and rice meant for TPDS is issued to the states and union territories at a highly subsidized rate. The differential between the procured and issued price is met by the central government. While this is a huge financial obligation, it integrates the loop between procurement and disposal of the commodities. While the consumers benefit from subsidized food, the farmers benefit from assured market at MSP.

However, several studies have shown, that this system has benefited only a few states, and further the relatively larger farmers within these states, with higher marketable surplus ratios. It is also no gain saying, that it has benefited only 2 crops – wheat & paddy.

Table 12.9 Year-wise food subsidy (Rs crore)

Year	Food Subsidy	YOY Growth (%)	Total Subsidies	Food Subsidy as percentage of total Subsidy
1996-97	6,066		15499	39
1997-98	7,900	30	18540	43
1998-99	9,100	15	23593	39
1999-00	9,434	4	24487	39
2000-01	12,060	28	26838	45
2001-02	17,499	45	31210	56
2002-03	24,176	38	43533	56
2003-04	25,181	4	44323	57
2004-05	25,798	2	45957	56
2005-06	23,077	-11	47522	49
2006-07	24,014	4	57125	42
2007-08	31,328	30	70926	44
2008-09	43751	40	129708	34
2009-10	58443	34	141351	41
2010-11	63844	9	173420	37
2011-12	72822	14	217941	33
2012-13	85000	17	257079	33
2013-14	92000	8	231084	40
2014-15	122676	33	260658	47

Source: Various Budget Documents

Distribution of benefits across states

In order to assess the pattern of distribution of food subsidy across various states in India, the trends in FCI procurement levels across different states in the country have been assessed. Analysis suggests that price support aided only farmers from few selected states. More than 20 states and union territories (UT) grow wheat in India, and nearly all states grow rice. However, FCI procurement for wheat and rice is concentrated only in few selected states. Procurement figures for rice for the year 1999-2000 and 2014-15, show that Punjab, Andhra Pradesh, Uttar Pradesh, Odisha and Haryana were the major states contributing around 80 percent of the total procurements undertaken by FCI, with only exception being Chhattisgarh a significant state in 2014-15 but not in 1999-2000. Also Punjab and Andhra Pradesh contributed more than half of the total procurement of rice in the entire country (Fig 12.5).

Figure 12.5 FCI procurement of rice: share across states

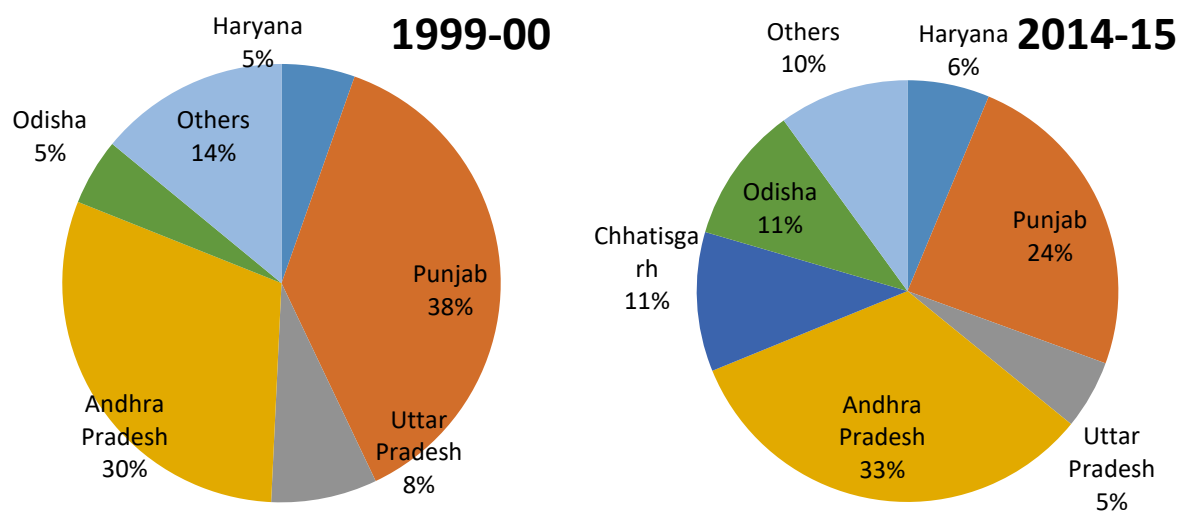
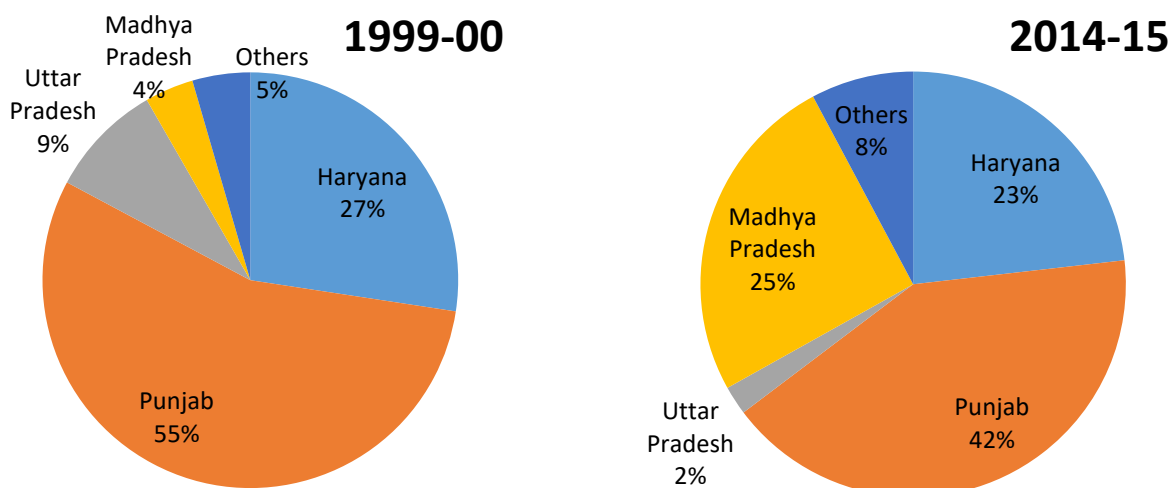


Figure 12.6 FCI procurement of wheat: share across states



In case of wheat, the procurement figures in 1999-2000 and 2014-15 were concentrated only in four states, namely, Punjab, Haryana, Madhya Pradesh; and Uttar Pradesh, with Punjab and Haryana contributing around two-third of the total procurement (Fig 12.6).

The trend of FCI procurement (Table 12.10) across various states, suggests that the price support benefitted farmers in only a few selected states, especially Punjab and Andhra Pradesh in case of rice; and Haryana and Punjab in case of wheat. In order to broadbase the procurement-food subsidy linked intervention, it is necessary to cover more states like Assam, Bihar, Chattisgarh etc in rice procurement operations; and Bihar, Gujarat, Maharashtra etc in wheat procurement operations, by taking into account the production status of wheat and rice.

Another option is to go beyond wheat and paddy and cover other crops like millets & pulses under procurement – food subsidy (TPDS) system. This will lead over time to better crop alignment in accordance with water availability and agro-climatic conditions) and benefit farmers cultivating different crops across the country. It will result in greater equitability.

Table 12.10 Procurement of wheat and rice for the cntral pool (lakh tonnes)

States/ UTs	Rice						Wheat					
	1999-00		2009-2010		2014-15		1999-00		2009-2010		2014-15	
	Quant ity	%	Quanti ty	%	Quanti ty	%	Quanti ty	%	Quanti ty	%	Quanti ty	%
<i>Irrigated States</i>												
Bihar	0	0	9	3	16	5		0	5	2		0
Haryana	10	5	18	6	20	6	39	27	69	27	65	23
Punjab	68	37	93	30	78	24	78	55	107	42	116	42
Uttar Pradesh	14	8	29	9	17	5	13	9	39	15	6	2
Uttaran chal		0	4	1	5	2		0	2	1	0	0
West Bengal	4	2		0	20	6		0		0		0
Sub- Total	96	53	153	50	156	49	130	92	222	88	188	67
<i>Arid+ Rainfed</i>												
Rajas than	0	0		0	0	0	6	5	12	5	22	8
<i>Coastal+ Rainfed</i>												
Andhra Pradesh	55	30	76	25	36	11		0		0		0
Telan gana		0		0	35	11		0		0		0
Kerala		0	3	1	4	1		0		0		0
Sub- Total	55	30	78	25	75	23	0	0	0	0	0	0
<i>Rainfed States</i>												
Madhya Pradesh	11	6	2	1	8	3	5	4	20	8	71	25
Chhatis garh		0	33	11	34	11		0		0		0
Odisha	9	5	25	8	34	11		0		0		0

States/ UTs	Rice						Wheat					
	1999-00		2009-2010		2014-15		1999-00		2009-2010		2014-15	
	Quant ity	%	Quant ity	%	Quant ity	%	Quant ity	%	Quant ity	%	Quant ity	%
Tamil Nadu	9	5	12	4	10	3		0		0		0
Sub-Total	29	16	73	24	86	27	5	4	20	8	71	25
Others	2	1	4	1	3	1	0	0	1	0	0	0
All India	182	100	308	100	320	100	141	100	254	100	280	100

Source : Ministry of Consumer Affairs, Food and Public Distribution, Govt. of India

The proposed commitment of the government (Union Budget, 2018) to honour the notified MSPs should lead to greater secularisation of the food subsidy benefits across crops, regions, cultivation systems and farmers. This will correct inter-crop advantages-disadvantages that exist today, and promote a more rational production system that is in alignment with scientific and ecology based cultivation practices.

12.3.2. Centripetal influence on subsidies

The subsidy related experience over the last 50 years since the introduction of green revolution in the country shows, that there is a tendency of various subsidies to crowd around a certain point, influenced by centripetal force.

Take the case of green revolution, that majorly banked on paddy and wheat for driving the food security vision of India. The crowding has happened in the following way:

- High Yielding Varieties (HYVs) were introduced for paddy and wheat.
- Both were irrigated crops, and HYVs needed intensive use of inputs like water & fertilizers for them to express phenotypically in-synch with their innate genetics potential.
- Each of these inputs – seed, fertilizer and water needed to be incentivized by offering price concession to increase their adoption.
- Further, adoption of the new package of technologies had to be incentivized by offering a minimum support price (MSP), so that pre-seasonal notifications served as a price signal to the farmers, and they could be influenced to grow paddy and wheat.
- Since the agricultural markets were not efficient enough to discover remunerative prices on the paddy and wheat output, they had to be offered price support in the form of procurements at MSP by the Food Corporation of India (FCI).

The above chain comprising several links came to be built on heavy subsidies at each stage. It turned out to be a typical case of acquiring a cat to keep off the rat, which then necessitated acquisition of a cow to produce milk for the cat reared at home and so on an endless way.

In respect of the aforementioned conundrum of paddy and wheat-centric food security, in sum,

various subsidies came to centre around just two crops (paddy & wheat) grown in irrigated areas, supported through subsidy on seeds, fertilizers, water, electric/diesel power and finally procurement.

In effect, it was the selected section of farmers in irrigated areas growing paddy & wheat, who came to benefit majorly from the large subsidy-kitty, and creating islands of privileges.

The per ha. consumption of subsidy on different components will stand as testimony to this biasness, when it is examined by crops, irrigated vs. rainfed regions and other like parameters.

However, this analysis and interpretation should not be misread. After all, India faced a crisis of food deficit in the 1960s, and the situation warranted an emergent intervention by deploying a readily available package of technology, which could be imported and adopted to suit Indian conditions. This is how Mexican varieties of wheat were brought from International Centre for Maize and Wheat (CYMMYT) in 1967, followed by rice varieties from International Rice Research Institute (IRRI), Philippines in 1968-69, which together triggered a high production curve in the country. The rest, as they say, is history.

12.3.3. New challenge from surpluses

The current times in the history of India's agriculture is faced by a challenge of another nature, which emanates from a situation of surpluses, and ironically disfavours the farmers from realising remunerative prices. This is however not an insurmountable problem. Several market reforms rolled out by the government, supplemented by the proposed broadbased procurement operations will come to benefit the farmers.

Over the years, government sponsored subsidies to farmers in terms of fertilizers, irrigation, electricity and procurement-subsidy system have witnessed an annual increase. Of the total planned revenue expenditure for agriculture, significant part is spent on subsidies leaving a very small amount earmarked for capital investment in agriculture. As a result, agriculture sector in India seems to be more dependent on input subsidies relative to other large emerging economies. The need is to prioritise capital investments over subsidies, reserving the latter to the truly needy among the farmers. Further, subsidy transfer can be efficiently targeted by adopting Aadhaar linked Direct Benefit Transfer (DBT). Savings achieved by this, should however be retained for agriculture sector and added to the yearly normal budgetary allocations for enhancing capital investments for basic infrastructure like irrigation, power, roads, communication, post-harvest agri-logistics, markets and the like.

What is further worth appreciation vis-à-vis the present situation of surpluses, is the window that is now available to make wholesome changes to the policy support including Agri-R&D and broadbase agricultural transformation, besides making it income-centric. Towards this directional change, the substantive size of subsidy that is annually offered can be restructured and apportioned for right investments and for the targeted farmers, who need support of subsidy.

III

Inflation Management: Need for a Rational Approach

12.4. Food Inflation

Food inflation trends in India over the past few decades show that diverse commodities have been the reason for food inflation in different years, and that no specific commodity can be held accountable for high inflation. Studies show that eggs, milk, meat, fish, vegetables and cereals were the main influencers vis-a-vis the most recent food inflation.

Vegetables and fruits revealed a much higher degree of intra-year volatility; high-weight commodities in the national consumption basket also showed very high inflation rates; and the contribution of pulses and edible oils remained low in terms of inflation. Shekhar et. al. (2016) established that both supply and demand factors are the reasons for inflation.

Prices of commodities such as cereals and edible oils seem to be driven by supply-side factors such as wage rates, level of production and minimum support prices, whereas in case of pulses, the effects of both supply- and demand-side factors appear almost equal. The prices of eggs, meat, fish, milk, and fruits and vegetables appear to be driven mainly by demand-side factors.

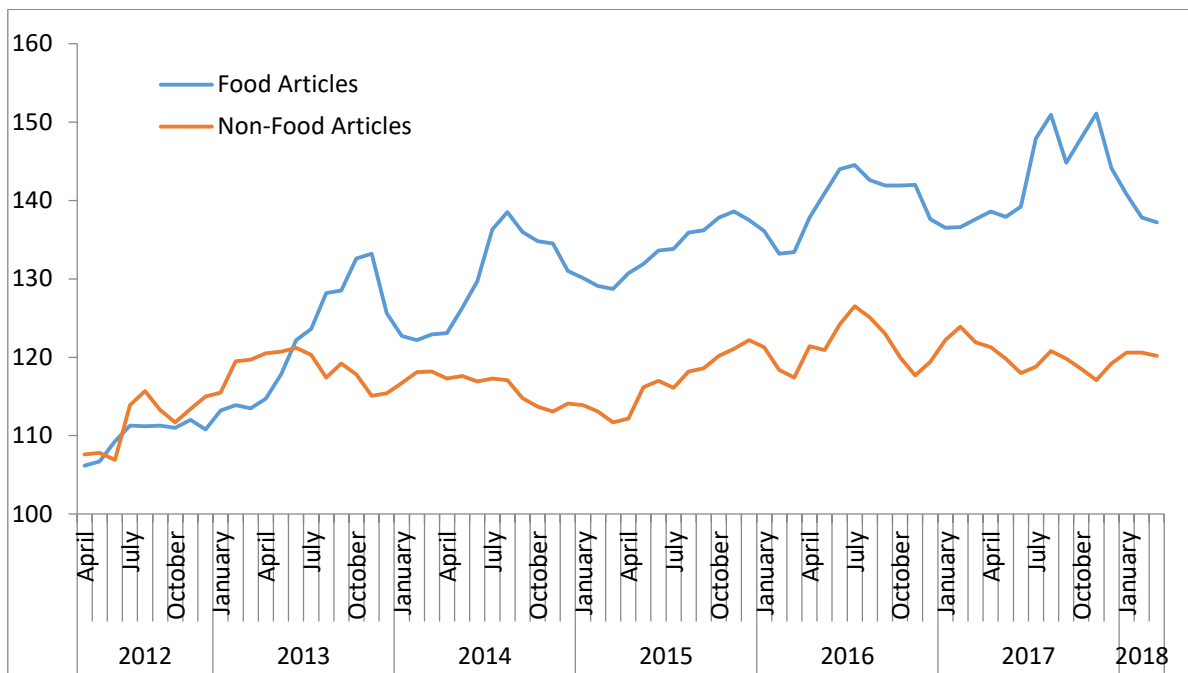
Over the past decade (2007-18), India has seen a prolonged period of high rate of general inflation (Figure 12.7), largely driven by persistently high food inflation. Past trend suggests that in the absence of a stronger food supply growth response, food inflation may outdo non-food inflation by 2.5–3 percentage points per year.

The country has recently adopted a flexible inflation targeting framework, under which it has set for itself a long term inflation target contained at 4 per cent. Some of the important factors relating to agriculture, that can help in sustaining this inflation target include strengthening of food supply, agricultural market-based pricing, and reducing price distortion externalities.

Several studies like those of Anand et al. (2016), Meenakshi (2016) and Shekhar et. al. (2016) have also highlighted the importance of these factors in shaping India's inflation dynamics and determining the conduct of monetary policy. Sonna et al (2014) provides substantial evidence on the importance of demand forces. The study shows that rising real rural incomes have had the major impact on food inflation while cost-push factors have a relatively smaller impact. Gokarn, S. (2012), in his comprehensive analysis of India's key food price issues for more than fifty years summarises, that rise in food prices is because of stagnation in food supply and food inflation cannot be contained until and unless food supply is regularised.

The Committee needs to spotlight, that in the face of ever rising production, barring a few produce types, it is evident that it is the supply and distribution system that fails or stagnates, to feeding inflationary pressure. Therefore, upgradation of market architecture and agri-logistics is to be given utmost priority.

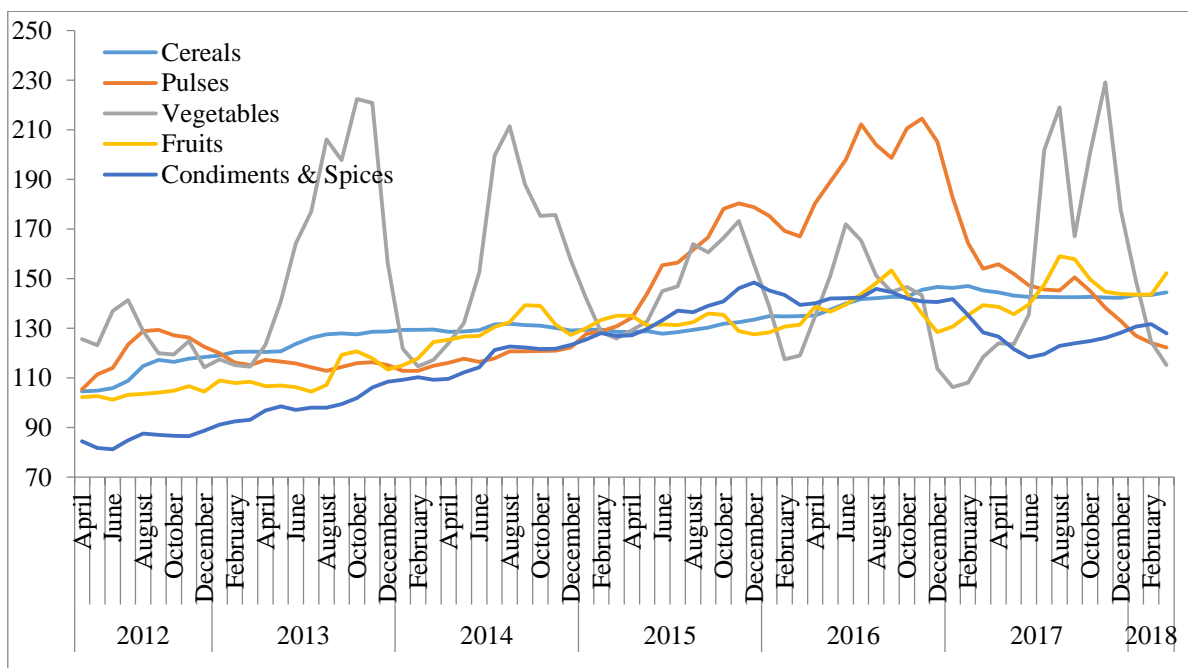
Figure 12.7 Wholesale Price Index (WPI) for food and non-food items



Source: Office of Economic Advisor, Government of India

Food inflation in India has averaged around 6.81 per cent between 2012 and 2018, reaching an all-time high of 14.72 per cent in November of 2013 and a record low of -2.12 per cent in June of 2017. The cost of food in India increased 2.81 per cent in March of 2018 over the same month in the preceding year.

Figure 12.8 Wholesale Price Index in food items category



Source: Office of Economic Advisor, Government of India

12.5. The Other Side of Food Inflation: Input Cost

In the recent past, there has been a significant increase in agricultural cost of production. To analyse the extent to which increase in cost of production in agriculture has contributed to food price inflation, agricultural input price indices have been used, which consisted of major farm inputs like fertilisers, pesticides, electricity, high speed diesel, light speed diesel oil, fodder, cattle feed, tractor, agricultural machinery & implements and lubricants. Within the category of agricultural inputs, light diesel oil recorded the highest inflation, followed by high-speed diesel and lubricants. Another traditional explanation for rising food prices has been the input supply-side shocks related to climatic conditions, either because of droughts or floods. Often, it is observed that the sudden slump in food supply associated with climatic conditions has led to food price inflation. (RBI, 2014).

12.6. Balancing Food Inflation and Guarding Farmers' Interest

The rising food inflation has been regulated by adopting different measures over the years. Some of these include subsidies on food and fertilisers, imports of food, and prevention of hoarding of farm produce. Though they did succeed in stabilising prices, such crisis management practices have been able to provide only short-lived respite, failing to check a continuous upward trend of food prices since 2007.

Over-emphasis on containing food inflation is good for the consumers, but bad for the farmer-producers. By causing stagnation in prices of food items, food production is rendered unattractive to the farmers. This approach will make food prices less remunerative; and discourage investments in agriculture, putting further stress on supply-side in the long run triggering inflationary pressure as a sequel. An effective strategy to keep food inflation at optimal level, while also benefiting the farmers from higher returns consists of enhancing per ha. yield (through more efficient production system) and an efficient agricultural marketing system (through market integration and a robust agri-logistics), that will ensure, a higher share of the farmer in the consumers' rupee. Merely increasing the prices in the market may not ensure better returns to farmers, as it may benefit only the intermediaries. From the farmers' income perspective, higher prices in the market constitute only a necessary condition, but not a sufficient condition. Capturing a higher share of the final value is therefore of more relevance.

Several other steps are needed to increase farmers' share in the consumer's price. The need is to lower the transaction costs. The farmer pays for transportation over long distances for his produce, before actually knowing the value at which his produce would be sold. The journey from farm gate to final consumer involves multiple levels of conveyance, labour expenses, commissions of agents and a market fee & cess, roughly adding to nearly one-fifth cost to food prices. There is need for large outlays to set up climate-controlled infrastructure to enhance the shelf life of farm produce. The public private partnership (PPP) could play a significant role in boosting the investment and adding value to the infrastructure. There is also need to add value to farm produce by facilitating food processing on a much larger scale, as food-processing industries can enhance both shelf life and add value to the products. However, some regulations like the Essential Commodities Act (ECA), which imposes strict restrictions on stock limits

and curbs movements, creates uncertainty, dis-incentivising long-term investments. This calls for reforms and liberalisation, and assume importance in the overall strategy for doubling enhancing farmers income

12.7. India's Food Inflation: The Supply-Demand Angle

Story of Pulses (2016-17)

Despite an increase in minimum support price (MSP) and government procurement in the agriculture year 2016-17, profit margins of all pulses except gram declined by about 30 per cent. The year saw record high production of pulses. However, prices of gram (chickpeas), which has a high share of 40-45 per cent in total pulses production and over 60 per cent in exports, bucked the trend, and shot up in the last six years. Unlike other pulses, there is no restriction on export of gram; so profitability remained higher for gram farmers as the international market was ready to absorb the excess domestic supply. (CRISIL, 2017).

The period of 2013-14 to 2015-16 (lesson from previous price volatility)

Two consecutive bad monsoons resulted in a fall in pulses production (driven by both acreage and yield declines) from 19.8 million tonnes in 2013-14 to 17.2 million tonnes in 2014-15 and finally a five-year low of 16.5 million tonnes in 2015-16. As a result, wholesale prices of gram, the principal pulse, rose by 65 per cent between August 2015 and August 2016, and 43 per cent between August 2014 and August 2015. This as expected impacted retail prices. For example, prices in Delhi rose by 49 and 38 per cents respectively during the years ending August 2016 and August 2015 (CRISIL, 2017). Some facts/information relating to controlling price volatility are given below:

- i. The principal pulses are under the government's price support regime, with minimum support prices (MSPs) being set on a cost-plus basis to provide a remunerative floor to market prices.
- ii. In bad harvest years, the government adopts policies to match supply with demand by encouraging imports, setting limits on stockholding by the private trade and restricting exports.

In the context of the sharp fall in domestic production from 2013-14 to 2015-16, the government had responded with similar measures to shore up domestic supply. Consequently, imports of pulses rose from 3.7 million tonnes in 2013-14 to 4.6 million tonnes in 2014-15 and 5.8 million tonnes in 2015-16. Exports fell from 0.34 million tonnes to 0.22 million tonnes between 2013-14 and 2014-15 and stood at 0.26 million tonnes in 2015-16.

Farmer-centric policy for inflation management: The following suggestions are made:

- i. Focus on increasing domestic production of pulses to strengthen supply side.
- ii. Procure pulses at MSP under price support scheme (PSS) or any other available procurement tool, whenever prices fall below MSP in the market.
- iii. A stable trade regime that checks imports and promotes exports be adopted, so that domestic market remains buoyant, even when production goes up.

- iv. Since 82 per cent of the area sown under pulses is un-irrigated, more investments are needed in expanding water-conservation techniques like small ponds, micro-irrigation and ferti-irrigation, and up-gradation of roads, storage and transportation facilities.
- v. Combination of market dependence and government interventions to balance the dual interest of consumer as well as farmers is needed.

It is noteworthy, that since 2016-17, the government's policy orientation and efforts have been on the above lines. A five year roadmap beginning 2016-17 to enhance production through productivity gains mainly, and using post-kharif fallow; and supported by higher MSP and top-up bonus has catalysed production. Procurement of pulses under PSS (Price Support Scheme) has also helped. This has led to record output of 23 million tonnes of pulses in 2016-17, and is expected to be surpassed in 2017-18. The trade regime-import & export policy has also been re-oriented in favour of the farmers.

Story of onion

Onion crop has received greater attention because of extreme price volatility (Saxena & Chand (2017)). In case of extreme price rise, the farmers tend to bring additional area under cultivation of onion from other competing crops. Such decisions lead to glut in the following season and farmers sometimes are not even able to recover the cost of production incurred. This situation suggests, that marketing and price scenarios need to be effectively examined and monitored to understand the linkages between/among markets and nature of volatility in onion prices.

The major policy instrument to regulate onion export and stabilise domestic market is MEP (Minimum Export Price). The other policy instrument is physical regulation of exports through quantitative restrictions (QRs) or total ban or canalising (routing) the exports through state trading enterprises. The motive behind such policies is the stabilisation of domestic supply of onion and to contain domestic price rise. This approach is obviously consumer-centric, and also at the cost of farmers' interests. Time series data on onion prices indicates that 2013 price situation was the most severe, with intense price shock. Such a situation drew immediate attention of policy makers, consequent upon which the MEPs were kept at the historically high levels. As the crises became intense, the government responded by repeatedly raising the MEP which went up to \$1150/MT. The situation eased only at the end of December 2013. A similar price crises situation re-emerged in 2015, which appeared to be relatively less severe as compared to the one of 2013. An MEP level of \$700/MT was notified in August 2015, which was 8 per cent higher as compared to August 2013 MEP. No further notifications were issued except in December 2015, when the price situation eased.

Saxena and Chand (2017) established that imposition of higher MEP in November 2013, July 2014 and June 2015 was able to lower the onion inflation in subsequent months i.e. December 2013, August 2014 and July 2015 respectively. If the farmer-centric policy approach is adopted, with a view to let the farmers take advantage of high price situations, it entails that MEP is determined with due objectivity and care. When prices are let to be little higher so as to protect the interests of farmers, the low income consumers need to be supported through

PDS supply of the commodity in question. For example, onion in this case.

In the long run though, supply management calls for proper management. Onion is cultivated in certain pockets of the country, but consumed all over implying that a robust agri-logistics can alone ensure distribution of onion from its production centres over space (i.e., all India). Further, its production is seasonal in nature (late Kharif and early Rabi), which means that onion has to be stored scientifically for demand-based release over time (i.e. throughout the year). This once again suggests the importance of storage godowns (like ventilated godowns) or processing and the like.

12.8. Annotation

There has been impressive growth in investments in Indian agriculture during the post-reform period. The initial decline of public investments in the 1990s was corrected and made up for in the decade of 2000s. However, a significant variation exists in the magnitude and direction of the investments across Indian states. An examination brings up inter-state disparities in both public and private spending in agriculture, particularly between irrigated and rainfed states. In consonance with the fact, that public spending in agriculture largely depends on fiscal resources and the priority the government attaches to the sector, the share of public investment vis-a-vis gross capital formation in agriculture has increased markedly in well-endowed states like Haryana and Maharashtra during recent periods.

As a large percentage of agriculture in the country continues to be monsoon-dependent, many of the states which are largely rainfed are seen to have diverted a significant proportion of their expenditure in strengthening and expanding irrigation coverage. The growth rate of private investment in agriculture has also been substantive in the rainfed states during the recent period. The case of developing states particularly Madhya Pradesh, is an example of agricultural transformation by enhancing public spends in terms of credit flow, subsidies and irrigation infrastructures. Water is the most critical input in a biological production system like agriculture.

Effective public-private inter-linkages to deepen capital formation in agriculture, can be replicated in all the states as well. Such public-private coordination for investment in agriculture is particularly important in those states which are largely rainfed. In these states, the critical need is to increase coverage of area under irrigation and water use efficiency.

In contrast to capital investments that go towards infrastructure build up, subsidies are in the nature of production support. The subsidies on critical inputs like fertilizers, water, power and MSP-linked procurements have increased substantively from Rs.12,158 crore in the year 1990-91 to Rs.2,43,811 crore in 2015-16. However, the green revolution technology conditional upon input guzzling crops and varieties has channelled a major part of the subsidies into irrigated belts, and majorly around a few crops.

Inflation management that targets to confine inflation to a certain threshold tends to suppress

the food prices, since food commodities account for a major weightage in the inflation basket. By and large, food prices have been managed with a view to protect the interests of the consumers, and not the farmers. Towards this the instruments of Price Stabilisation Fund (PSF), import-export duties and market operations have been used by the government. This approach may have been appropriate during the periods, when India suffered from food deficiency. But the current times when India's farmers are generating food surpluses, the challenge is one of ensuring remunerative prices on their produce. In this context, balancing the inflation and the need for ensuring fair & remunerative prices on the farmers' produce is a challenge. It needs to be addressed on priority for sustaining higher production.

Chapter 13

Mobilising Farmers – Cooperatives and Farmer Producer Organisations

“The fact that food companies are prospering but farmers are not, shows that profits are in the market, not the farm”. With increasing density of population, the size of farms is only declining apart from being subjected to the additional challenge of fragmentation. An optimal solution to achieve efficiency in agriculture lies in mobilising the farmers into farmer producer organisations (FPOs), including cooperatives of various nature.

13.1. Introduction

Cooperatives are present in most of the countries and in almost all the sectors, including agriculture, food, finance, health care, marketing, insurance & credit. A cooperative is an autonomous association of persons, united voluntarily to meet their common economic, social and cultural needs and aspirations through a jointly owned and democratically controlled enterprise.

Cooperatives have inherent advantages, for addressing issues of poverty alleviation, food security and employment generation, considered to have immense potential to deliver goods and services in areas where both the public and private sectors have failed. Since its formal launch in 1904 in India, the Indian Cooperative Movement has played very important role in the Indian economy, especially in the development of the agriculture and rural domains combining the strengths of both public and private sectors. In particular, the small and marginal farmers and weaker sections have benefited from cooperatives.

Agriculture sector, which still employs 48 per cent of the total workforce in India and contributes around 15.5 percent to the country's GDP (2016-17), needs sturdy cooperatives so as to overcome many of the difficulties faced by the farmers, especially in the context that 86 per cent of the farmers belong to small and marginal category. Farmers in India usually buy their inputs at retail price and sell their produce at wholesale prices, thus loosing at both stages. Organisations built on the concept of collectives (cooperatives and FPOs), could play key role in numerous areas like input purchase farm advisory, value addition and branding, storage facilities, soil-water-seed testing, purchase or hiring of customize farm machinery sale of output.

13.2. History of the Co-operative Movement in India

The prevalence of widespread distress in the country in the 1800's, the growing volume of rural debt and the machinations of the money-lenders, led to certain voluntary efforts in the field of rural credit, in the then Madras Presidency were organised into 'Nidhis' or Mutual-Loan Associations. Based on the co-operative principle, these associations attained significant success. By 1901, there existed 200 *nidhis* with more than 36,000 members and subscribed capital of more than Rs.2 crore. In Punjab, a society on co-operative lines was started as early as 1891 at Panjavar in Hoshiarpur district. The interest shown by local farmers in these

societies and the powerful support lent by the Indian Famine Commission (1901) induced the government to set up a working group to report on the introduction of co-operative societies in India. Thus the first Co-operative Societies Act came to be passed in the year 1904.

The introduction of the Co-operative Credit Societies Act in 1904 marked the commencement of the cooperative movement in the country. The goal, as specified in the preamble of this Act, was *to boost thrift, self-help and co-operation amongst farmers, artisans and persons of limited means*.

However, the movement did not make the progress expected of it. By 1911, there were only 8,177 credit societies consisting of around 4 lakh members throughout the country, with a share capital of around Rs. 50.5 lakh. This concern pushed the government to take stock of the circumstances, and a committee headed by Sir Edward Maclagan, was appointed in 1915, to study and report whether the cooperative movement was proceeding on reasonable and financially sound lines. The Committee submitted its Report in 1915 and it resulted in reorganisation and thorough overhauling of the whole administration of Co-operatives.

An attempt was made to get rid of societies which did not live up to the ideals of co-operation, and in particular, to insist upon prompt repayments. Under the Reforms Act of 1919, co-operation became a transferred subject with the result, that the control and course of the movement passed completely into the hands of the new Provincial Governments. This gave the movement the advantage of greater flexibility since it could now be modified in accordance with the needs of every province. Thereafter, the Government in the year 1945 appointed the Cooperative Planning Committee to draw up a plan of cooperative development in the country.

With the achievement of independence and the advent of planning, the role of cooperatives underwent a radical change. It was in this context that the Rural Credit Survey Committee was appointed in 1951. A distinct shift in cooperative guidelines happened in 1958 when the National Development Council passed a resolution, which in effect, led to *'the rejection of the old large-sized credit society and the emergence of small sized 'Service Cooperatives'*.

Over the years, the co-operative movement made rapid progress, but was, however, not uniform across all the states. The progress was more marked in the states of Maharashtra, Punjab, Tamil Nadu, Gujarat and Madhya Pradesh; and the movement was weak in the eastern region comprising the states of Assam, Bengal, Bihar, Orissa (now Odisha), Manipur and Tripura. A most welcome development during the plan period was the diversification of the movement. A major breakthrough was witnessed in the field of agricultural marketing and processing. The development of consumers' stores and industrial co-operatives was also significant. But the movement, somewhere, failed to fulfil all the aspirations attached with it initially, since still a large percentage of rural population remained outside the fold of cooperatives, and for most of their credit needs (specially small and marginal farmers) continued to depend on agencies other than the co-operative society.

13.3. Different Types of Cooperatives in India

Consumers' Cooperatives: are formed by the consumers to obtain their daily requirements at reasonable prices. Consumers' cooperatives or cooperative stores are working primarily in urban areas in India. Such a society buys goods directly from companies and wholesalers so as to eliminate the profits that middlemen garner.

Producers' Cooperatives: Producers or industrial cooperatives are voluntary organisations of small producers and artisans, who stick together to impart efficiency to their operations.

Housing Cooperatives: These societies are formed by low and middle income group people in urban areas to have a house of their own. Housing cooperatives are of different types. Some societies acquire land and give the plots to the members for constructing their own houses. They also arrange loans from financial institutions and government agencies. Other societies themselves construct houses and allot them to the members who make payment in instalments.

Credit Cooperatives: These societies are formed by needy people to benefit from financial support and to develop the habit of savings among members. They help to protect members from exploitation of money lenders who charge exorbitant rates of interest on their lending. Credit cooperatives are found in both urban and rural areas. In rural areas, agricultural credit societies provide loans to members mainly for agricultural activities. In urban areas, non-agricultural societies or urban banks offer credit facilities to the members for household needs.

Marketing Cooperatives: These are voluntary associations of independent producers who want to sell their output at remunerative prices. The National Agricultural Cooperative Marketing Federation (NAFED) under the Ministry of Agriculture and Farmers' Welfare is an example of marketing cooperative in India. The output of different members is pooled and sold through a centralised agency to keep away middlemen. The sale proceeds are distributed among the members in the ratio of their outputs. As a central sales agency, the society may also perform important marketing functions such as processing, grading and packaging the output, advertising and exporting products, warehousing and transportation, etc.

Cooperative Farming Societies: These are voluntary associations of small farmers who come together to obtain the economies of large scale farming. Indian farmers are small and also fragmented. In their individual capacity, the farmers are unable to use modern tools, seeds, fertilizers, etc. They pool their lands and do farming collectively with the help of modern technology to maximise agricultural output.

13.4. Need for Cooperatives in Agriculture

Lack of sufficient numbers significantly reduces the bargaining power of small and marginal farmers both in case of input procurement as well as sale of produce. Small and marginal farmers require agricultural inputs in small quantities, which they procure from local traders at a considerably higher price than the wholesale rate. Most of the times, inferior quality of these inputs further aggravates the problem. Often for small and marginal farmers transporting small

quantities of produce to urban markets is not a feasible option, and they end up selling their produce (most often perishable produces) to local traders at lower prices than normal. Lack of techniques for access to credit and insurance services and vulnerability to several forms of risks (climate change, pests and other risks) complicate the scenario for small and marginal farmers in India. Several of these concerns have given rise to the notion of a cooperative so as to ensure low costs of inputs, opportunities for value-addition and processing, collectively increasing the numbers so as to enhance bargaining power in case of marketing, (Agarwal, 2010), and access to formal credit (Braverman et al., 1991)

Box 13.1: Cooperatives in agriculture

- Co-operative Credit
 - NCDC
- Co-operative Farming
 - Co-operative Tenant Farming
 - Co-operative Collective Farming
 - Co-operative Better Farming
 - Co-operative Joint Farming
- Co-operative Marketing
 - NAFED
- Co-operative Processing
- Co-operative Storage
- Consumers' Co-operatives
- Women Co-operatives

13.4.1. Different types of agricultural cooperative societies⁴

Farming Cooperative Societies: Development of farming sector was given major emphasis after independence for ensuring food and employment security in rural India. In this context, the concept of cooperative farming was mooted by the then Planning Commission to pool the land owned by small farmers for joint management. The proposed approach was either to retain individual ownership of the land and lease to the cooperative or transfer land ownership to the cooperative and collect shares worth the value of the land. The Cooperative could then pool the holdings for land improvement and intensive cultivation, using modern technologies. These farming cooperatives were supported financially to develop land and water resources.

Agricultural Processing Cooperatives: The first processing cooperative society was established in India for setting up of a ginning factory in 1917. Subsequently, cooperatives for sugar processing, paddy milling, groundnut decorticating, copra and oil seed crushing, processing of fruit, vegetables, tea and jute were established. These processing cooperatives

⁴ Adapted from Kumar, et al. (2015)

with individual farmers, cooperative marketing societies and local service cooperatives as members are regulated under the cooperative rules and by-laws.

There were 716 installed sugar factories in the country as on 31-March-2016, of which 326 were under the cooperative sector. The sugar industry has a huge annual turnover, ensuring livelihood for lakhs of sugarcane growing families and a large mass of agricultural labourers. Dairy cooperative is another success story in India. Presently, 170 Milk Producers' Cooperative Unions and 15 State Cooperative Milk Marketing Federations are involved in milk processing. However, many of these dairy federations have failed to function successfully, in the true spirit of a people's movement. However, some positive exceptions exist in a few States. Nevertheless, the dairy cooperatives account for the major share of processed liquid milk marketed in the country. Dairy cooperatives have been instrumental in transforming the rural economy on the lines of cooperative sugar factories in several states like Gujarat, Maharashtra, Karnataka, etc.

Agricultural Marketing Societies: Establishment of marketing cooperatives was encouraged to provide marketing facilities to small farmers. The anticipated advantages were increase in bargaining strength of farmers, removal of intermediaries and direct interaction with consumers. There was also scope for availing credit and cheaper transport, storage facilities, grading and processing of agricultural produce to fetch better prices.

The National Agricultural Cooperative Marketing Federation of India Ltd. (NAFED) was established in 1958 for promoting cooperative marketing of agricultural produce. NAFED procure foodgrains, pulses, oilseeds, spices, cotton, tribal produce, jute products, eggs, fresh fruits and vegetables from farmers through its cooperative network in selected areas whenever farmers have faced problems of marketing their produce as manifest in low remunerative in the market. The Indian Farmers' Fertiliser Cooperative Limited (IFFCO) was established in 1967 to produce and distribute fertilisers through cooperatives. Presently, over 40,000 cooperative societies are members of IFFCO.

The advantages of cooperative marketing are increased bargaining strength of farmers, direct dealing with consumers, credit availability, cheaper transport, storage, grading and processing facilities and market intelligence.

Agricultural Service Cooperatives: Cooperatives play an important role in disbursement of agricultural credit. These cooperatives have been aiming at increasing agricultural production through credit supply to agricultural producers, agricultural labourers, artisans, supply of agricultural inputs, arranging storage, marketing and processing of agricultural produce, arranging raw materials for industries and providing technical guidance, while promoting social and economic welfare. The Primary Agricultural Cooperative Credit Society (PACS) at the village level is the base for many of these activities. They federate into Central Cooperative Bank at the district level (DCCB) and further into Apex Bank at State level.

Allied Agricultural Cooperatives: These cooperatives cover activities like dairy farming, poultry, piggy, etc, but most of them suffered from inadequate financial and technical support and lack of coordination between and amongst production, storage and marketing.

13.5. Successful Cooperatives in India

In the first few decades after independence, the sector played a pivotal role in the economy, especially in respect of primary sector production. Maharashtra, for example, has been home to some successful cooperative movements in agriculture, with the strong emergence of sugarcane farming and sugar production cooperatives, as well as in consolidation of cooperative credit banking system. The dairy cooperative is another success story in India. The Anand model for cooperative milk marketing in Gujarat launched in the year 1946, with its well-recognized Amul brand, provided later the blueprint for replicating its success elsewhere under the National Dairy Development Board program, contributing to the success of Operation Flood.

In case of fertilizer production and distribution, the Indian Farmers Fertilizer Cooperative (IFFCO) controls over 35 per cent of the market. In the production of sugar, the cooperative share of the market is 58 per cent, while in the marketing and distribution of cotton it is 60 per cent. Cooperative sector accounts for 55 per cent of the production in the hand-woven textiles sector, whereas cooperative marketing and distribution channels account for 50 per cent of the edible oil market in India. Dairy cooperatives in India, operating under the leadership of the National Dairy Development Board (NDDB), collectively, are the largest producers of milk in the world.

Notwithstanding the significant gains made by the cooperative movement, the sector has of late shown signs of slowing down with several issues emerging. Unfortunately, the notable successes have remained limited to some apex groups, while most of grass-root cooperatives continue to remain fragile and continue to depend on outside agencies for their survival.

13.5.1. Major areas of concern⁵

a. Government interference: A major factor responsible for the poor performance of the movement was the lack of skilled/professional leaders on a scale proportionate with the considerable expansion that took place in the movement. Right from the beginning, the cooperative movement in India has been patronized by the government, which also provided a window for interference. Cooperative institutions were treated as if they were part and parcel of the administrative set up of the government making such intrusion an indispensable element in working of these institutions. In most of the cases the movement's independence and self-reliance existed only on paper. Though there has been some change in the attitude it has not been adequate. This has restricted the full blossoming of the cooperative movement of the people. Cooperatives have always depend on the governments for support, which has held this back from developing as separate independent entities. Also, often cooperative

⁵ Adapted from Das et al. (2006)

societies are enforced upon the people irrespective of their desire or willingness for such togetherness. This top down approach has only brought about increase in number of members, while compromising the cooperative spirit.

b. Mismanagement and manipulation: The essence of the cooperative movement is that it gives the farmers the status of shareholders and assures them of agricultural, educational and medical facilities. Over the years, this truly democratic idea got corrupted and farmers with larger holdings grew more powerful. A more disturbing trend, however, was the domination of co-operative institutions by group politics. Various other parochial interest associate into its vitals. The result was that either a society did not do much work or there was favouritism and nepotism in the grant of loans restricting the benefits to favoured members. There were instances where members of rival faction persuaded people not to repay their dues. Such narrow and sectoral interests have succeeded in causing more harm to the movement.

c. Lack of awareness: People are not well informed about the objectives of the movement, the contributions it can make in rebuilding the society and the rules and regulations of cooperative institutions. Members did not understand and appreciate the aims, objectives, and the possibilities of the movement. They joined a society only as 'clients of convenience' and deserted it after their needs were met. There was no genuine urge to develop the movement. People look upon these institutions as means for obtaining facilities and concessions from the government, and till such time as these expectations are met, they see to it that societies somehow continue to function. Lack of education, politics of the village, caste-ridden elections to the offices of cooperative societies, bureaucratic attitudes of the government officers, particularly, at the lower rank are some of the hurdles in diffusion of right information and spread of cooperative spirit.

d. Restricted coverage: The cooperative movement has also suffered on account of two important limitations in its working. One, is that the size of these societies has been very small. Most of these societies are confined to a few members and their operations extend to only one or two villages. As a result, their resources remain limited, which makes it impossible for them to expand their means and extend their operations. Two, most of the societies have been single purpose societies, rendering them unable to take a total view of the persons seeking help, nor be able to analyse and solve problems from different angles. Under these circumstances it has not been possible for these societies to make much progress. After all, an individual has multiple needs which should be recognized.

e. Functional weakness: The cooperative movement has suffered from inadequacy of trained personnel right from its inception. As a consequence, often co-operative institutions suffered with issues such as the lack of proper accounting, irregularities of loans, maintenance of records etc. Despite the introduction of training programme, the quality of staff in the co-operative institutions has failed to attain high standard of efficiency. Lack of trained personnel has been caused by two major factors. In the first place, there has been a

lack of institutional support for robust training of personnel. Secondly, because of unsatisfactory working of cooperative institutions, efficient and committed personnel did not feel sufficiently attracted or motivated towards them. The functioning of the cooperative societies, too suffers from several weakness. Some of these are, taking no care of the need of credit seekers or their repaying capacity at the time of granting loans, making no adequate provision for the return of loans, poor keeping of accounts, factional politics in its management, lack of coordination among various divisions of the cooperative structure, too much dependence on outside sources of finance, lack of adequate auditing, etc.

13.5.2. Factors ailing rural credit cooperatives

Considering the importance of institutional credit in the rural and agricultural sectors, the health of the rural credit cooperatives assumes importance. As of date, about 47 per cent of the farmers alone have access to institutional credit. Hence, some of the factors impairing the health & progress of rural credit cooperatives are discussed below:

i. Need for prudent interest rate policies

The cooperatives have the freedom to tailor their interest rates on both deposits and advances, in a manner that they are able to generate revenues for sustainability. In many cases, they exhibit unprofessional visional approach by borrowing at unsustainably high rates and lend in an imprudent manner without reference to cost of borrowing and profit margins. They need to be more prudent in this regard, such that they are able to build revenues and surpluses.

ii. Viability a question

Many primary agricultural credit societies are neither viable, nor potentially viable and are therefore not capable of offering production loans.

iii. Target-centric growth

A large number of primary societies have been established, without concern about their viability or quality of performance. Many a time, the state governments have not ensured adherence by these societies to the legal provisions of the State Cooperative Societies Act. There is compromise in respect of governance, lending, including transparency, audit, internal checks & controls, recovery of dues, recruitment of qualified personnel etc.

iv. Below par governance

State governments are the dominant shareholders, and this position is used to interfere where not needed. Board members of the societies need to be given the autonomy and security of their tenure, so that they can provide appropriate leadership and also be held accountable.

However, in some states where independent Election Commissioners for Cooperatives have been appointed, there is progress in respect of conducting fair elections.

v. Duality of control

As per constitutional arrangement, 'Cooperation' is a state subject governed by the respective State Cooperative Societies Acts. They contain the provisions relating to registration, incorporation, management, election and audits. However, aspects relating to banking activities are regulated and supervised by the Reserve Bank of India (RBI)/NABARD under the Banking

Regulation Act, 1949 (as applicable to cooperative societies). Banking functions need to be brought under the total control of the Banking Regulation Act, and let them override the provisions of State Acts/bye-laws/rules, when there is overlap or conflict.

vi. Loan policies unfavourable to the farmers

The cooperatives continue to lend crop loans to the farmers against the collateral of land and not the anticipated crop. Effectively, large number of farmers, particularly the lessees, sharecroppers, tenants etc. actually cultivating the land are left out. Even actual owners stand to lose sometimes, on account of ownership rights not being updated. Further, due to poor financial position, many societies tend to lend much below the scale of finance, thereby not fulfilling the full credit needs of a farmer.

vii. Favouring the better off

Many cooperatives have become 'a combination of the strong not for the weak but against them'. Theoretically, cooperative credit is supposed to be personal-credit based upon the character and repayment capacity of the cultivator; but in practice, it is the medium and large farmers who benefit more relative to the small & marginal farmers, who are in true need of credit.

viii. Partial approach to lending

A farmer who derives his income from both farm and non-farm activities needs credit for multiple activities. These include farming, dairy, irrigation, marketing, cottage industry, etc., but all these are treated in a mutually exclusive manner and the comprehensive credit needs of a rural family are seldom met.

13.5.3. Continued relevance of cooperatives in agriculture

The above-mentioned imperfections and weaknesses notwithstanding, the co-operative movement in India still remains an instrument with excellent potential for the economic and social emancipation of the poor and the weak. Some of the key areas where cooperatives can help and integrate the efforts for doubling farmer's income are:

- **Information and Farm Advisory Centre:** Cooperatives can play an effective role in providing extension and advisory services for crop cultivation and animal husbandry, fishery and aqua-culture.
- **Market Led Extension:** Cooperative personnel can be trained for linking farmer produce to the market.
- **Value Creation, Processing and Branding:** Individual farmers can be organized through cooperatives to go for value creation and brand building of their produce. Farmers can bring their produce to cooperatives for value addition and market integration.
- **Storage and Warehousing:** Warehousing of agricultural produce and inputs can be effectively done by the cooperatives as they present at village level and are in close proximity to the farmer fields.

- **Better Market Price Realisation:** Cooperative registered warehouse can act as a mandi (market) or hub for shifting produce, physical grading, cold-chains for perishables, etc. so that better price realisation of farmers produce is possible. Farm produce can further be assayed for export purpose.
- **Soil-Water-Seed-Fertiliser Testing:** Cooperatives can be provide accredited services for soil testing, water testing, seed and fertilizer testing, etc. This will help farmers get assured product quality for higher crop yields and also diversification of business cooperatives.
- **Farm Machinery and also Other Facilities for Custom Hiring:** Cooperatives can provide custom hiring services for farm mechanisation. They can also tender their services for farmers for transportation of their farm produce.

Agricultural cooperatives have long been the primary form of farmer communes; however over time, the cooperatives have had to experience too many limitations thus affecting their efficiency. Notwithstanding the significant gains made by the cooperative movement most notably in dairy sector, the concept has not proved much successful in case of agriculture produce. Illiteracy, geographic remoteness and lack of professional skills among farmers are major constraints in developing cooperative self-reliance. However, the cooperatives cannot be wished away.

It is well said that the answer to failure of democracy is offering more democracy. Similarly, in case of cooperatives too, the secret of success lies in infusing the movement with more dollops of cooperative spirit of right quality. Cooperatives have a place in all the sub-sectors of the broader agriculture sector, and at every stage of the value chain. The relevance is greater today, when the scale of efficiency can be brought in, only by mobilising small and marginal cultivators of land and release of livestock.

In order to promote the cooperatives, the approach has to be bottom-up, wherein people are able to identify their common interests and come together. The provisions of law should facilitate this without being unduly overbearing. The learning from Khaira District Milk Union, popularly known as Anand Milk Union Ltd (AMUL), is that the leadership was provided by a committed and pro-people Shri Tribhuvandas Patel and professional management came from Dr. Kurien. Any cooperative needs to be infused with a spirit of togetherness and commonality of interests; simultaneously it has to be run professionally, for which a competent personnel need to be brought in and given due independence to carry out the day to day activities.

The leadership needs to be an example of integrity and concern for society. In the words of Dr. Kurien, “I have often spoken of integrity as the most important of these values, realising that integrity – and personal integrity at that – is being honest to yourself. If you are always honest to yourself, it does not take much effort in always being honest with others”.

13.5.4. Reinvigorating cooperative credit institutions

Some suggestions are made in this regard which may be seen below:

i. Recapitalisation of all the remaining PACSs

A number of Committees set up by the government have submitted their report on improving the performance of the cooperative credit structure, the latest one being the Vaidyanathan Committee set up in 2004. Based on the latter's recommendations, the Government of India rolled out in January-2006, a package for revival of the Short-Term Rural Cooperative Credit Structure (STCCS). The Task Force also suggested wide-ranging reforms in the governance and management of STCCS including carrying out critical amendments to the respective State Cooperative Societies Acts. And these were to precede the recommended one-time capitalization jointly by the Central Government, the State governments and the STCCS of the state itself.

As against the above, 25 state governments signed the MoU with Government of India and NABARD. As on December, 2012, only 21 states had amended their respective Acts. Further, the status of amendments to the Rules and adoption of Bye-laws in respect of both State Cooperative Banks and District Central Cooperative Banks varies across the states and districts. A sum of Rs.9,003 crore was released by NABARD as Government of India share, while the state governments released Rs.855.33 crore as their share of recapitalization of 53,202 eligible PACSs in 17 states.

Recapitalisation assistance could not be released in many cases as the states did not complete all the necessary benchmark activities within the stipulated period. The stipulated period for settlement was three years in case of those who signed the MoU. Since, many PACSs have remained without the benefit of recapitalization due to various reasons, it is recommended, that the Central government may consider to take up this exercise once again giving a special window in respect of all states & UTs, which now wish to undertake recapitalization in respect of uncovered PACSs, subject to fulfilling the conditions laid down in the MoU.

ii. Licensing of rural cooperative banks

The Committee on Financial Sector Assessment (under the chairmanship of Dr. Rakesh Mohan) set up in 2006 recommended relaxation of norms in respect of cooperative banks, a large number of which were functioning without license. The relaxed norms were Capital to Risk-weighted Assets Ratio (CRAR) – minimum 4 per cent; and Compliance with CRR (Credit Requirement Ratio) and SLR (Statutory Liquidity Ratio) for the previous one year (default on one or two occasions were permitted). This relaxation helped many unlicensed banks to qualify and brought down the number of unlicensed banks from 73 as on 29-February-2012 to 23 as on 30-June-2013. There has been further progress thereafter. As on date, of the total of 33 State Cooperative Banks and 363 District Central Cooperative Banks, there are only 3 unlicensed District Central Cooperative Banks (DCCBs) in the country.

It is recommended that all the unlicensed banks as on date may be supported to acquire qualification for a license. This will help in further strengthening the credit structure in the areas served by these 3 District Central Cooperative Banks.

iii. Core Banking Solution (CBS)

The RBI has permitted State Cooperative Banks and District Central Cooperative Banks to participate in the payment system and offer RTGS/ECS/NEFT facilities to their customers. Many Cooperative Banks have adopted CBS either through NABARD assisted project or on their own. There still remain some State and District Cooperative Banks without CBS integration. They need to be brought onboard, and offer better services to the customers associated with the cooperative credit institutions.

iv. National Cooperative Development Corporation (NCDC)

In the recent four years, NCDC has shown substantial growth in lending to cooperatives. NCDC utilises internal accruals, market borrowings, including international assistance and allocations from Government of India to meet the credit requirements of cooperatives. In FY 2017-18, NCDC released nearly 22,000 crore of loans. The experience and strength of NCDC must be taken advantage of, to reach out and meet the credit needs of more cooperatives. A target of one lakh crore in lending by 2022-23 may be considered for NCDC. To service the training needs of cooperatives, the Laxmanrao Inamdar National Academy for Co-operative Research and Development (LINAC), has been initiated as a centre of excellence. Besides training, LINAC of NCDC should also assume the role of creating downstream institutional linkages for cooperatives.

13.6. Linking Cooperatives with Farmer Producer Organisations (FPOs)

Cooperatives being traditional in structure, lack linkages with buyers, input suppliers, etc., who are vital actors across the larger supply chain. This undermines long term sustainability of cooperatives. Thus came a new form of collectives called Farmer Producer Organisations (FPOs) to address the challenges faced by the small and marginal farmers, particularly those to do with enhanced access to investments, technological advancements, and efficient inputs and markets (Hellin et al., 2009). These collective efforts, evidently offer means for small and marginal farmers to contribute in the otherwise imperfect markets of the developing countries (De Janvry et al., 1991).

The basic purpose envisioned for the FPOs is to collectivise the small farmers for backward linkage for inputs like seeds, fertilizers, credit, insurance, knowledge and extension services; and forward linkages such as collective marketing, processing, and market-led agriculture production (Mondal, 2010). While cooperatives entail benefits to farmers via state intervention, FPOs are perceived to empower farmers through collective bargaining along with imparting an entrepreneurial quality to farming, which otherwise is practised as a subsistence, particularly by the small and marginal farmers.

Heralded as contributors to livelihood enhancement through provision of substantial gains beyond what is possible within the traditional farming context, FPOs that function as farmer producer companies, can leverage on the strengths of cooperatives to engage with the government on reforms in agriculture.

Government of India has initiated several measures towards this. The Small Farmers Agribusiness Consortium (SFAC) mandated by Department of Agriculture, Cooperation and Farmers Welfare, Ministry of Agriculture and Farmers Welfare, Govt. of India, supports the state governments in the formation of Farmer Producer Organisations (FPOs). Besides providing initial grant, it also provides venture capital assistance.

The initiative which started in 2011-12 under the two central sector **Schemes for Vegetable Initiative for Urban Clusters (VIUC)** and **Integrated Development** of 60,000 Pulse Villages in Rainfed Areas has expanded its scope and covers special FPO projects being taken up by some state governments under general Rashtriya Krishi Vikas Yojana (**RKVY**) funds as well as through the National Demonstration Project under the **National Food Security Mission (NFSM)** and **Mission for Integrated Development of Horticulture (MIDH)** (SFAC, 2017).

Box 13.2

Major services delivery by FPOs⁶ leverage the benefits of economics of scale for both production and marketing enabling more efficient production and better price discovery. Some of the major services that is being delivered are as follows:

- **Farm inputs:** The FPO buys essential inputs such as seed, fertilizer, pesticide in bulk and sells through its retail outlet. The inputs are sold to the members at a price which is far below the market price and thereby help the member farmers to reduce the cost of inputs.
- **Custom Hiring Centre:** To address the ever increasing cost of farming by small and marginal farmers many FPOs have established Custom Hiring Centres with assistance from Central/ State Schemes on farm machinery. The FPOs rent out machineries and implements to members at affordable cost (much below the cost charged by private players).
- **Output market linkage:** Many FPOs have succeeded in creating market linkages for their produce. FPOs have tied with major retailers for selling their produce and have succeeded in getting remunerative prices for their produce. Besides, many FPOs, with assistance from State Government, have established retail outlets for marketing their produce. Some of the FPOs have also gone ahead with value addition, processing and branding of their produce.

First few farmer producer organisations registered as companies (FPCs) were nourished by developmental Non-Government Organisations (NGOs), led by ASA and PRADAN in Madhya Pradesh. Under the state government's 'District Poverty Initiatives Program', FPCs were formed with the help of NGOs. In Gujarat, DSC and AKRSP formed FPCs of farmers

⁶ Farmer Producer Organisations (FPOs)-Pathways to link farmers to the value chain, Small Farmer's Agribusiness Consortium (Ministry of Agriculture and Farmers Welfare, Government of India)

they were working with. Bhartiya Agro Industries Foundation (BAIF) also established a producer company of mango and cashew growers in Vansda in south Gujarat. In few cases, such as Vishakhapatnam in Andhra Pradesh, an existing dairy farmers' cooperative converted itself into an FPC. Rangasutra was organised around the craft groups of URMUL in Rajasthan.

As on 31-March-2017, against a target of 7.40 lakh farmers to be mobilized 6.15 lakh small & marginal farmers have been identified and formed into 36,214 Farmer Interest Groups (FIGs). These FIGs have further been federated into FPOs and so far 586 FPOs have been registered and 152 are under the process of registration SFAC (2017).

Several State governments and NABARD are extensively promoting FPOs. However, the spread of FPOs is limited to selected region. Credit expansion across different regions and farm size classes would further help in enhancing efficiency of FPOs and upgrade their business running capacity. Integration with existing agricultural product value chains, deployment of ICT, professional management, demand led operations, etc. will impart greater efficiency to their operations.

13.6.1. Types of Farmer Producers Organisations (FPOs)

Farmers can be mobilised into farmer producers organisations (FPOs) through different instruments. These include:

- FPOs registered under Societies Act.
- FPOs registered under State Cooperatives Act.
- FPOs registered under Indian Companies Act.

FPOs registered under the Companies Act are called as farmer producers companies (FPCs). Various constraints relating to cooperatives in India have been discussed above. In order to negotiate such constraints and challenges, the Government initiated on forming FPCs. These are a hybrid that combine the strength of cooperatives and companies.

FPCs stand to benefit from the collective spirit of a cooperative society and management flexibility of a private company. It would, therefore, be worth it to promote FPCs in the interest of farmers and agriculture.

With the union budgetary announcement for the financial year 2018-19, that agricultural income of FPCs will also benefit from tax exemption under the Income Tax Act, they now stand on a level playing field vis-à-vis other FPOs. This was a long standing demand, which has come to be met now and removes the hurdle that FPCs were facing.

13.6.2. Promoting FPCs/Cooperatives in Private-Private Partnership (PPP)

Leveraging the initiatives of NABARD along with that of various government departments/schemes could be effective in promotion of FPOs. Corporates may be roped in so as to converge with various government programme of forming FPOs in various locations.

Corporates could facilitate these groups by linking them to private markets, warehouses, cold chains and mega-food parks. Large corporate houses can help in bringing latest technology and innovations at primary processing stage and facilitate the aggregation of raw material. This can then be linked to markets, including marketing online trade from the aggregation platform. Corporates could be important enablers for linking these collectives, including with the value chain of processing units, right from the stage of pre-production, through the production stage and finally upto the stage of reaching the consumers by forming the framework for action planning.

A good example like PPL FPOs is the initiative of Indian Society of Agribusiness Professionals (ISAP). Under various schemes, ISAP has set up around 50 Farmers' Producer Organisations (FPOs) and another 150 are under registration. These projects subscribe to a broad objective of mobilising farmers into groups called Farmer Interest Groups (FIGs), forming Farmer Producer Organisations (FPOs), strengthening farmers' capacity through training on agricultural best practices for enhancing crop productivity in sustainable manner, ensuring access to and usage of quality inputs and services, and facilitating access of the producer groups to fair and remunerative markets for marketing the crop produce as well as their value added products, where feasible.

BOX 13.3 Some cases of ISAP promoted FPOs

#	Schemes	Locations
1	National Food Security Mission (NFSM) Number of FPOs – 15 Number of farmers- 15000 Crops – Pulses & Cereals	Karnataka Raichur : Manvi, Lingasur, Devadurg and Raichur Maharashtra Aurangabad : Paithan, Aurangabad, Vaijapur, Kannad and Gangapur Telangana Adilabad : Bazarhathnoor, Jainath and Talmudgu
2	MP Special Project Number of FPOs –12 Number of farmers- 12000 Crops – Pulses & Cereals	Rewa: Gurh and Huzur Sidhi: Majhauri and Rampur Naikin Shivpuri: Shivpuri and Pohari Sheopur: Beerpur Guna: Guna and Bamori Hoshangabad: Piparia, Sohagpur and Bankhedi
3	Mission for Integrated Development of Horticulture (MIDH) Number of FPOs – 3 Number of farmers- 3000 Crops – Fruits & Vegetables	Bhiwani: CharkhiDadri, BawaniKhera, Bhiwani, Tosham, Siwni and Loharu Sirsa: Dabwali, Rania, Sirsa, Ellenabad, NathushriChopta, Odhan and Baragudha Jind and Kaithal: Jind, Julana, Safidon, Uchana, Alewa, Narwana, Pillukheda, Cheeka (Gulha), Kaithal, Kalayat, Pundri and Siwan
4	Producer Organisation Development Fund (PODF), NABARD Number of FPOs – 19 Number of farmers- 950 Crops – Milk & allied products and Vegetables	Amritsar: Chogowan, Jandiala, Rayya TarnTaran: Chohla sahib, Bhikiwind Gurdaspur: Dera Baba Nanak, Qadian Pathankot: Bamial, NarotJaimalsingh, Sujampur Kapurthala: SultanpurLodhi, Dhilwan, Kapurthala Karnal and Kurukshetra

#	Schemes	Locations
5	Karnataka Special Project Number of FPOs – 15 Number of farmers- 15000 Crops – Fruits & Vegetables	Gadag: Gadag Ballary: Hospet, Koppal: Koppal, Kushtagi Bidar: Humnabad Raichur: Raichur Yadgiri: Yadgiri Gulbarga: Aland Hassan: Channaraypattan, Belur Kodagu: Madikeri Dharwad: Hubli, Dharwad Haveri: Haveri, Hangal
6	Vegetable Initiative for Urban Clusters (VIUC) Number of FPOs – 2 Number of farmers- 2000 Crops – Vegetables	Ajmer : Peesangan and Sri Nagar

Source: <http://www.isapindia.org>

13.7. Annotation

Creation of farmer groups such as Cooperatives, Farmer Producer Organisations (FPOs), Village Producer Organisations (VPOs), etc., in which farmers are equal partners is very crucial for imparting efficiency of agriculture at various stages of the operation. They are particularly helpful in linking farmers directly with the markets and for scaling up post-harvest operations.

The aggregation of farmer into FPOs (Cooperatives/SHGs/FIGs/Company), augment their integration into the supply chain, and in taking up roles traditionally operated by market intermediaries. Strengthening the post-harvest logistics does increase the demand for farmers' produce and benefits them in a less direct manner.

The main advantage of strengthening the post-harvest logistics goes to those engaged in this business. No doubt, this does increase the non-farm income component in the rest of the economy. However, where farmers get involved in the post-production operations, a more direct benefit is extended. The most critical point in the entire supply chain of farm harvest, is the initial aggregation and preparation of marketable logistics loads, so as to efficiently connect with terminal markets of own volition. The benefits also depend on the extent to which the farmer is directly involved as a partner in the post-harvest activities and logistics. Unless the farmer is part of an FPO and/or a cooperative society, his share of the benefits is going to be rather small in terms of the remunerative price and/or enhanced sale of his produce.

FPOs have performed well in states like Maharashtra, Madhya Pradesh and Kerala; farmers there have been able to realise higher returns for their produce. But still most of the FPOs remain engrossed in addressing issues of technology infusion, crop planning, input supply and primary marketing. They are supposed to expand their roles further up the value chain, entering into post-harvest management, transport, storage and value added processing and engage in contract production of primary agricultural produce, for which cooperatives could play a very crucial role. Thus, linking FPOs with already existing cooperatives would facilitate aggregation and pooling of the output from farms and in establishing the market linkages, decreasing post-

harvest losses as well as optimising transaction costs.

It is also necessary to encourage FPOs into crop activity specific cultivation on contiguous parcels of land for better efficiency. To take advantage of higher scales of operations, there is need for FPOs to collaborate and federate into Village Producer Organisations (VPOs).

Chapter 14

Minor Forest Produce – Core of Tribal Economy

In pockets where the concentrations of tribal population is high and where they live in close relation with the forests, the gathering of non-timber forest products (NTFPs) and what are commonly called as minor forest produces (MFPs) contribute substantive income to the families. Simultaneously, agriculture in these regions is very difficult and the farm incomes are low. It is, therefore, important that gathering of MFPs is considered at par with agriculture and provided necessary environment for high level monetisation.

14.1. Tribal Society and Cultivation Practices

As per 2011 Census, the Tribal community population of the country accounts for 8 per cent. While the tribal population is spread across the nation's geography, the concentrated pockets mostly pan across the Central Indian, Eastern and North-Eastern States. In a number of eastern states like Jharkhand, Odisha and Chhattisgarh the tribal population goes up to as high as 23 per cent, and within these states there are districts with tribal community as the majority population. The social and economic life of these communities is woven around the forests, dwell as they amidst the forests.

In majority of such areas, not only is agricultural land not settled under individual ownership and continues as community owned land, the practice of agriculture is also not sustainable. Since agriculturally fertile land as the ratio of the total land in their dwelling region is less, the tribal society practices shifting cultivation along the slopes of hillocks which goes by different names like *jhum*, *podu*, etc. The practice in essence is slash and burn, where under the vegetation is put to fire during summers and the land is readied for raising millets and pulses. After raising the crops in successive years for about 3-4 seasons, they move onto the next hillock, to let the cultivated space rejuvenate. The cycle of such cultivation has gradually dwindled on account of growing population and restrictions brought under the Forest Act, making cultivation unsustainable.

The tribal communities gather different kinds of 'minor forest produces' (MFP) from the forest areas and this constitutes a major source of income.

14.2. Changing Forest Laws

Over the civilizational times, the traditional forest was a mixed forest that yielded a range of non-timber forest products (NTFP). These encompassed tree/bush borne oilseeds, fruits, flowers, roots, shoots, leaves, bark and herbs. They were the source of food and medicine, apart from constituting the ecology.

The rights of forest were entirely usufructs rights, which meant that there was no claim over the land. The Forest Act, 1927, changed the nature of relationship between the tribal society and the forests as the latter came to be notified as 'out of bound' for the tribal communities. With this piece of law, the tribal communities who had been living in symphony with forests for ages came to be rendered as trespassers. While this position continued for many decades,

including after independence, the provisions of the Panchayats (Extension to Scheduled Areas) Act, 1996, commonly known as 'PESA' made a favourable breakthrough in favour of the tribals. However, while the Act conferred the ownership of 'minor forest produces (MFP)', it did not define the term leaving a critical lacuna. In addition, no mechanism was provided for framing of rules at state level, so that a clear definition could emerge based on the local circumstances.

Another major deficiency of this Act was that the ownership of MFP was conferred on the Gram Sabha and not the NTFP gatherers. A favourable change in this regard was achieved through the Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006. This Act commonly known as Forest Rights Act was brought into correct the deficiencies of PESA. That, this Act confers the tribal-gatherers a legal ownership over the MFP is a positive measure in the relationship between the tribal society and the forests. With proper implementation of the provisions of this Act, the rights of tribals society can be well protected.

14.3. Issues relating to MFP

Over the period, large extent of MFP bearing forests have made way for timber plantations thereby reducing the availability of minor forest produce. The estimated value of MFP in raw form collected by the tribal communities is around Rs.2 lakh crore a year and these produces gathered by the tribals find their way for use in various pharmaceuticals, FMCG items and confectionaries. Various Forest Surveys have brought out that the canopy cover in many for various forest regions is need of restoration. In order to impart greater relevance to the legal right that Forests Rights Act, 2016 confers upon the tribal communities in respect of MFPs, it is important that these forests are developed comprehensively to improve the density and yield levels. It is estimated that if this is done the value of MFPs in raw form itself would multiply at least five to six times implying that greater income can be transferred to the tribal communities.

Apart from the need to develop these forest bearing MFPs, another challenge relates to capturing the value in favour of the tribal communities. This is akin to what a general farmer faces in case of the farm grown produces. It estimated that the MFP gatherers received not more than 20 per cent of the value of their produce and the major share is cornered by the middle-men. The gatherers are mostly dependent on weekly *haats* for marketing their produce.

Though there are state corporations dedicated to serve the marketing needs of the MFPs, they have not fully succeeded in transferring right value to the gatherers. The practices at the weekly *haats* are opaque and there exists no marketing system to ensure fairness & efficiency of transactions. The share of the gatherers in the consumer's rupee in case of MFP at 20 per cent is lower even than a horticulture producer's share, which stands at 50 per cent and is much lower than that in case of a cereal producer whose share is anywhere around 70 per cent. The challenge and answer to improving the incomes from MFPs in favour of the tribal communities lies in creating an efficient marketing structure that will remove intermediaries who do not add

any value, and thereby increase the share of the MFP gatherers in consumers' rupee to a minimum level of 50 per cent. Along with efficient marketing, other dimensions of monetization include logistics (storage, transportation etc.); and value addition which will further push up the share in the consumers' rupee. The scope for promoting value addition facilities in case of MFPs is vast.

14.4. Recommendations

- (i) It is necessary to recognize non-timber forest products (NTFPs) as a source of income at par with agriculture in case of the tribal communities and facilitate them to improve the practices of gathering MFPs. This requires proper training and orientation, use of appropriate mechanization process and harvesting practices.
- (ii) It would help to promote the self-help groups (SHGs) of the gatherers and provide them with a well-appointed place (drying yard, storage, primary processing support etc.) so that the small lots can be aggregated and traded more efficiently.
- (iii) The trading of MFPs can also be integrated with online agriculture trade platforms like e-NAM by developing needed standards, rates etc. and developing assaying labs. The provision for trading in MFP including online trading can become part of the State Marketing Act APLM or if the states feel necessary they may enact a separate Act on similar lines as that of Agricultural Marketing. The Act can be called as Minor Forest Produce Marketing (Promotion and Facilitation) Act. The Union Ministry of Tribal Welfare can develop and share Model Act and Rules with the states for adoption.
- (iv) Comprehensive development of the NTFPs may be taken up and funds available under various ongoing schemes like MGNREGA, Tribal sub-plans etc. can be used.
- (v) MFP value-system supported by integrated value-chain and supply-chain management may be put in place.
- (vi) Now that the government is promoting agro-forestry and bamboo under the National Bamboo Mission outside the forest areas, even these products can become part of the MFP value-system.

Chapter 15

Support Tools

The process of transformation of agriculture and re-positioning it as an income-yielding enterprise calls for certain tools that help measure the farm income, monitor performance in real time and forecast demand and price for an array of agri-commodities enabling the farmer to make rational production and marketing decision. This chapter deals with some of these needed support intervention.

15.1. Measuring of Farmers' Income

The progress of agriculture so far has been monitored more in terms of area coverage, production and productivity. There are no adequate mechanisms existing, if income changes are to be measured. There is no system of direct measurement of farmers' income at fixed intervals. This would be a sine-qua-non, considering that the strategy for doubling farmers' income is time bound. Even if there is no such time-bound target, it would help in annual measurement of farmers' income (farm + non-farm income) to evaluate the progress and make necessary interventions. This would be a very effective instrument in transitioning agriculture as an agri-business, besides serving as one of the important measures of farmers' welfare.

15.1.1. Measuring Farmers' Income – attempts so far

The attempts / approaches so far have not been direct and comprehensive in estimating the farm income. They have been largely based on point information, besides not being comprehensive on account of paucity of data and aggregation issues. The approaches adopted hitherto are:

- i. Farm business income from CACP data.
- ii. Aggregate and disaggregate farm income using CSO and NSSO data.
- iii. Income estimates based on Situation Assessment Survey (SAS) of NSSO

It is the estimates of this survey (SAS, July 2012-June 2013) that have been used by the DFI Committee in working out the base year (2015-16) farmers' income, and to estimate therefrom the needed annual growth rates to double farmers' income by 2022-23 (Chapter 6, Volume-II of DFI Report).

It would help knowing, that NSSO's SASs were carried out based on a sample survey in the year 2002-03 (59th Round) and 2012-13 (70th Round). While the 59th Round was called the situation Assessment Survey of Farmers' the 70th Round (July 2012 to June 2013) was called the SAS of Agricultural Households. Notwithstanding some variation between the two Rounds in defining the farmer / agricultural household, the respective estimates of income per agricultural households are comparable after suitable normalization. As per these Surveys, the total income per agricultural household grew at an annual rate of 11.75 per cent from Rs. 25,380 in 2002-03 to Rs. 77,112 in 2012-13. As a result, the income in nominal terms doubled in 6 years. When measured in real terms (after neutralising the effect of inflation), the annual income growth was 5.24 per cent.

A wholesome and accurate approach to monitoring of farmers' income calls for adopting a

standardised methodology. This has been examined by National Institute of Agricultural Economics and Policy (NIAP), whose concept note is enclosed as Annexure-III to this Volume. A standard approach to estimation of farmers' income would help in:

- quantifiable route to measure the changes over time and adopt corrective interventions;
- measure intra-farmer class income spread and move towards equitability; and
- measure inter-profession (agriculture vs. other sectors, as also national averages) income behaviour and move towards equitability

Regular surveys to measure farmer's income, having defined a farmer, is necessary and this should be taken up on a priority basis.

15.2. MIS Based Dashboard - Effective and Qualitative Implementation

There is surfeit of data collected at various hierarchical and horizontal levels by different divisions & organisations within the department / ministry, as also across the departments / ministries. Unfortunately, the data structure is not uniform. The architecture of Applications, Portals, Websites and other data / information collection points is not standardised. The result is isolated databases, that cannot talk to one another. Required, and possible today, is an effective tool for real time evaluation and monitoring of the performance vis-a-vis the laid out targets. An inter-operable and open source architecture will help in seamless integration through cross DB intelligence and use the power of big data analytics and its interpretation for visualising patterns & trends and delineating the messages.

An appropriately designed Management Information System (MIS), operated via dashboard, will serve as a command and control system. When installed on need to know basis, at various hierarchies – Gram Panchayat - Block/Taluk – District – State - National levels, it will provide for seamless sharing of data and information, and interpreted in a harmonised language and format. It is then possible to work for a shared vision, common mission and for universally accepted objectives & targets.

This will also facilitate an efficient and effective implementation at various levels. The quality of implementation has always remained an issue. MIS will help in adopting outcome based implementation strategy, so that one is monitoring beyond quantitative targets of works and expenditure. It is possible to adopt key performance indicators for each of the programmes & projects and monitor their progress from a qualitative perspective.

15.3. Rationalisation of Organisations

In response to specific needs arising from time to time, several organisations have come up over the years. They may be within an individual department or ministry or outside. These organisations are generally in the nature of autonomous bodies, attached offices, corporations, boards and directorates.

There are overlaps in mandates across these, leading to not just duplication, but at times also leads to cross-purpose work or differing messaging. This is in addition to the avoidable establishment costs on men and material.

Within the Ministry of Agriculture itself, there are several such organisations under each of its three (3) departments (DAC&FW, DAHD&F and DARE/ICAR).

15.3.1. Restructure, Reorganise, Re-mandate

From the stand point of improving the efficiency and effectiveness of service delivery for the farmers, it would be useful to undertake an exercise that will lead to restructuring & reorganisation, as also re-mandating of various organisations / institutions / divisions within the Department / Ministry of Agriculture to address the current and future needs of India's agriculture. In doing so, the Ministry will stand to benefit from deriving optional outcomes from its organisations at both individual and collective levels.

As an illustration, there can be supplementary work relationship between the Directorate of Crops (now under Crops Division of DAC&FW) and Directorate of Plant Protection (35 units of CIPMCs, 6 units Locust Forecast Centres) under the Plant Protection Division of DAC&FW). The Crops Division which monitors the crop situation across the country can benefit from inputs from PP Division. A synergy is possible if the two Directorates are able to work in close coordination.

Further, from the cost-saving perspective, the two Directorates may find it useful to share their infrastructure. Sometimes, the two Directorates are located in two different buildings at the same location. A physical integration through sharing of buildings will help in sharing and supplementing / complementing each other's work, besides offering the farmers and other stakeholders a single window service facility.

Taking another case of probable overlap in mandates, the Directorate of Extension and MANAGE (National Institute of Agricultural Management and Extension) need to have well defined roles and responsibilities for maximising their reach in terms of extension research, knowledge and diffusion. While these two are under the Division of Extension of DAC&FW, there is NIAM (National Institute of Agricultural Marketing) under the Marketing Division of DAC&FW. There is some amorphousness in marketing domain between MANAGE and NIAM. At the least, there should be sharper clarity for greater coordination.

The DMI (Directorate of Marketing and Inspection), an attached office of the DACFW, is another appropriate candidate as an example of the suggested restructuring, reorganisation and re-mandating. DMI was set up in the year 1939 with a primary mandate to support market inspection. It now maintains the AGRIMARKNET portal, AGMARK standards and laboratories. It is more of a regulatory body. Over the period, some sundry activities have been assigned to DMI like inspection of storage godowns under the DACFW's ISAM. The organisation hosts several field units and laboratories across the country and is manned by well

qualified personnel with domain knowledge in agricultural Marketing, chemistry etc.

As discussed in Chapter 9 of Volume IV and chapter 4 of this Volume, demand and price forecasting are essential to help the farmers with information on these two important aspects of marketing. There is thus a need for setting up an institutional mechanism for this, which DMI can handle after subjecting it to suitable restructuring and reorganisation. The DMI can further be supported in this respect by CACP (Commission on Costs and Prices) and DES (Directorate of Economics and Statistics), both working in the Ministry of Agriculture itself. DES collects cost of production data for CACP to examine and recommend MSPs for 25 commodities. DES also monitors area and production statistics for various crops and releases 4 Advance Estimates and 1 (one) Final Estimate of area and production. An institutional mechanism can bring all these 3 institutions along with the Price Monitoring Systems of the Department of Consumer Affairs to offer to the farmers' price and demand forecast based signals. This will form the basis for a rational decision by the farmers.

Going beyond a single department or ministry, one finds that there are a plethora of institutions, whose output can be utilised for agriculture sector. But there is no institutional arrangement to build conduits across these and create a common pool of knowledge.

Taking the case of Public Extension Service providers under different departments and ministries of Government of India alone, there are as many as 68 institutions. In addition, there are at least 22 number of inter-governmental institutions; and many at the state level too (refer Annexure II of Volume-XI). All these are concerned with the farmer in one or more of his activities. The challenge of governance, therefore, is to bring about coordination and convergence among them in optimal service of Indian agriculture. Re-mandating some of these organisations to meet the current challenges is useful.

The DFI Committee, therefore, suggests that a Group from within the Ministry of Agriculture may be set up to study and make suitable recommendations on:

- i. Building a conduit among various institutions, so as to reconcile their services and optimise delivery at the level of department, farmers and other stakeholders.
- ii. Identifying institutions that need to be strengthened or restructured, reorganised, re-mandated and relocated.
- iii. Promoting single window services.

If such an exercise is taken up by the states too, greater efficiency can be achieved. While doing so, the supplementary relationship and partnership focus among national and state level institutions may be kept in mind.

15.3.2. Divisions within Ministry of Agriculture & Farmers' Welfare

As laboured through the preceding Volumes of this Report, the approval advocated is to transform agriculture into agri-business, for bringing focus on management of agriculture as a

professional and profit making enterprise. This entails enlarging the attention of the policy makers and implementing agencies beyond the production segment. Though changes are visible over the last few years, much sharper and focused emphasis is necessary.

The need is to reorganize some of the Divisions so as to bring into focus some new aspects like agri-logistics, investments for capital formation, primary processing etc. while a comprehensive exercise may be needed, some following suggestions are made:

(i) **Division of Marketing and Agri-logistics:** Presently, the Division of Marketing in DAC&FW does not concern itself much about the varied aspects of agri-logistics except for dry storage. Other aspect like cold storage and transport is dealt by the Division of Horticulture and the overall policy is not coordinated at any single point of decision. For effective promotion of a restructured market system and -logistics, one of the Divisions needs to be mandated with policy formulation and coordination, even when different segments and its implementation are the subject domains of other Divisions. It is, therefore, suggested that the Division of Marketing be reorganised as 'Division of Agricultural Marketing and Agri-logistics'.

(ii) **Division of Investments and Secondary Agriculture in DAC&FW:** Now, there is a Division of RKVY-RAFTAAR, that handles the allocations under RKVY. This is a scheme that promotes strategic investment in production and post-production investments. As recommended in Volume-II, the importance of capital formation in accelerating the growth of agriculture has been highlighted. There is an urgency to scale up the magnitude of investments under public and private sectors. It is suggested that Division of RKVY is upgraded as the 'Division of Investment and Secondary Agriculture'. It may be mandated to draw up policies for promoting Gross Capital Formation (GCF) in agriculture, and coordinate with different Divisions and various departments and Ministries, so as to deliver convergence where needed and optimisation of investments. This Division may also look after promotion of enterprises linked to agriculture, i.e. secondary agriculture.

(iii) **Division of Investments and Secondary Agriculture in DAHDF:** As mentioned in case of DAC&FW, a similar division on investment and secondary agriculture, is recommended in the Department of Animal Husbandry, Dairying & Fisheries, which will focus on livestock sector.

(iv) **Division of Crops and Primary Processing:** The Division of Crops majorly focuses on production activities. Considering the need for capturing the value from agri-commodities, the Division may be restructured as the 'Division of Crops and Primary Processing' to bring focus on primary processing of the harvested produce at farm gate level. Additionally, the Division should also concern itself with grain storage and small storage systems at individual farm level. For this purpose, the Division may need to coordinate with erstwhile Division of Marketing, as also the Division of Horticulture.

There are a few examples, and a diligent exercise by the Departments will help in positioning

their existing Divisions to meet the new requirements arising from income based approach to agriculture.

15.4. Reforms and Ranking – Ease of Doing Agri-business

As well recognised by now, the reforms and liberalization story of India's economy that begins in 1991 has left out agriculture sector to a large sector. Nevertheless, there were some good initiatives taken as well, in agricultural marketing (Model APMC Act, 2003 and Model APMC Rules) and agricultural trade (removal of stock limits under control orders in 2006). However, the agriculture sector still needs to adopt comprehensive reforms with a view to ease:

- (i) Pooling of land
- (ii) Mobilisation of farmers
- (iii) Promoting marketing efficiency
- (iv) Developing logistics infrastructure for market connectivity
- (v) Making available inputs that are low in cost and high in quality

The reforms and modalities involved are many and these need to continue to evolve over time, to remain in context with other developments.

15.4.1. Suggested Basket of Reforms

15.4.2. To promote land pooling

- i. Adoption Land Lease Act
- ii. An Act to facilitate licensing of land cultivation

15.4.3. To promote farmers' pooling

- i. Contract Farming and Services Act
- ii. Farmer Producer Organisations (FPOs)

15.4.4. To promoting market efficiency

- i. Adoption of Model APLM Act, 2017
- ii. Agri-value system platform
- iii. Strengthening of primary Rural (grameen) Agricultural Markets (GrAMs)
- iv. Strengthening of unified National Agricultural Market – online trade
- v. Strengthening decentralised procurement – adoption of 'Market Assurance Scheme (MAS)' and other measures.

All the above basket of reforms vide paras 10.5.1, 10.5.2 and 10.5.3 have been discussed in detail in different Volumes and chapters – mainly Vol. III, IV and XIII-A, may be referred.

15.4.5. Liberalisation of input supply

Apart from land, other important inputs that are important in the production system are seeds, fertilizers and pesticides (both chemical and biological). They need to be made available to the farmers in right time, in right form / formulation, in right quality and at right rate. In fact, these

three inputs account for a bulk of cost of cultivation. Their production / manufacture, therefore needs to be competitive, so that multiple options are available to the farmers. Today, both cost and spuriousness have become a cause of concern. The laws relating to registration and licensing in respect of these 3 inputs are as follows:

- i. Seed Act
- ii. Fertilizer Control Order
- iii. Insecticide Act

All 3 of these pieces of legislation need to be reformed in farmers' interest. They have been discussed in chapter 6 of this Volume.

15.5. Ranking of States

Competition can bring in a healthy spirit of achieving excellence and performing better than others. The “Ease of Doing Business” ranking of the World Bank at global level has demonstrated, that nations tend to compete and perform better. Within the country too, the “State of States” ranking by India Today magazine has introduced an element of healthy competition. The Prime Minister’s Civil Services Awards by evaluating the performance of Districts in respect of Government of India’s flagship schemes has also proved, that healthy competition can trigger change.

The NITI Aayog has identified five states and 200 districts that are lagging in terms of development, based on five domains including agriculture. In order to enhance the overall economic growth of the country on a sustainable basis, the NITI Aayog recommends special focus on these identified states and districts. The NITI Aayog is aiming at live competition for all the stakeholders based on measureable achievements in respect of the five domains. This initiative is also with the rationale that competition will bring out the best among all the stakeholders and lead them into better performance than hitherto.

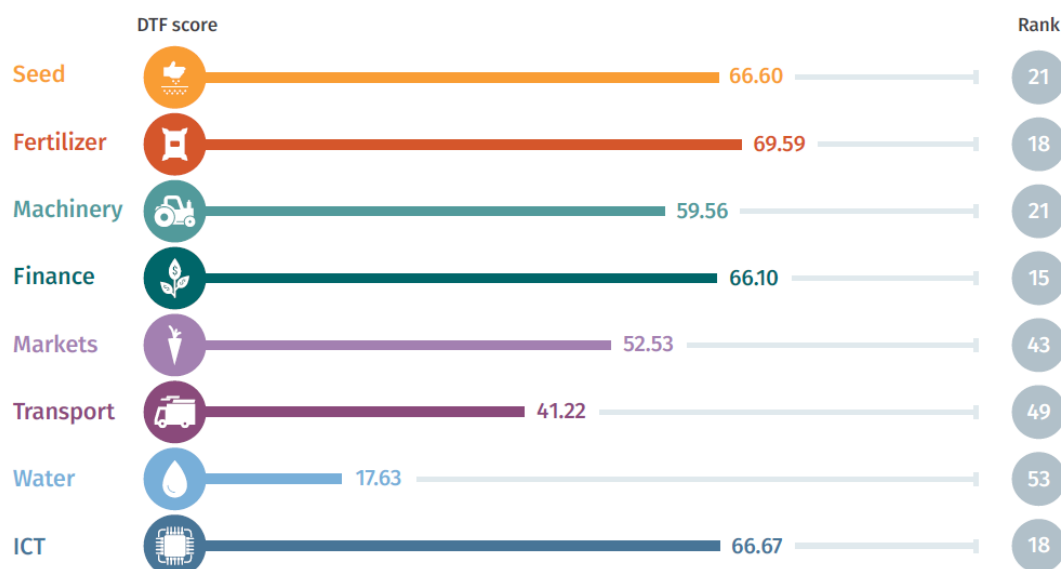
On similar lines, it is suggested that inter-se ranking of all states and UTs may be taken up on an annual basis on “Ease of Doing Agri-business”. A quantifiable, parameter based evaluation of states and UTs vis-à-vis the reforms done during the year to effect simplification of procedures, transparency, objectivity, etc. may be adopted. Such recognition itself is expected to position the states appropriately and help them attract investments. However, care must be taken to build an evaluation scale that is agreeable to all parties and is conducted by a third party in a credible manner.

15.6. Annotation

The EBA Project of the World Bank Group, refers to the assessment of data from various countries, on laws and regulations that impact the enabling business environment for agriculture. Commenced in 2013, the project has released three reports on ‘Enabling the Business of Agriculture’ (EBA). The EBA2017 report covers a total of 63 countries and included India for the first time. The report studied 12 core topics that relate to ease of business

in agriculture and assigns scores on each. In case of India, four of the topics, land, livestock, environmental sustainability and gender, were not scored. However, of the remaining eight, the EBA2017 shows that in areas of markets, transport and water, India scored poorly, mostly in the bottom 20. In the other areas, India scored comparatively higher, ranked among the top 21.

Figure 15.1 EBA-World Bank: India snapshot



Source: World Bank. *Enabling the Business of Agriculture 2017*.

Assessments such as these, offer relevant insights on the areas that should be find strategic focus and resources to improve the overall agricultural value system. The EBA2017 report indicates that at a national level, irrigation, marketing and logistics are the domains, that demand more focused investment for the betterment of Indian agriculture. A similar state-wise assessment, will also help bring attention to drive holistic development.

Key Extracts

- A harmonised standard of measure of farmers' income, needs to be formulated and adopted, for more wholesome and accurate monitoring.
- An MIS system, interoperable which outputs a centralised dashboard is recommended. In current situation, data structure is isolated, duplicated and no standardised.
- There is urgent need to restructure, reorganize and re-mandate the various agencies & institutions, especially with purpose to converge and share the targets, efforts and resources. This will enable outcome based, resource use efficiency in governance.
- The identified gaps in the agricultural value system, such as in agri-logistics, capital formation, market value capture, etc., require a comprehensive reorganisation of Divisions within DAC&FW.
- Reforms must enable and promote Ease of Doing Agri-business. A State and UT ranking system for the purpose is recommended.

Chapter 16

Operationalising DFI Strategy - An Empowered Body

The process of transformation of agriculture and re-positioning it as an income-yielding enterprise calls for focused inter-ministerial coordination and constant monitoring. Further, regular stewardship will be required, to re-orient and support both the policy formulation and the implementation apparatus to achieve the desired outcome in a time-bound manner.

16.1. Setting a New Course for Agriculture

The Prime Minister of India has, in sharing a new vision for the farmers of the country, laid out a challenge, to double farmers' income by the time the country celebrates its 75th year of Independence in 2022. This challenge, though on the face of it, targets primarily the farmers, it in reality touches all Indians. For everyone, including the consumers, are affected by the status of agriculture and financial health of the farmers. The target is achievable with a good strategy, well-designed programmes, adequate resources and efficient governance framework for implementation.

The strategy is discussed in the various volumes of this Report, including making specific recommendations in Volume XIV. New interpretations have been tabled by this Committee by redefining various concepts that were in vogue for long. Many of the policies & programmes that can support the DFI strategy are in place, and will serve the purpose better with appropriate changes. And, there is need for new ones too. It is in this context, that certain recommendations have been made to restructure the existing ones, including the governance mechanism, and also adopt new ones as needed. It is also important, that the available resources are prioritised and the strategy does allow to suitably improve upon the capital and resource use efficiency, as efforts are made to channel additional resources by creating a stake for multiple agencies.

The vision requires a grass root level shift in the attitude towards agriculture, in all citizens of the country, including among farmers and in the government agencies at different levels of hierarchy. The DFI Committee in its discussions felt that there is an urgent need to bring about a mind-set change amongst all stakeholders. What logically follows is the usefulness of creating a dedicated 'Centre-Point'. Otherwise, with diffused responsibility, the historical agenda that seeks to bring about a farmers' income revolution, can get lost. Sometimes, it may be a situation of missing the wood for the tree. The DFI Committee through its multi-stakeholder consultations, intra-committee deliberations and dissection of the complex agricultural value system was drawn to a logical conclusion, that the DFI strategy implies "Farmers' Income Revolution".

The agriculture sector needs an overhaul, and not just a transformation, if farmers' income is to be enhanced substantively and consistently. This makes a case for a change in the narrative, that the time has come to transcend from 'Green Revolution' to 'Income Revolution', to give meaning to a comprehensive change. Green revolution, with its major emphasis on production attempts, is only a partial treatment of the agricultural sector. Income revolution impresses upon production through productivity, sustainability, marketability and an orientation shift

towards farmers' income as outcome.

Agriculture is a large field, that cuts across multiple disciplines and domains. The vast number of recommendations listed in this Report, especially those requiring coordination and convergence among the disciplines, may get mislaid without appropriate guidance. The Committee observed, that the valuable recommendations of various commissions and committees, tend to get lost when translating into implementation, not just in agriculture but elsewhere too. The loss may be attributable to various factors including the absence of a dedicated centre-point to shoulder the responsibility and drive the mandate into actuality.

In reviewing the array of interventions that are planned for agriculture, it is amply clear, that **land is no more the principle laboratory where the change has to be initiated. The new lab to effect change is the mind, and the market is the new theatre of operations.** To reiterate, a complete overhaul and not mere tinkering with the approach is required. It is apparent, that there is need to direct ardent efforts that will advocate this required change in thinking among farmers in their demands, scientists in their endeavours, market actors in their operations, and of course the policy formulation apparatus in its approach. The governance system will also require a paradigm shift, and adopt an orientation that is outcome linked.

It is common experience, that the administrative machinery is many a time held responsible for poor implementation. Integrity of implementation is as important as tailoring a comprehensive policy and structuring field-appropriate programmes. The challenge gets more daunting, when it is a complex and risk-prone enterprise, like that of Agriculture. The task gets further uphill, when it is to be implemented for 120 million farm families living across a vast geography. That, agriculture is a state subject and calls for partnership between Centre and States/UTs (as many as 35) is another facet that needs to be factored in. Hence, there is the need for an 'Empowered Body' led by an adequately senior person & supported by a small team of professionally competent resources; and appropriately empowered. This 'Body' is not to substitute the existing system, but to own bottom line responsibility for carrying forward the roll out of the DFI strategy. It shall be the Department of Agriculture, Cooperation and Farmers' Welfare, that anchors the implementation of DFI strategy. In this capacity, DAC&FW shall coordinate with and enable synergy of efforts of all other concerned departments / ministries who are to translate all their specific recommendations into action, just as it acts upon its own set of recommendations.

16.2. Empowered Body

However, the officers down the line beginning with Secretary of the Department/Ministry are extremely occupied with multiple and administrative tasks. They may hence be challenged, by both time and the mind space needed to create the implementation framework vis-a-vis the recommendations. An 'Empowered Body' can build such a framework and offer the needed support system to the principle stakeholders, namely, the DAC&FW and other Departments/ Ministries. As an illustration, one of the DFI recommendations is to popularise the post-harvest interest subvention based loans. This will call for development of 'Guidelines' and an

‘Operational Strategy’. The Empowered Body should be able to meet this requirement. Similarly, Model Rules following the adoption of Model APLM Act, 2017 and Model Contract Farming & Services Act, 2018 will need to be developed. The DFI Report contains several such recommendations, that need close attention, but may be difficult for the Ministries / Departments to allot the required time. It is the Empowered Body, that can own such additional responsibilities and provide the much needed ‘reform and restructuring support’.

16.2.1. Role and responsibility of the Empowered Body

The proposed Body housed in the Ministry of Agriculture and Farmers’ Welfare will require to coordinate directly with Secretaries of various ministries and departments, centre and state. The following roles & responsibilities are suggested to be assigned:

- i. Develop necessary Acts, Rules and Regulations for the concerned ministry/department, so as to assist states and the centre to fast track the required restructuring and governance reforms.
- ii. Draft executive orders and guidelines for the concerned ministry/department, that will help ease specific bottlenecks in implementation of programs and in executing the support planned by the government.
- iii. Help undertake necessary capacity building and advocacy, to build a greater understanding among general public, polity, academia and farmers, on the related set of changes they need to incorporate in their approach towards agriculture.
- iv. Coordinate between and among ministries/departments to help bring about a convergence in the financial resources deployed, for greater resource use efficiency; and synergy of efforts. This can be initiated for selected activities and regions, at first instance.
- v. Prepare the schedule and monitor the data on income status of farmers on an annual basis.
- vi. Suggest interventions needed for course correction in policy or implementation, which need may arise, as the agricultural system undergoes transformation.

The DFI Committee views this ‘Empowered Body’, by whatever name it goes, as the final necessary resource centre. It would be expected to study the recommendations and the logic behind them, and provide a comprehensive support to the implementing ministries and departments.

Since the suggested ‘Body’ is expected to coordinate, monitor, guide and mentor the efforts of multiple ministries and departments, for driving an income revolution for the farmers in the country, it should be constituted at an appropriate level and in a format that is enabling.

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Annexures**Annexure-I****System of Collection of Agricultural Statistics and Crop Forecast**

For every agricultural year (July-June), the Directorate of Economics & Statistics (DES), Department of Agriculture, Cooperation and Farmers Welfare, Ministry of Agriculture and Farmers Welfare releases four Advance Estimates (AE) followed by Final Estimates of production of major agricultural crops of the country. Each of these five estimates are available State-wise and at the national level for the 27 identified crops. The time of release and period covered under each of these estimates are as under:-

- The First Advance Estimates are released in September. These cover only Kharif crops, when Kharif sowing is generally over.
- The Second Advance Estimates are normally released in February, the following year when rabi sowing is also over. The second advance estimates cover kharif as well as rabi crops. They take into account; (i) firmed up figures on kharif area coverage; (ii) available data on crop cutting experiments for yield assessment of Kharif crops and (iii) tentative figures on area coverage of rabi crops.
- The Third Advance Estimates incorporate revised data on area coverage for rabi crops and better yield estimates of Kharif crops. These are released in April-May.
- The Fourth Advance Estimates are released in July-August. By this time fully firmed up data on area as well as yield of Kharif crops and rabi crops are expected to be available with the States. As such, Fourth Advance Estimates are expected to be very close to the Final Estimates.
- Final Estimates are released about seven months after the Fourth Advance Estimates in February of the following year. This allows sufficient time to States to take into account even the delayed information while finalising area and yield estimates of various crops.
- No revision in the State level data is accepted after release of Final Estimates.

2. The agricultural estimates at all-India level are prepared on the basis of crop-wise data on area, production and yield furnished by State Governments. For this purpose, the State Governments have designated one of their Departments viz. Departments of Agriculture/Land Records or Directorate of Economics & Statistics as State Agricultural Statistics Authority (SASA). SASAs finalize State level estimates on the basis of district-wise data on area, production and yield. At district level, there is a system of effective collaboration between the officials of SASA and Revenue Department.

3. The district level estimates of production of different crops are obtained through multiplication of area coverage and average yield of respective crops in a district. For assessment of area coverage, a comprehensive system has been laid down in each State/UT.

Under the above system, the primary worker of Revenue Department i.e. Patwari/Lekhpal visits each field/survey number and records the crop sown and area during Kharif as well as Rabi seasons. For this purpose, a sample of 20% villages is selected in such a way that over a period of 5 years all the villages in a State/UT are covered. For each of the 20% villages selected in the sample for a particular year, the Patwari prepares a Village Abstract indicating total area under different crops in the particular village. The area figures are progressively added over blocks/circles/tehsils/district to arrive at total crop composition in the sample villages in a district. This multiplied by 5 gives the crop-wise area estimates in the particular district.

4. For assessment of crop-wise yield, the Crop Cutting Experiments (CCEs) are conducted under the General Crop Estimation Surveys (GCES) of States/UTs. The CCEs are also conducted by the Revenue Authorities. The number of CCEs for a crop are in proportion to the area under different crops in a district. A district having 80,000 hectares or more area under a particular crop is considered as a major district for the crop. Even if the area under the crop in a district lies between 40,000 hectare to 50,000 hectare but it is higher than the average area per district for the crop in the State then also the district is considered as a major district for the crop. All other districts are considered as minor districts for the purpose of conducting CCEs in a particular crop. Normally, in a major district 80 to 120 CCEs and in a minor district 44 to 46 CCEs for a crop are conducted.

5. For CCEs, a multi-stage stratified random sampling is adopted. Tehsils within a district are considered as strata and villages within tehsils are taken as first stage sampling units. After preparing the list of survey numbers with the specified crop in a selected village, two survey numbers are selected as second stage units for conducting CCEs. In each of the two survey numbers selected, an experimental plot of specified size is earmarked and the crop within the specified plot is harvested to arrive at the yield per hectare for the plot. The average yield of all the CCEs on a crop in the particular district is taken as the yield for the district. The CCEs are conducted in the villages selected from within the 20% villages identified for area enumeration. Out of total 1,20,000 villages selected for area enumeration in a particular year, a sample of about 10,000 villages is selected for checking/supervision of area enumeration and conduct of CCEs by the staff of SASA, Agriculture Department and National Sample Survey Office.

6. While finalising all-India level estimates, the crop-wise data on area, production and yield received from State Governments are thoroughly scrutinized on the basis of information from alternative sources on area, production and yield such as Mahalanobis National Crop Forecast Centre (MNCFC) and Institute of Economic Growth (IEG) under Forecasting Agricultural output using Space Agro-meteorology and Land based observations (FASAL) Scheme, rainfall conditions, previous crop-wise trends of area, production and yield in the respective States as well as commodity-wise trends in prices, procurements etc.

7. Thus Government has a well-established system of regular assessment of production of major agricultural crops in the country on the basis of reports on area, production and yield of major agricultural crops received from State Agricultural Statistics Authorities (SASAs) in

various States/UTs. This system allows the Ministry to get an assessment of State-wise area, production and yield of major crops within the shortest time after the sowing of crops in a season is over. Thus, Government is in a position to take policy decisions regarding import, export, procurement, etc. of agricultural commodities. The very purpose of having a series of four successive estimates during the year is that the estimates of agricultural production in the country may be refined and improved as the year progresses and better, firmer data on sowing and yields become available. However, though the estimates are periodically revised, the preliminary estimates for kharif released, in September, and those for rabi, released in February, can be used for policy decisions related to import, export and pricing.

Annexure-II**NOTE ON HORTICULTURE STATISTICS****Coverage:**

Horticulture sector covers wide range of sub-sectors viz. fruits, vegetables, spices, floriculture, aromatic and medicinal plants, honey etc. Government is maintaining the data for about 161 major crops.

Relevance of Horticulture Statistics

Horticulture, which has gained commercial importance in the recent years, is an important component of Agriculture, having very significant share in the economy of the country. India has the advantage of diverse agro-climatic conditions which enables it to produce a wide range of horticultural crops round the year. The horticulture crops also provide better alternative for diversification of Indian agriculture in view of higher return. It plays an important role in country's nutritional security as well, including poverty alleviation and employment generation.

Present Status of Horticulture Data

At present horticulture data is available in respect of area and production. Multiple agencies like Department of Agriculture & Cooperation through State Horticulture Department; Directorate of Arecanut & Spices Development (DASD) for Arecanut and spice Crops, Directorate of Cashewnut and Cocoa Development for Cashewnut and Cocoa and Honey Board for honey are involved in collection/ compilation of this data.

While the estimates of area are based on Girdawari and on the basis of input supplied etc., estimates of production are based on eye estimation, oral enquiry from farmers, productivity norms as calculated by GCES, Crop estimation survey- Fruits & vegetables (CES-F&V). Estimates so prepared are consolidated by the Horticulture Statistics Division of DAC and approved by a Review Committee under the Chairmanship of Principal Adviser, Department of Agriculture and Cooperation, Economic and Statistical Adviser, DAC&FW, Joint Secretary (MIDH), DAC&FW, Horticulture Commissioner, DAC&FW, Managing Director, National Horticulture Board, DG, CSO and Adviser (Hort) DAC. as members. The Schedule of Release of data is as under:-

Estimates	Date of finalization	Date of receipt of data from States/UTs
<ul style="list-style-type: none"> 1st Advance Estimates of the current year Final Estimates of previous year 	15 th January	10th December
2nd Advance Estimates of Current Year	15th May	1st May
3rd Advance Estimates of Current year	31st August	10th August

Methodology

As at present there is no uniform methodology followed by the State Horticulture departments for estimating area and production of horticulture crops, it is pertinent that the alternative methodology developed by IASRI, on the recommendations of National Statistical Commission, is tested on pilot basis in 6 states. It would facilitate in improving the area and production estimates of horticultural crops and once the testing of the methodology is completed and is found to be reliable and cost effective, it could be considered for replication in all the States / UTs of the country.

NEW INITIATIVES TAKEN by the HORTICULTURE STATISTICS DIVISION**1. CHAMAN: (Coordinated programme on Horticulture Assessment & Management using geoinformatics):**

- **This is a new technological initiative taken by this Division using the Remote Sensing technology and Sample Survey Methodology for development of sound methodology for assessment of Horticultural crops.** This Project was launched during September, 2014 and expected to be completed by March 2018 at an estimated cost of Rs. 13.38 Cr. The programme has the objective to develop and firm up methodology for estimation of area and production under horticulture crops using “Remote Sensing Technology” and “Sample Survey Methodology”.
- **Remote Sensing Methodology:** The programme is implemented by Mahalanobis National Crop Forecast Centre (MNCFC). Under this component 7 major crops, viz. Banana, Mango, Citrus, Onion, Potato, Tomato and Chilli are being covered for Area and production assessment in 11 major producing states. Besides this Geospatial Applications studies are being conducted for Horticultural Development and Management Planning and detailed scientific field level studies are being conducted for developing technology for crop identification, yield modelling and disease assessment, through Remote Sensing. The states covered are Tamilnadu, Andhra Pradesh, Maharashtra, Gujarat, Karnataka, UP, MP, Bihar, Punjab, West Bengal and Odisha.
- **Sample Survey Methodology:** This component is implemented by the Indian Agricultural Statistics Research Institute (IASRI) as “Study to test the developed alternative methodology for estimation of area and production of horticultural crops”. Under this component IASRI is covering all major fruits and vegetables in is making the assessment using sample survey methodology in Five states viz.: Karnataka, Tamil Nadu, Andhra Pradesh, Himachal Pradesh and Maharashtra.

2. HAPIS: Horticulture Area and Production Information System: Under this initiative the Division launched a program called HAPIS, with the help of NIC in Feb, 2015 for collection of Horticulture Area, Production statistics from states online. The system provides online interface to enable crop-wise data in respect of horticulture crops, flow from block to district, district to states and there-on to the centre after consolidation, validation and verification by states/districts. Provision has been made for data entry by various agencies

providing horticulture data like MNCFC for CHAMAN, Directorate of Arecanut & Spice Development (DASD) for Arecanut and spice crops, Directorate of Cashewnut and Cocoa development (DCCD) for cashewnut and cocoa. Under this program all states & above mentioned agencies have been provided trainings and they are now submitting District level estimates in respect of 160 horticulture crops along with State level estimates for 78 horticulture crops Online. Recently provision has been made for collection of data on crops grown under protected cultivation separately through HAPIS.

3. Publication of Horticulture Statistics: For the first time in the history of DAC&FW, a Publication namely, Horticultural Statistics at a Glance has been brought out which contains detailed information on the Area, Production Productivity of major crops since 1991-92 till date. This publication presents a comprehensive picture of the Indian horticulture sector by using statistical data across states, districts and time periods, covering diverse aspects such as area, production, productivity, growth trends, percentage share, value of output and so on for major horticultural crops. Other aspects covered are outlays and expenditure under horticultural activities; monthly series of prices and arrivals over past year in respect of onion, potato and tomato; inputs for horticultural crops; exports and imports; infrastructure availability; India's position in world scenario of horticulture production and so on.

4. Periodical Reports: The Horticulture Statistics Division has started bringing out periodical reports on Onion and Potato, giving a comprehensive picture of these crops regarding production, sowing, arrivals, price trends, exports etc. This is to provide intelligence reports to the Senior Govt. officers for taking timely decision for ensuring adequate supply and thereby control prices in the markets.

Annexure-III

Concept Note on

Methodology for Estimation of Farmers' Income

1. Backdrop

The agricultural sector, being prime sector of Indian economy, received continuous attention of the policy makers and stakeholders. A number of initiative were undertaken to improve the performance of this sector. For the first time in our history, Hon'ble Prime Minister of India exhorted to "Double the Farmers' Income" by 2021-22" and this slogan has enthused and fuelled lot of energy and motivation among the government organizations and other stakeholders and helped in channelizing the efforts in the unified direction. Now, a holistic approach is being followed from top to bottom in an integrated manner and the slogan is catching the momentum and attention of one and all. DFI goal was also coupled with many new and well-thought out schemes on crop insurance for mitigating losses (*Pradhan Mantri Fasal Bima Yojana*), ensuring effective marketing and marketing reforms through unified national agricultural marketing platform (e-National Agricultural Market), and improving soil health via promoting organic farming through *Paramparagat Krishi Vikas Yojana* for maximising the gains from farming. The irrigation programs are coordinated with great thrust and direction under the *Pradhan Mantri Krishi Sichai Yojana*. These programmes and schemes, with a sound implementation strategy will bring lot of reforms and modernization in the agricultural sector.

To ensure that DFI mission is moving in the desired direction within stipulated time frame and taking the corrective action to rectify any imbalances in the economy, it is extremely important that accurate information on certain indicators which reflect the farmers' income and welfare is generated and made available for their monitoring. The most appropriate measure of farmers' well-being is the level of farm income. A few attempts made by some scholars to prepare estimates of farm income in the past are based either on a sample of farmers or a particular segment of agriculture. The researchers and academicians have come out with various methodologies which provide estimates of farmers' income; however, the estimates are available only on point basis. The studies have largely referred to the growth in agricultural output (VOP/AgGDP/GSDP), output and input price behaviour along with price spread, rise in wages, rising indebtedness, to indicate the given state of Indian farming.

2. Earlier Attempts

A number of attempts have been made in India to estimate the farm income; however, these attempts were largely based on the point information. Also, in some cases, the approach could not cover the sector as a whole due to paucity of data and aggregation issues. An account of these is given below:

2.1 Farm business income from CACP data: The comprehensive cost of cultivation scheme of DAC&FW was started in the year 1970-71, which collects and compiles the data on costs and receipts of selected agricultural crops. Farm Business income, is thus calculated by deducting the relevant costs from the receipts by the farmers

i.e., value added in crop production less factor payments. Such incomes provide a good indication at the region and commodity level, however, may not be useful in estimating the aggregate farm business income for the sector as a whole. Farmers' welfare is closely linked to the level and trends in farm incomes. Estimates of value added from crop production can, of course, be obtained for the sector as a whole without detailed cost of production studies – by combining estimates of physical crop production (from area estimates and results of crop cutting experiments on yields) with estimates of farm-gate prices to obtain the gross value of output, and by deducting from this estimates of input use obtained by product-flow methods (state of Indian Farmers). But this shall be largely confined to field crops. Sen and Bhatia (2004) estimated farm business income using data from the central Government's Comprehensive Scheme for Studying the Cost of Cultivation of Principal Crops in India (COC) from 1981-82 to 1999-00 and included the farm business income both from crop cultivation and livestock. This was the first comprehensive step towards preparing estimates of farm income in the country. Though the cost of cultivation data is representative of crops or crop complexes in major growing states, it does not cover horticultural crops and several minor crops. Horticultural sector is tremendously growing in India and excluding this does ignore the major source of potential growth. The data on income from the livestock sector is not appropriately captured in the cost of cultivation schedules, which do not intend to do so, thus the farm business income derived from the COC data is not an adequate measure of actual farm business income in the country or a state (Chand et al., 2015).

2.2 Aggregate and disaggregate farm income using CSO and NSSO data: Chand et. al. (2015) derived the farm income by deducting the capital consumption and wage bill for hired labour employed in agriculture from GDP of Agriculture and allied sector. The wage bill for agriculture and allied sector was computed by multiplying the number of hired labourers employed in agriculture with per day agricultural wage earnings and the number of days of wage employment in a year in agriculture and allied activities based on various rounds of the NSSO on employment and unemployment and also the Rural Labour Enquiry Reports (RLER). The estimates of farm income were prepared for various points corresponding to six rounds of the National Sample Survey Organization (NSSO) on Employment and Unemployment—1983 (38th Round), 1987-88 (43rd Round), 1993-94 (50th Round), 1999-00 (55th Round), 2004-05 (61st Round), and 2011-12 (68th Round). Farm income obtained at current prices from equation was deflated by the CPIAL to arrive at the real farm income. This was the maiden attempt in India to estimate the aggregate farm income for the agricultural sector as a whole, which was also computed on per cultivator, per household and per unit of net sown area to reflect the scenario at the disaggregated level.

2.3 Income purely on the basis of Situation Assessment Survey of NSSO: Besides the above approaches, NSSO carried out two separate rounds on Situation Assessment Survey (SAS) of Agricultural Households (59th and 70th Rounds), which included all possible dimensions for determining the socio-economic status of agricultural households. As per the SAS, the total income per agricultural households grew annually 11.75 per cent from Rs. 25,380 in 2002-03 to Rs. 77,112 in 2012-13, the income doubled in about 6 years; however,

measured in real terms (after neutralising the effect of inflation), the income growth was 5.24 per cent and doubling of income would take 14 years at this rate (NABARD, 2016). However, one needs to identify a proper deflator to convert the nominal income to real income. Also, such a comprehensive annual survey would cost substantially and therefore may not be feasible.

3. Standardized Approach for Farmers' Income Estimation

The doubling income requires initial or benchmark set of estimates regarding the farmers' income which are to be doubled in a given time-frame. Thus, a Committee has been constituted under the chairmanship of Dr. Ashok Dalwai, Additional Secretary, Department of Agriculture, Cooperation and Farmers' Welfare, Ministry of Agriculture and Farmers' Welfare for institutionalization of the effort. The National Institute of Agricultural Economics and Policy Research of Indian Council of Agricultural Research has been entrusted with the task of finalising and publishing the estimates of farmers' income at all India and state level. Such estimates would really be helpful in monitoring the level of income and taking the corrective actions to move the sector to the desired path to fulfil the objective of doubling farmers' income.

4. Methodological Options

- I. The first and foremost indicator reflecting the farmers' welfare may be the Net State Domestic Product (NSDP) from agriculture of the country/states.
- II. The NSDP agriculture and allied consists of NSDP from crops, livestock, fisheries and forestry sub-sectors. As entire output from forestry will not be directly accrued to the farming community, it was proposed that the NSDP forestry may be adjusted by a certain fraction which indicates the share of farm forestry in NSDP forestry
- III. Three approaches for estimation of farmers/household income were decided
 - a. Estimating Net farm Income from Agriculture by deducting the paid-out labour cost, imputed value of family labour and rental value of land.
 - b. Estimating the household agricultural income after deducting the paid-out cost of hired labour. This is equivalent to returns to family labour and fixed factors of production, i.e. land.
 - c. As farmers derive a certain proportion of income from non-farm sources, it would be worthwhile to consider the non-farm income of agricultural households and thus, total household income (farm and non-farm) may be computed.
- IV. The above indicators are directly linked to farmers' income and welfare; it would also be worthwhile to include certain indicators which reflect welfare of agricultural labour. Few indicators were decided as:
 - a. Nature (regular, casual) Labour employment in different sectors and sub-sectors
 - b. Wages/wage earnings across different sectors

ILLUSTRATION OF METHODOLOGICAL APPROACHES

I. Net Value Added at 2011-12 prices (Rs Crore)

The first and foremost indicator reflecting the farmers' welfare has been taken as the Net Value Added (NVA) of the country (Box 1).

Box 1. Net value added from Agriculture and allied sector

Sectors	NVA (Rs. Crore)				Share to total			
	2011-12	2012-13	2013-14	2014-15	2011-12	2012-13	2013-14	2014-15
Agriculture, forestry and fishing	1406113	1421371	1476700	1465919	19.6	18.9	18.5	17.2
Crops	900830	896292	930142	891503	12.5	11.9	11.7	10.4
Livestock	322150	338734	357334	383331	4.5	4.5	4.5	4.5
Forestry and logging	123095	123430	121512	120207	1.7	1.6	1.5	1.4
Fishing and aquaculture	60039	62915	67712	70879	0.8	0.8	0.8	0.8
TOTAL NVA	7189515	7537348	7982616	8534815	100.0	100.0	100.0	100.0

Source: National Accounts Statistics, 2016

II. NVA after adjustment in Forestry NVA

India has a notified forest area of 77.47 million hectares (m ha), comprising 39.99 m ha of Reserved, 23.84 m ha of Protected and 13.64 m ha of Unclassed (unclassified) Forests. The Reserved Forest is an area notified under the Indian Forest Act or a State Forest Act enjoying a higher degree of protection (human activities are prohibited unless expressly permitted); Protected Forests are also notified under the Forest Acts but the restrictions are less stringent (human activities are permitted unless expressly prohibited), however, unclassified Forests are forests which have not been included in reserved or protected forest categories (FAO, 2009). Considering this, it was realised that the farming community might realise the benefits from un-classed forest only, thus, the adjustment to forestry sector NVA can be done by taking the fraction of unclassified forest (13.64 million hectare (mha)) to the total forest 77.47 mha in India (Box 2).

**Box 2. Net value added from agriculture and allied sector after adjustment in NVA
Forestry at 2011-12 prices (Rs Crore)**

Sectors	2011-12	2012-13	2013-14	2014-15
Agriculture, forestry and fishing	1406113	1421371	1476700	1465919
Agriculture Adjusted for Forestry	1304692	1319673	1376582	1366878
Crops	900830	896292	930142	891503
Livestock	322150	338734	357334	383331
Adjusted forestry and logging	21673	21732	21394	21165
Fishing and aquaculture	60039	62915	67712	70879
Total NVA at basic prices	7189515	7537348	7982616	8534815

Source: National Accounts Statistics, 2016

III. Computing Paid Out Labour Cost for Estimating Farmers' Income

The net value added is computed by deducting the value of inputs such as seeds, organic manure, chemical fertilizers, current repairs & maintenance of fixed assets and other

operational cost, feed of livestock, irrigation charges, market charges, electricity, pesticides & insecticides, diesel oil, financial intermediation services indirectly measured and consumption of fixed capital. It does not deduct the cost of paid-out human labour which is one of the important cost items. Chand *et.al.* (2015) have already established that farm income can be estimated by deducting the estimated human labour cost which may be termed as “Wage Bill.” There can be three approaches to estimate the paid out labour cost.

(a) **Through Estimated Wage Bill:** The wage bill can be computed by multiplying the wage earnings and days of wage employment by the number of hired human labour in agriculture. The income computed at current price can be converted into real terms by dividing with the consumer price index for agricultural labour (CPIAL). In this exercise, we have taken CPIAL at 2004-05 prices, however, it would be worthwhile to take CPIAL at 2011-12 prices.

Box 3. Illustration of Estimation of Farm Income after adjusting paid out labour costs (through estimated wage bill) (Rs Crore)

Item	Item Description	2011-12	2012-13	2013-14	2014-15
NVA (at current prices)	Agriculture Adjusted Forestry & Fishing	1304692.1	1459316.3	1656043.3	1737532.0
Paid out labour costs	Labour(crore)	7.8	7.6	7.4	7.3
	wage rate Rs/day)	121.4	141.0	163.8	190.2
	Average days of wage employment (Number per year)	262.0	267.0	272.1	277.2
	Wage bill (Rs crore)	248729.2	287298.0	331847.4	383304.8
Farm income at current prices	NVA minus wage bill	1055962.9	1172018.3	1324195.9	1354227.3
CPIAL @ 2004-05 prices		199.0	219.0	245.0	265.0
Real Income		530634.6	535168.2	540488.1	511029.2

Source: Computed by the team

(b) **Through Compensation of Employees:** Another measure of paid out labour costs is the Compensation of Employee (CE) in agricultural sector and published in the National Accounts.

Box 4. Illustration of Estimation of Farm Income after adjusting paid out labour costs (through compensation of employees from National Accounts Statistics) (Rs crore at current prices)

Item	Item Description	2011-12	2012-13	2013-14	2014-15
NVA	Agriculture Adjusted Forestry & Fishing	1304692.1	1459316.3	1656043.3	1737532.0
	Crops	900830.0	995632.0	1121094.0	1127983.0
	Livestock	322150.0	369219.0	422764.0	492840.0
	Adjusted forestry and logging	21673.1	23512.3	24907.3	24019.0
	Fishing and aquaculture	60039.0	70953.0	87278.0	92690.0
Labour costs	Compensation of employees	185398	202834	232067	259637
Farm income	NVA minus compensation of employees	1119294.1	1256482.3	1423976.3	1477895.5

Source: Computed by the team

c) **Using the Labour Share in disaggregated studies:** Another approach which could

be considered for estimating the paid out labour costs is to use the labour cost shares available in household level studies for various sub-sectors, namely crops, livestock and fisheries. Recently, NSSO has completed the Situation Assessment Survey of Agricultural households and also provides the data related to cost of cultivation of crops and livestock. The receipts and expenses details reveal that labour comprises of around 8 per cent share of the value of output from crops. We used the same share for crops and computed the labour cost by multiplying the labour cost share with the respective value of output. The labour cost shares for livestock and fisheries were compiled from authentic/published research studies. *These shares are used only for the illustration purpose for estimation of farmers' income. These will be firmed up during the course of actual estimation process of farmers' income.*

Box 4. Illustration of Estimation of Farm Income after adjusting labour costs (paid as well as unpaid using the labour shares) (Rs Crore)

Item	Item Description	(at current prices)			
		2011-12	2012-13	2013-14	2014-15
NVA	Agriculture and allied	1304692.1	1459316.3	1656043.3	1737532.0
	Crops	900830.0	995632.0	1121094.0	1127983.0
	Livestock	322150.0	369219.0	422764.0	492840.0
	Forestry and logging	21673.1	23512.3	24907.3	24019.0
	Fishing and aquaculture	60039.0	70953.0	87278.0	92690.0
Paid out labour costs					
Crop sector	Labour share in crops VOP	0.08	0.08	0.08	0.08
	Crop sector VOP	1191483	1328035	1500148	1536092
	Labour cost	99111	110470	124787	127777
Livestock sector	Labour share in livestock VOP	0.24	0.24	0.24	0.24
	Livestock VOP	487751	561109	642566	733054
	Labour cost	117060	134666	154216	175933
Fisheries sector	Labour share in fisheries VOP	0.015	0.015	0.015	0.015
	Fisheries VOP	80105	94292	114881	122775
	Labour cost	1202	1414	1723	1842
Total labour cost		217373	246550	280726	305551
Farm income	NVA minus total labour cost	1087319.2	1212765.9	1375317.5	1431980.8

Source: Computed by the team

IV. Computing the total income from agriculture after adjusting for Imputed Value of land

In the above section, the paid out labour costs using various approaches were deducted to arrive at farm income. This seems justified when we simply want to analyse the gains to farmers over the paid out expenses. However, one needs to adjust these gains by deducting the opportunity cost of agricultural land i.e. the rental value of land in agriculture. For this, the aggregate land cost may be imputed. Box 5 illustrates the procedure how the value may be imputed and the farm income is adjusted for this estimate. The rental value of land for various crops was compiled from CACP Reports. The average rental value was worked out by taking the weighted

average of crop-wise rental values and the weights were crop area shares. As this weighted average accounts for all season crops, the average rental value was multiplied with the net sown area of the country to arrive at the aggregate land cost. This value was deducted from the farm income computed earlier by adjusting for paid-out labour costs (using the wage bill).

Box 5. Illustration of Estimation of Farm Income after adjusting rental value of land (Rs Crore)

Item	Item Description	(at current prices)			
		2011-12	2012-13	2013-14	2014-15
NVA	Agriculture and allied	1304692.1	1459316	1656043	1737532
	Crops	900830	995632	1121094	1127983
	Livestock	322150	369219	422764	492840
	Forestry and logging	21673	23512	24907	24019
	Fishing and aquaculture	60039	70953	87278	92690
Paid out labour costs	Labour (crore)	7.80	7.60	7.40	7.30
	wage earnings (Rs/day)	121	141	164	190
	Average days of wage employment (Number per year)	262	267	272	277
	Wage bill (Rs crore)	248729	287298	331847	383305
	Share in NVA	19.1	19.7	20	22.1
Farm income	NVA minus wage bill	1055963	1172018	1324196	1354227
	Share in NVA	80.9	80.3	80.0	77.9
Land cost	Average Rental value of land (Rs per ha)	10429	12565	14701	17454
	Net cropped area (m ha)	141	140	140	140
	Gross cost of land (Rs crore)	147022	175822	205709	244230
	Share in NVA (%)	11.3	12.0	12.4	14.1
Farm Income	NVA minus wage bill minus land cost (Rs crore)	908941	996197	1118487	1109997
	Share in NVA (%)	69.7	68.3	67.5	63.9

Source: Computed by the team

V. Computing the Total Household Income

In order to assess the gross farmer welfare, one needs to examine the income from farm as well as non-farm sources. Inclusion of non-farm income is important as this will be directly responsible for upscaling farmers' welfare. It is supposed to bring improvement in overall status of living and also should induce investment in farming at the same time. The recently conducted situational assessment survey of NSSO provides the details of farmers' income from farm as well as non-farm sources. Using this, we computed the ratio between total household income and income from farm sector. This ratio signifies the gains from non-farm sector. A ratio of 1.67 was derived between total household income and income from farm sector. This signifies that a household is able to earn 67 per cent more from non-farm sources over a base of 100 per cent income from farm sector. As the SAS provides single point information, we used the growth in GDP agriculture and GDP non-agriculture to project it further. The income

derived earlier by deducting the paid-out cost was multiplied by this ratio to arrive at the total household's income. The income computed in this manner was analysed from different angles. The nominal income was converted to real income by using CPIAL as the deflator. The gross real income, thus, was divided by the number of cultivators, holdings and nets sown area to examine the changes happening at individual level.

Box 5. Illustration of Estimation of Total Household Income after adjusting rental value of land

	2011-12	2012-13	2013-14	2014-15
Farm income after paid out costs (Rs crore)	1055962.9	1172018.3	1324195.9	1354227.3
CPIAL @ 2004-05 prices	199.0	219.0	245.0	265.0
Real Income (Rs crore)	530634.6	535168.2	540488.1	511029.2
Cultivators (Crore)	14.6	14.3	13.9	13.6
Holdings (Crore)	14.00	14.19	14.38	14.58
Net sown area (M Ha)	141.0	139.9	139.9	139.9
Ratio of Farm Income to Non-farm Income	1.670	1.701	1.718	1.786
Per cultivator income (Rs)	36290	37500	38803	37590
Per household income (Rs)	37909	37718	37580	35053
Per unit of net sown area (Rs)	37641	38245	38625	36520
Per household total income	63307.4	64155.1	64550.2	62588.3

Source: Computed by the team

VI. Factor Shares

Box 6 provides the details of sharing of value of output among four factors of production i.e. land, labour, capital and management. *The estimates presented here are only for illustration purpose, which will be firmed up during the course of actual farmers' income estimation after the approval of methodology.*

Box 6. Computation of Factor Shares

	2011-12	2012-13	2013-14	2014-15
Land	147021.8	175821.8	205708.6	244229.8
Labour	248729.2	287298.0	331847.4	383304.8
Capital	442393.1	506758.2	573063.2	614779.7
Management	946487.4	1040989.2	1176023.1	1177652.6
Total value of output	1784631.4	2010867.2	2286642.2	2419966.9
Factor shares				
Land	8.2	8.7	9.0	10.1
Labour	13.9	14.3	14.5	15.8
Capital	24.8	25.2	25.1	25.4
Management	53.0	51.8	51.4	48.7
Total	100.0	100.0	100.0	100.0

Source: Computed by the team

VII. Labour Welfare Indices**a. Labour employment**

Labour employment is an indicator for examining the labour welfare. Box 7 provides the details of agricultural workforce over last thirty years which has been compiled from various rounds of employment and unemployment of NSSO. During 2004/05 and 2011/12, the total agricultural labour has declined at CAGR of -2.31 per cent per year. The maximum rate of decline has been noted in case of rural female. An analysis of inter-sectoral employment and wage earnings will provide an elaborate idea whether the shifting labour force is gainfully employed in other sectors or not.

Box 7. Trends in Agricultural Workforce

		1983-84	1987-88	1993-94	1999-00	2004-05	2011-12	Growth: from 2004-05 to 2011-12
Ag labour	Rural male	37.5	41.0	51.7	56.4	50.7	46.8	-1.13
	Rural Female	29.4	28.2	37.0	39.0	36.7	27.1	-4.26
	Urban male	1.3	1.2	1.9	1.5	1.2	1.4	3.06
	Urban female	1.2	1.3	1.6	1.4	1.4	1.0	-4.11
	Total Ag labour	69.4	71.7	92.2	98.3	90.0	76.4	-2.31
Self employed	Rural male	75.9	77.3	85.1	82.8	92.7	91.5	-0.19
	Rural Female	51.8	50.1	53.3	51.8	67.7	49.4	-4.39
	Urban male	2.8	2.5	3.2	2.6	3.3	3.8	2.03
	Urban female	1.2	2.1	2.3	1.6	2.4	1.5	-6.25
	Total self employed	131.6	132.0	143.9	138.8	166.1	146.2	-1.80
Regular employee	Rural male	4.9	4.9	2.6	2.5	1.9	1.1	-7.90
	Rural Female	0.8	1.4	0.5	0.7	0.5	0.5	-1.71
	Urban male	0.3	0.2	0.3	0.2	0.2	0.3	0.66
	Urban female	0.0	0.0	0.0	0.1	0.1	0.1	-0.79
	Total regular employee	6.1	6.6	3.4	3.4	2.8	1.9	-5.45
Total Agricultural Workforce		207.1	210.4	239.6	240.5	258.8	224.5	-2.01

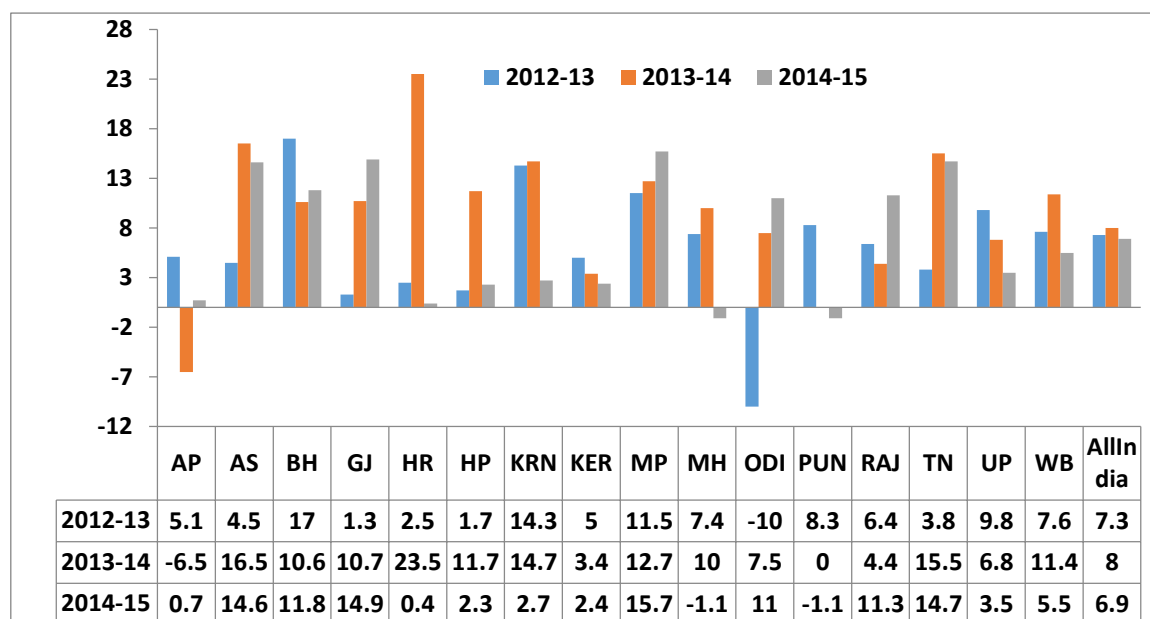
Source: NSSO, Various rounds on employment and unemployment

b. Change in wages/wage earnings

As indicated earlier, it is important to analyse the relative wage earnings of labour across sectors. Box 8 presents annual average growth in agricultural labour wages in real terms (at 2014-15 prices) across major states and all-India during 2012-13 to 2014-15. An increase in real wages during 2012-13, 2013-14 and 2014-15 was 7.3, 8.0 and 6.9 percent respectively. The latest year i.e. 2014-15 indicates a decline in wage rates in general for states as well as the country. The growth in agricultural wages has been higher in Assam, Bihar, Gujarat, Madhya

Pradesh, Odisha, Rajasthan and Tamil Nadu as compared to other states.

Box 8. Trends in agricultural wages across states



Source: CACP
