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Transforming Agricultural Marketing in India: Linking Farmers to a National Gateway and E-Markets

Current Scenario and a Way Forward

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INTERNATIONAL CROPS RESEARCH
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- Mission India for Transforming Agriculture (MITrA)
- Soil Health Mapping and Direct Benefit Transfer of Fertilizer Subsidy;
- Pradhan Mantri Krishi Sinchai Yojana: Enhancing the Impact through Demand Driven Innovations;
- Transforming Weather Index-Based Crop Insurance in India: Protecting Small Farmers from Distress, Status and a Way Forward;
- Digital Agriculture; and
- Self-sufficiency in Pulse Production.

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Current Scenario and a Way Forward

KV Raju, Gopal Naik, R Ramaseshan, Tushar Pandey and Partha Joshi

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About the authors

Lead authors

KV Raju	Theme Leader, Policy and Impact, Regional Program-Asia, ICRISAT
Gopal Naik	Professor, Indian Institute of Management, Bangalore
R Ramaseshan	Advisor, NCDEX e markets Limited and Vice Chairman, Rashtriya e Market Services Private Limited, Bangalore
Tushar Pandey	Senior President, PSPM Group, YES Bank Limited, New Delhi
Partha Joshi	Asst Vice President, PSPM, YES Bank Limited, New Delhi

Contributing authors

TR Sreenivas	FPM, Indian Institute of Management, Bangalore
S Rajeshwaran	FPM, Indian Institute of Management, Bangalore
Srikanth Rupavatharam	Visiting Scientist, Post-Harvest technologist, IDC, Asia Research Program, ICRISAT

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Executive Summary

Constraints

- Physical trading of agricultural commodities in India falls under the jurisdiction of the state governments. Each state has its own Agricultural Produce Market Committee (APMC) Act to regulate trading. The APMC Act requires buyers and sellers to assemble at designated places known as regulated market yards or *mandis*.
- Each regulated market yard is governed by a market committee, which is expected to facilitate the competitive price discovery process for the farmers. Once the state government declares a particular area to be part of a market committee, all wholesale trading in that area has to be undertaken at that designated market.

  The number of regulated markets has steadily grown from 286 in the year 1950 to 7,157 in the year 2010. However, they suffer from the following deficiencies:

  - Large number of intermediaries who do not add value;
  - Farmers have to sell in the local *mandi* and only to licensed intermediary;
  - High transaction costs including excessive travel by farmers (cutting their profit margins);
  - Intermediaries need multiple licenses to operate in different *mandis*, their physical presence is required to obtain a license and they need to own a premises to participate;
  - Long processing time (time taken to process and pay);
  - Poor grading and quality description to assist price estimation;
  - Poor storage leading to wastage;
  - Inadequate price information; and
  - Poor market infrastructure.

How is the Government already intervening?

- The Ministry of Agriculture and Farmers Welfare, Government of India had formulated a Model Act on agriculture marketing in 2003. Based on the Model Act, 17 states have already amended the APMC Act and seven other states notified APMC rules under their Acts. Some attempts have been made to automate these markets using Information and Communication Technology (ICT) tools. However, a silo approach could not remedy the fundamental and systemic issues.
- To deal with these problems, the Government of India has recently approved a new Central Sector Scheme for the promotion of a National Agriculture Market (NAM). The NAM will be realized through a pan-India electronic platform that can facilitate the participation of buyers and sellers from all over the country. Key enablers to operationalize this platform include provision for material accounting, trade fulfillment, fund processing and post-sale document creation (like generation of e-bills), which would increase the efficiency of intermediation. Generating e-permits for all transactions conducted on this platform would create an audit trail that is verifiable across the country and can simplify the movement of goods.

Recommendation for enabling the National Agriculture Market

- **Removal of entry barriers:** Allow buyers to participate across all markets with a single license. Allow farmers to sell in any market of their choice.
- **Assist price discovery:** Auction of the produce should take place simultaneously on the electronic platform in all regulated markets all over the country.
- **Standardized scientific assaying and grading:** Reliable assaying and quality testing infrastructure has to be established in every market, and quality-based bidding must be encouraged. Standardization of quality and quantity parameters, dissemination of these parameters to buyers, clearing and

settlement mechanisms and dispute resolution are key prerequisites for encouraging participation from remote locations in a pan-India market.

- **Electronic settlement of sales:** Collection of sale proceeds from the buyer and remitting it to the bank account of the seller must be facilitated by the market;
- **Removal of controls:** Restrictions on inter- and intra-state transportation of commodities should be removed.
- **Move to warehouse-based trading system:** In the longer term, marketing system needs to transform into a warehouse-based trading system. A farmer brings his produce to a warehouse; the produce is graded as per a standard protocol and the farmer is issued a Negotiable Warehouse Receipt (NWR). The NWR guarantees the grade quality of the produce for a certain period of time.
- **Involvement of other stakeholders:** Participation of private players along with farmer producer organizations (FPOs) should be encouraged. The Maharashtra model of linking FPOs with *Apni Mandi* concept of providing marketing platforms to retail FPOs production to consumers should also be considered.
- **Improve market infrastructure:** Existing physical infrastructure related to logistics, supply chain, storage should be improved.
- **New institutional mechanisms:** The public-private partnership (PPP) model adopted by Karnataka with the help of National Commodity and Derivatives Exchange Limited (NCDEX), wherein a SPV was floated to create a United Market Platform (UMP) model across 65 markets offers some key lessons on some aspects of operationalizing the NAM. Additionally, besides PPP model, build-operate-transfer model also needs to be explored. Formation of a Special Purpose Vehicle (SPV) can be a way forward to implement the strategy.

The Government of India has made a formal announcement of a new scheme, in its annual Budget Speech 2016-17, to implement the Unified Agriculture Marketing Scheme, which envisages a common e-market platform that will be deployed in selected 585 regulated wholesale markets.

1. Situation Analysis

1.1 Background

Agricultural marketing is mainly a state prerogative with the Central Government providing support under central sector schemes. Starting from the year 1951, various Five-Year Plans focused on the price support programs through Minimum Support Price (MSP), development of physical markets, on-farm and off-farm storage structures, facilities for standardization and grading, packaging and transportation. Agricultural marketing plays a pivotal role in promoting and sustaining agricultural production and productivity, leading to food security and inclusive growth of the country. A number of external and internal factors such as globalized markets and urbanization have enforced market reforms. Marketing system improvement needs to be an integral part of any policy and strategy devised for agricultural development. The current agricultural marketing system is the outcome of several years of Government support/ interventions. In India, a number of institutions have been established with a developmental mandate targeted towards one or more areas of agricultural marketing such as procurement, storage and warehousing, credit and cooperative marketing.

1.2. Current status[1]

Establishment of regulated markets for orderly marketing of agricultural produce is the major intervention made by most of the state governments in India. An expert committee on agricultural marketing constituted by the Government of India (GoI) in the year 2001, suggested various market reforms. The

1. Source: Small Farmers' Agri-business Consortium (SFAC)

Where are we now	Why change	Options	Preferred option and players
Produce sold in local markets (mandis) with poor infrastructure, handling, storage, price stability and intermediaries.	Farmers get too little, consumers pay too much, and aggregators and wholesalers make a big cut	Integrated National Market System has been proposed in this document to initiate the piloting in some places and later for scaling up	Integrated National Agriculture Market Policy and establish a national level market institution.
Agricultural input distribution to remote areas by private marketers is better placed than the farm outputs.	Need to align with international practices and quality and face the fiercely competitive globalized world	Use technology to digitalize and network all the markets using ICT. Improved e-trading, computerized billing, end- to-end process	National market with pan-India electronic platform for trading.
Market regulation policies of states are outdated due to the differential licensing system.	There is potential to improve the contribution of agricultural sector to the GDP of the nation.	Key processes required: Issue of lot number linked to the farmers account, auto-recorded electronic weighment, standards and assaying, trading, interstate participation in tendering, interstate free movement of goods, warehouse receipt system, linking electronic banking for facilitating direct payment to the producers	Setting up of a national level cell for a SPV to implement the National Agriculture Market Policy
Agricultural commodity movements are restricted within and across the states.	No national consistency:Some states reformed the markets act, however there is no improvement in Infrastructure	Establishment of improved testing and grading systems	A national level regulator for agricultural commodity standards, assaying and testing
Financial institutions not geared up to meet the requirements of the agricultural markets	Mechanisms of determining prices are arbitrary and do not favor the producer	Creating a favorable environment for licensing of farmers, traders and intermediaries with good governance.	Capacity building of Farmer Producer Organizations(FPOs) and producer organizations through the existing National Skill Development Corporation
Standardization of quality and assaying limited, leading to farmers not getting higher price for better quality produce.	Storage facilities, logistics need to upgrade to improve the quality of produce and turnaround times of the transactions.	Linkage with spot exchange and networking with commodity markets at the national level.	Develop PPP and/or BOT models
	Quality and standardization along with grading have been neglected. Hence, the products are not competitive in global markets.	Infrastructure development through PPP for storage and warehouse receipt system	
	Lack of traceability while handling agricultural, horticultural or dairy produce (including animals)	Establishment of Dairy Animal Information System (DAISy)	
		Developing forward and backward linkage of markets through FPO	
		Upgrading and capacity building of all stakeholders	

finalized rules were circulated to all state governments in the year 2003, which then transformed as the Agriculture Model Act to be implemented by the states. Several states have amended their APMC Acts as per the provisions of the Model Act while others have partially implemented it.

Reforming Agriculture Markets

Reforming agricultural markets is essential for enabling the provision of competitive choices of marketing to farmers, simplifying transactions, reducing intermediation, cost and wastage, improving quality and encouraging private investment for the development of market infrastructure and alternative marketing channels.

In the new (NAM) framework, all the registered market participants such as farmers and traders will have direct access to grading and storage facilities and will be able to access financing options. With this upcoming initiative, some of the following key action areas have emerged in recent years:

a. Farmer Producer Organizations (FPOs) and Producer Companies (PCs) have been established to create online platforms for National Agriculture Marketing;

b. Integration of the APMC regulated market yards across the states into the online platforms to create a unified NAM;

c. Enabling buyers / sellers situated even outside the state to participate in trading at the local level;

d. Reducing transaction costs on moving produce from one market area to another within the same state;

e. Unified licensing system and establishing a quality management system for quality assurance and grading.

1.3 Policy focus

The agricultural policy addresses the two key policy areas of production and marketing. Farmers are primarily concerned with the profitability, cost, sustainability and risks involved in crop production. These concerns arise out of levels and variability of yield, costs and price. Levels and variability of yield is influenced mainly by the weather and input application apart from local conditions such as soil type and access to scientific knowledge; cost is influenced by the quantity and quality of inputs applied and their prices; and price of output is influenced by the market conditions of supply and demand.

Stage of Reform	State/Union Territories
Reforms done for private market, direct marketing, contract farming, e-trading and farmer markets	Gujarat, Goa, Himachal Pradesh, Jharkhand, Karnataka, Maharashtra, Mizoram, Rajasthan and Sikkim and Tamil Nadu
Partial Reforms	Andhra Pradesh, Arunachal Pradesh, Assam, Chhattisgarh, Delhi, Haryana, Madhya Pradesh, Nagaland, Odisha, Punjab and Tripura
Applicability of single point levy	Andhra Pradesh, Chhattisgarh, Goa, Gujarat, Himachal Pradesh, Jharkhand, Karnataka, Madhya Pradesh, Mizoram, Nagaland, Punjab, Rajasthan, Sikkim and Tamil Nadu
Reform done for unified license	Andhra Pradesh, Goa, Gujarat, Haryana, Himachal Pradesh, Jharkhand, Karnataka, Madhya Pradesh, Maharashtra, Mizoram, Nagaland, Rajasthan, Sikkim and Tamil Nadu
Deregulation/exemption of market fee on Fruits and Vegetables (F&V)	Assam, Chhattisgarh, Delhi, Haryana, Himachal Pradesh, Karnataka, Madhya Pradesh, Meghalaya, Nagaland, Odisha and West Bengal
States where APMC Act does not exist or has been repealed	Bihar, Kerala and Manipur
States where APMC act has not undergone any reform	Jammu & Kashmir and Meghalaya

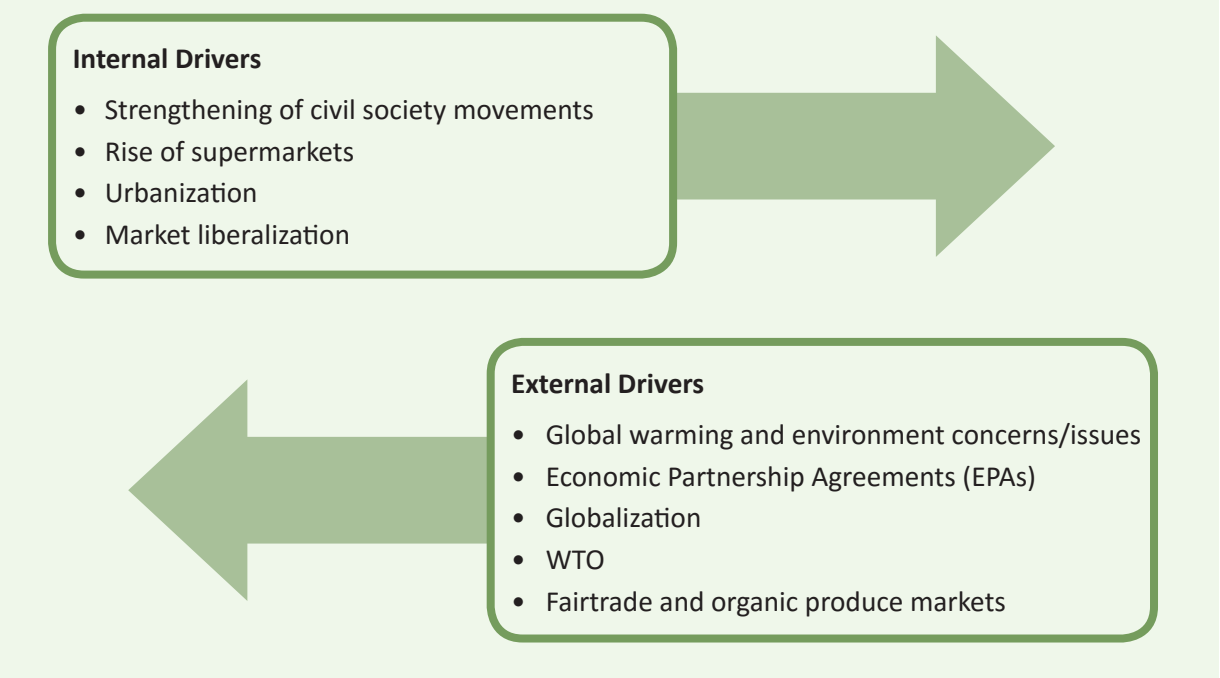

Figure 1. Internal and external drivers.

Weather, inputs, and market conditions are the major causes for the extent of level and variability of returns to farmers. While weather is external to agricultural production and its long-run variability is unpredictable; it is still possible to reduce the loss if contingency measures are applied. For example, if the monsoon is delayed, then a shorter duration crop may be planted or a different crop may be planted. However, in the extreme conditions of drought and flood, there are chances of substantial loss. A major factor in influencing the extent and variability of yield and costs of production are the inputs applied that are again influenced by a host of factors. Proper use of input-knowledge systems addresses the requirement for determining appropriate input levels. Market conditions that determine output prices are also external but are largely predictable at least in the short run. In addition, price risk management mechanisms such as forward contracts may also be available.

Production Related Reforms

Weather forecasting, quality extension, reliable source of input supply and price risk management methods such as future contracts or contract farming, would greatly help farmers to improve the profitability and reduce risk factors. However, the current situation of these supporting and risk mitigation measures is far from satisfactory. While there are weather measurement systems, weather forecasting, and its proper dissemination is yet to take place in an effective manner. Also, extension systems are very poorly organized, and farmers are left to seek information from other progressive farmers or input dealers. A reliable source of inputs is another major problem in most farming areas. While there are future contracts and contract farming in place, their utilization is not widespread due to the absence of effective local level organizations. This operating environment has led to poor yield and high risk in agriculture across the country.

Addressing these problems requires a holistic-systems approach to integrate extension, input supply, and risk mitigating measures. An effective system would consist of an insurance company, extension agency and an input supply agency all coming together with a tripartite interlocking contract that will create incentive and disincentive for each agency, to assist in improving agricultural productivity and profitability.

The system's objective would be to insure crops against a revenue amount covering the full cost of production including 15% of the cost as a return on management. This will be done with two components

of insurance: (1) regular insurance coverage, and (2) catastrophic insurance to cover extreme weather and uncontrollable diseases depending on the location and crops.

Marketing Related Reforms

The objective of any good marketing system is to: a) make markets more efficient, including i) efficient price discovery through competitive markets, and ii) reduce marketing cost and time; b) improve access to markets; c) ensure quality; d) convenience for producers and consumers; and e) efficiently deliver market services.

The problems in the current systems are: a) large number of intermediaries; b) high transaction costs (margins); c) long lead times for payment; d) no proper system to store produce thus leading to wastage; e) inadequate price information; and f) poor infrastructure in markets.

a. **Regulation of Agricultural Produce Markets:** To achieve an efficient system of buying and selling of agricultural commodities, most of the state governments and union territories have enacted a range of legislation to regulate the Agricultural Produce Markets. The core objective has been to ensure reasonable gains to farmers by fair play of supply and demand forces, to regulate market practices and to attain transparency in transactions. The number of regulated markets in India has increased from 286 in the year 1950 to 7,157 in the year 2010.
b. **Marketing Reforms Initiatives:** To provide competitive choices of marketing to farmers and to encourage private investment for the development of market infrastructure and alternative marketing channels, the Ministry of Agriculture had formulated a Model Act on agriculture marketing in the year 2003, to guide them for the removal of barriers and monopoly in the functioning of agricultural markets. In India, 17 states have already amended the APMC Act as per provision of the Model Act. Another seven states have also notified APMC rules under their Act.

   The establishment of regulated markets has provided physical facilities and institutional environments to farmers, intermediaries, traders and other market functionaries for conducting business. However, their contribution in mitigating the marketing problems of farmers, improving physical and economic efficiencies and enhancing competitiveness are debatable. In the changing scenario of agricultural production and marketing, it is necessary to reform them further to achieve the objectives for which they were established.

   The GoI has also decided that assistance under National Horticulture Mission (NHM) and Scheme for Development/ Strengthening of Agricultural Marketing Infrastructure, Grading and Standardization for the development of market infrastructure projects to state agencies/APMCs would be subjected to waiving of market fees for perishable horticultural commodities. It would permit direct marketing by farmers to consumers, processing units, bulk purchase of cold chain facilities and storage and contract farming. However, it has been decided that reasonable user charges can be levied for the use of market facilities and infrastructure.
c. **Direct Marketing:** Producers use different market outlets (commission agents, local traders and farmers' markets) at different times of the year as a strategy to get the best price for their produce. Farmers' Markets are especially beneficial for the small producers, who have difficulties in selling small volumes in the conventional market system. Farmers' Markets have mainly influenced the producers' practices in the following ways (i) diversification of production to include a wider variety of vegetables, and (ii) stimulated producers' adoption of marketing strategies through a better understanding of consumers' needs and preferences. Factors that affect producers' capacity to adapt to changes include access to credit and financial assets, and institutional support across the system. Direct marketing enables the farmers and processors and other bulk buyers to economize on transportation cost and improve the price realization to a considerable extent. Some of the popular examples are: a) Rythu Bazaar in Andhra Pradesh and Telangana states, b) Shetkari Bazaar in Maharashtra, c) Uzhavar Sandhai in Tamil Nadu. (see box on page 35 for details).

d. **Market Research Information Network (MRIN):** The Ministry of Agriculture has launched the ICT-based Central Sector Scheme of Marketing Research and Information Network in March 2000. This provides electronic connectivity to important wholesale markets in the country for the collection and dissemination of price and market-related information. The scheme was implemented in the year 2000-2001, and presently, more than 3,000 markets from all over the country have been linked to a central portal (http://agmarknet.nic.in). These markets report the daily prices and arrivals for more than 300 commodities and 2,000 varieties from more than 1,900 markets covering nearly all the major agricultural and horticultural produce. The information on arrivals and prices are disseminated in 12 regional languages.

1.4. 'Social Equity': Key to successful public-private partnerships in agriculture

Although PPP has emerged as the 21st century economic tool to fast track infrastructural development and leverage the operational expertise through participatory management, there is a need to approach PPP in agriculture with the distinct value systems of Social Equity that are different from the existing ethical and operational paradigms in other sectors, owing to the large mass of lower to middle income population involved. The proponents of Social Equity in Agriculture have to be centred around Collaborative

Conditions of existing Agricultural Markets

1. Primary or periodic markets (*haat*/bazaars) are most neglected – basic amenities are not available
2. Condition of cattle markets most appalling
3. Low density of regulated markets in some states - farmers have to travel long distances to sell their produce
4. Weak governance of APMCs – unprofessional management
5. Licensing systems create entry barrier to new trader/buyers
6. Multi-point levy of market fee (varies from 0.5 to 2%) and multiple licensing system
7. Restrictions on inter-state and even intra-state movement of goods

Key issues

a. Too many intermediaries resulting in high cost of goods and services
b. Inadequate infrastructure for storage, sorting, grading or post-harvest management
c. Private sector unwilling to invest in logistics or infrastructure under prevailing conditions
d. Non-transparent price setting mechanism.
e. *Mandi* staff ill-equipped and untrained
f. Market information not easily accessible
g. Essential Commodities Act impedes free movement, storage and transport of produce

Community Structures that can provide:

a. Equitable administrative responsibilities;
b. Scalability from Production to Marketing, Logistics and Consumer Engagement;
c. Balancing Social Benefits with Rural Requirements;
d. Micro, Small and Medium projects that could be built using PPP and derive benefits from the various social benefit schemes of the government.

2. A Way Forward

2.1 Technology

Currently, the adoption of technology in Agricultural Marketing is at very low levels. The existing technology would progressively improve as the levels of available infrastructure improve. The following strategies are suggested for implementing improved ICT and other technologies in a phased manner.

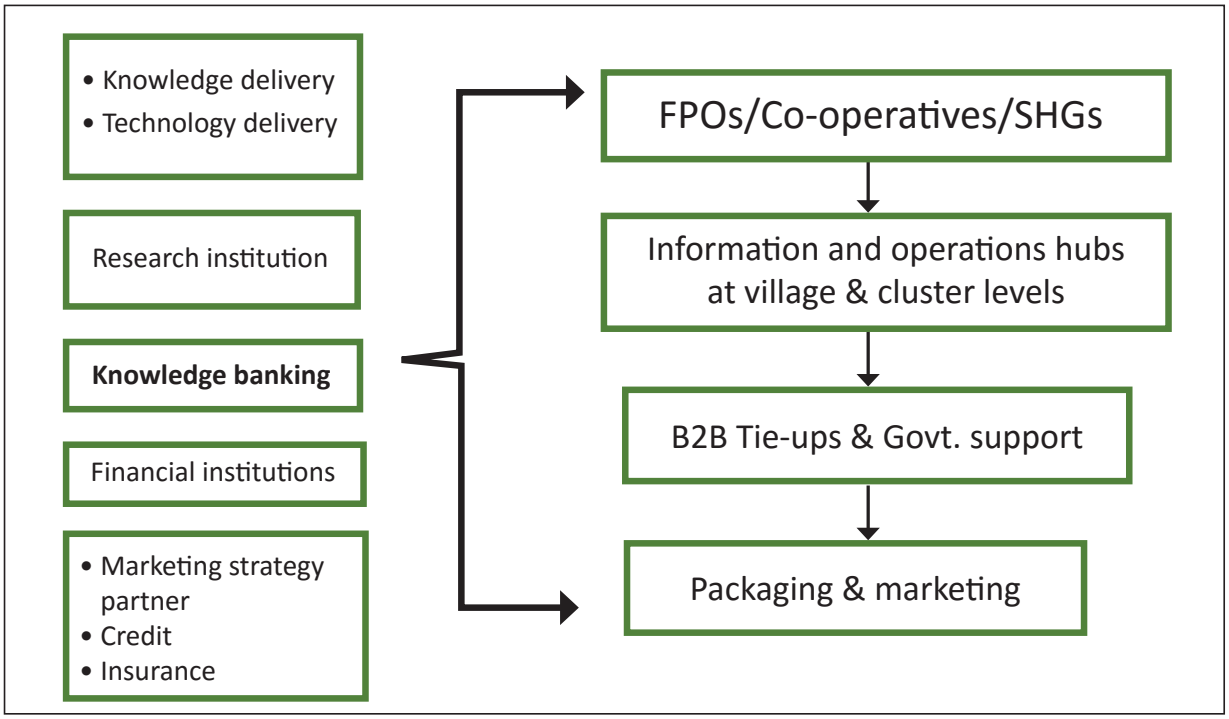

Figure 2. Knowledge sources.

Adoption of a Comprehensive Electronic Platform in Agricultural Produce Marketing Committees (APMCs)

a. A Comprehensive Electronic Platform, capable of handling all market operations, namely, auctions and price discovery, material accounting, trade fulfillment, fund processing and document management may be adopted by all APMCs in the country. This would benefit farmers by ensuring transparency and would reduce the time required to complete the sale of produce. Since basic computing hardware as well as software facilities are extensively available, such a comprehensive electronic platform should be extended to all markets and to all commodities and thereby replacing the manual processes in all markets immediately. This process will eliminate delays in finalizing the transactions and bring in transparency.

b. Associated processes like weighing should also be improved by installing electronic weighing machines (where there are none) and linking them to the Comprehensive Electronic Platform, with a unique identity (e.g., lot number and member number). With details of the lot (like farmer particulars, commodity particulars, etc., captured at the gate, all market processes would be linked to the lot number and would be retrievable.

c. As detailed later in this report, the Comprehensive Electronic Platform has to be a pan-India platform and should be centrally hosted. Towards that end, all APMC markets should have reliable internet connectivity, necessary dedicated backup power supply for running the systems continuously, using dedicated power lines or with alternatives like generators/inverters wherever needed (solar, wind).

Improving assaying and grading system at markets

a. Government of India has enacted the Agricultural Produce (Grading and Marking) Act, 1937. The scheme of "Grading at Producers' Level" introduced in 1962-63 by the Directorate of Marketing and Inspection (DMI) continues to be implemented by the States and the Union Territories at the APMCs, but the grading, if done, is done unscientifically and is at best an approximation. This has to be upgraded in a phased manner to create full-fledged quality testing infrastructure at APMCs, by using perhaps a Public Private Partnership (PPP) model.

b. As the physical market for agricultural commodities accommodates the produce of all qualities and varieties, appropriate standards taking local stakeholders into account may have to be worked out.

c. The quality of the produce should be displayed in the platform, enabling the buyer to form an opinion on the bid that he would propose for the lot. Thus, bidding would factor in the quality of the produce, thereby benefitting the farmer. The system of specification standards needs thorough upgrading with appropriate linkages to ongoing research. While the AGMARK specified by the DMI, has been the *de jure* standard for agricultural commodities in the country, these do not always conform to International standards. There is also an immediate need to harmonize the national standards with those accepted internationally. This activity needs to be accepted at the national level for all commodities across the country and could be made mandatory at all APMCs in a national grid. For those commodities where the demand is confined only to some regions, the initiative is to be taken up at the state level.

Document management and accounting modernization

a. The Comprehensive Electronic Platform would handle all post sale documentation, like recording of weights, generation of sale bill, etc.
b. While the farmer would get an intimation about the sale through a SMS, a computerized bill would be made available soon after the sale process is completed. Manual billing systems that are currently prevailing should be discarded.
c. There is a need to integrate other documents facilitating post sale activity, like permit generation, gate exit, material accounting and filing of returns and to the extent feasible these should be auto generated, relieving market participants the need to interact with market authorities.
d. Collection and accounting of market fee may be integrated with fund management, thereby relieving market authorities the need to manually reconcile the amounts due and the collections made.
e. Progressively, the accounting system in the markets may be modernized, adopting a double entry accounting system linked to the Comprehensive Electronic Platform.

Farmer database

a. Create a database of farmers with a unique identity number like AADHAAR, and populate with details like mobile phone number, bank account number, landholding and other socio economic details. Adoption of the JAM (Jan Dhan, AADHAAR and Mobile) a trinity of technologies will be highly useful in this context. The database would have details of farmers with respect to agricultural production and practices.
b. Such an exhaustive database can then be used for transfer of sale proceeds to the farmer directly. This would also be used to track agriculture practices and farmer education in course of time.

Adoption of cutting edge technology

a. Enabling a WiFi environment in the market yard, use of handheld devices to capture data based on bar-coding and for placing bids.
b. Monitoring the market process, generating value-added reports for agriculture policy planning and managing demand supply imbalances, information dissemination to remove market asymmetries, etc., have to be adopted gradually.
c. Building an intelligent system to monitor market behavior and initiating action to maintain the integrity of the market can also be developed in course of time.

Create a warehouse receipt system in the APMC yards

As a gradual process, the marketing system should transform into a warehouse-based trading system. This creates a virtuous cycle of marketing that has potential to elevate the current practices to international standards.

a. Allow modern warehouse systems to be set up within a market area with appropriate ICT linkages, preferably in Public Private Partnership (PPP) model. The warehousing development and regulatory authority (WDRA) will regulate such warehouses.

b. Introduce a Negotiable Warehouse Receipt (NWR) system where as soon as a farmer brings in his/her produce, it is graded with a standard testing protocol and given ***a NWR which guarantees the grade quality of the produce for a certain period of time***. Until then the warehouse owner takes the responsibility to ensure that the quality is maintained and any damage to quality will be compensated through an appropriate insurance system.
c. These warehouses can be declared as submarket yards and linked to the mother market, thereby getting a set of ready buyers to bid for the stored produce.
d. With the warehouse receipt the transaction of the lot is simplified. Farmers can get a pledge loan very easily based on the NWR. At any time when they would like to sell the produce they can offer it on the Comprehensive Electronic Platform and sell produce without going to the market. This helps in preventing distress sale by farmers by making the pledge loan facility easily available and reduces uncertainty of quality loss at the storage. Farmers will have the freedom of selling at any time. The process can further be simplified with appropriate linkages to finance.
e. The role of commission agents will also reduce; they can instead become assayers and warehouse facility owners by acquiring proper skills, equipment and processes.
f. Since the warehouses are created with private participation, there is a possibility of infusing next generation technologies like Internet of Things (IoT), that is 'things' like storage bins and weighing machines embedded with electronics, software, sensors, and connectivity, that enables exchange of data. Progressively, bulk storage can be introduced, thereby making storage and handling of the produce efficient.

However, a word of caution. Farmers may harbor an illusion that the stored produce would always fetch a higher price. Therefore, intensive farmer education should be the precursor to making warehouse-based selling a practice.

Developing Forward markets

a. In contrast to the future contract, delivery is mandatory in forward contracts where a buyer or a seller can square off his position before the maturity date of the contract. Forward contract ensures the transaction of the commodity and farmers do not have to worry about selling the produce. This can be facilitated by the proposed SPV (discussed later) with the help of Farmer Producer Organizations (FPOs) and other market participants.

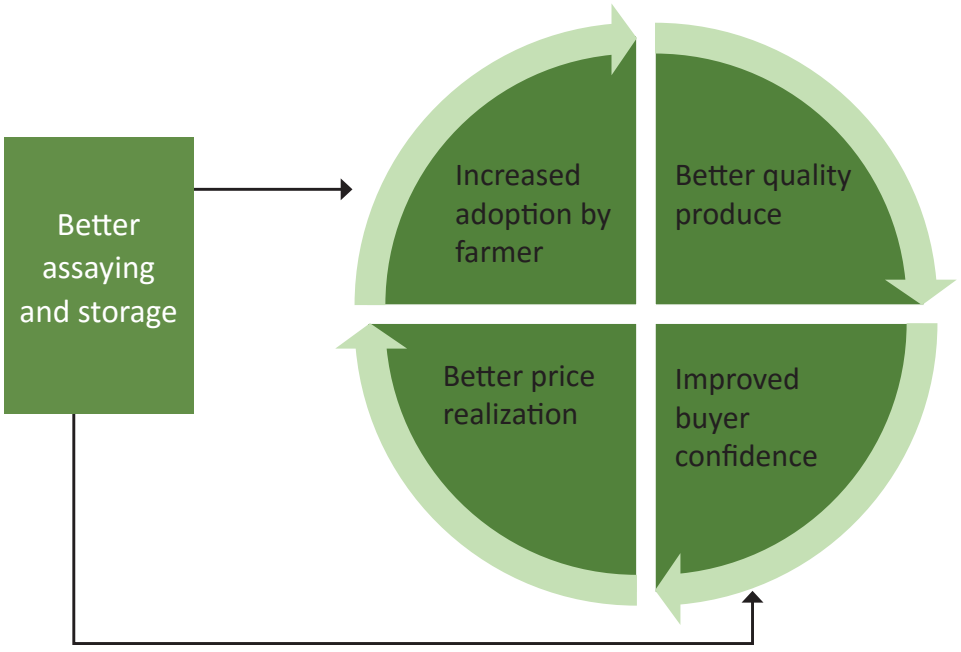

Figure 3. Virtuous cycle of next generation agricultural marketing.

2.2 Institutions

The existing institutional structure needs to be modified in order to achieve the goals set in the above strategies. We suggest formation of one organization that leads the technical, functional and operational aspects and one regulatory institution. We also suggest some modifications to the existing warehousing and agricultural marketing regulatory setup.

National Agriculture Market (NAM)

a. The GoI has recently approved a new Central Sector Scheme for the promotion of NAM. It needs the following refinements:
    - Auction of the produce takes place in the same electronic platform in all regulated markets (APMC markets) of the country;
    - Every regulated market is supported by infrastructure for quality assaying of the produce;
    - A buyer, irrespective of his location, can participate in any market of his/her choice;
    - Collection of sale proceeds from the buyer and remittance to the bank account of the seller should be facilitated by the market; and
    - Restrictions in transportation of the commodity should be removed.

This does not imply a single price for a commodity across the country; price discovered at each center would depend on various factors such as whether it is a production, trade or consumption center, transportation, holding costs and other intermediation costs. The major issue that is sought to be addressed is the price discrimination due to information asymmetry, restricted market access, and barriers to arbitrage between the markets.

b. **The main objectives** of creating a national market would be:
    - Allowing interplay of local demand and supply, duly reckoning aggregate national demand and supply efficient price discovery;
    - Realizing higher unit prices for farmers based on democratization of information regarding clear grades and standards and real-time price discovered and e-trading to push value capture to farmers and reduced pricing and traceability for consumers;
    - Improved price forecasting to help farmers make sowing decisions and enabling effective negotiation of forward contracts;
    - Lower costs and time taken for transactions; and
    - Availability of pledge loan facility to avoid distress sale.

c. **Inhibitors:** Creation of a national market requires addressing regulatory issues, physical isolation of markets, restrictions in participation in buying and difficulties in movement of goods and fostering of technology harmonization across states to support seamless market integration. State-based legislation inhibits the creation of a national market. Each state fiercely guards its right to regulate agricultural markets, and a national consensus is yet to emerge in spite of many previous attempts. The traditional approach to create a national market could be to aim for legislation at the national level and structure the individual markets accordingly. However, such an approach requires all states to agree to a common legislation, which could be time consuming. Therefore, alternative possibilities of creating a national market should be examined.

Regulated markets were started as physically independent entities and have remained as such across the country. They have not modernized with time and have not adopted information technology extensively. Any attempt made to improve the efficiency of price discovery by leveraging appropriate technology in all market operations should be seen as the way forward.

Regulation restricts competition for the produce in the market by restricting the access to market participants. Mandatory physical presence in a market for obtaining a license for participation and licensing requirement that mandates a separate license for each market are major barriers at the state level. Lack of supporting infrastructure also contributes to the restricted buyer interest in markets. An

artificial restriction on movement of goods, both within and outside the state is another issue that needs to be addressed for a national market to be realized. Policies to support a national market will include a Goods and Services Tax (i.e., GST Bill) to support efficient and transparent trans-state trade.

d. **Designing a National Market:** Even if regulated markets are abolished, one cannot assume marketing as a post-harvest activity. The need for the buyers and the sellers to meet within a regulated framework cannot be over-emphasized. A complete absence of regulation in this area could do more harm than good; the farmer as the weaker participant in the market would be exploited by the more powerful buyers. Thus, the need for a regulated but efficient environment requires emphasis. Reforming the existing marketing system by redesigning the market structure, ushering in transparency, leveraging technology in operations, providing a well-functioning regulatory framework, encouraging private participation along with regulated markets with clear and measurable grades and standards will empower buyer and seller to make informed choices. Making banking an inherent part of the marketing function could be the way forward.

i) Market process based approach

In the past, some states had attempted to adopt IT-based auction solutions for their regulated markets. However, the approach was to treat this as an IT problem and market design issues were never addressed. Each market partially implemented the solution. Many markets that had adopted IT processes reverted to the manual process for a variety of reasons, like lack of technological support, inability to make changes, and incomplete solutions.

Therefore, a simple technology solution attempting to automate the existing process was inappropriate for creating a NAM. A market-centered approach with centralized architecture was needed. A comparison of the earlier IT-centered approach and proposed market-centered approach may be seen in Annexure 1.

A well-designed robust electronic platform uniformly available to the regulated markets all over the country for price discovery and providing for all market processes was needed. Such a system could monitor every market on a real time basis. The number of servers required was reduced, due to centralized deployment, high availability and reduced costs. This system would provide high flexibility, and great scope for re-engineering market processes and was scalable.

Provision for material accounting, trade fulfillment, fund processing and post-sale document creation (like generation of e-bills) would increase the efficiency of intermediation. Generating e-permits for all transactions conducted on the platform would create an audit trail verifiable across the country and simplify the movement of goods and support traceability. Various market reports generated stated that the adoption of advanced surveillance techniques would support decision-making and improve the integrity of the market.

ii) Single license enabling pan-India participation

Currently, each regulated market isolates itself by restricting the buyers with licensing requirements being the main hurdle. Needless restrictions like owning premises in the market yard or market area for the granting of a license and an individual license for every market are the two main impediments. Some states have taken a step forward by removing such artificial barriers. All states may be encouraged to simplify the licensing conditions and do away with restrictions like the physical presence of participants. Moreover, a single license can be prescribed for trading in every market in a state. Given that each state has a distinct legislation; it may not be possible to have a pan-India license in the near future. However, the process of licensing can be simplified by making it an online process. The pan-India electronic platform can capture the requirement for each state and can act as a gateway for applying and granting a license by a state. Granting of a license by the home state of a trader can be relied upon by the other states. This would greatly simplify the licensing process and can facilitate pan-India participation.

iii) Supporting infrastructure for pan-India participation

Participation is not feasible with the current practice of visual grading and quality assessment of the produce. Reliable assaying and quality testing infrastructure has to be established in every market and quality-based bidding should be encouraged. Standardization of quality and quantity parameters, dissemination of these parameters to buyers, clearance and settlement mechanisms and dispute resolution are key prerequisites for participation from remote locations. Testing and certifying the quality of the produce would require infrastructure for carrying out the sampling and testing processes. Availability of physical space may limit the quantity that can be assessed in a given market. This may be conquered by encouraging warehouse-based selling, which will decentralize the auction process and open up commodity funding for both the farmers and traders.

iv) Easy movement of goods

Movement of goods has to be reckoned at two levels – intra-state and inter-state. Almost all states impose restriction on the movement of goods as a way to increase collection of market fees; however, these restrictions make movement a herculean task, which is best handled by intermediaries. This is one reason why outstation buyers prefer to buy goods from a local trader rather than going through the rigid processes of getting permits and paying extra taxes. To make pan-India participation a reality, the movement of goods needs to be open within and between the states through Goods and Service Tax (GST) legislation.

Doing away with the permit system and verification of papers may not find favor with the states; however, they may consider movement of goods as a natural requirement and reorient their verification processes accordingly. Generation of permits may be done through the electronic platform and a central repository created that can make online verification/SMS-based verification of the permit possible. Thus, permits that can be generated in a secured fashion (with state level variants duly factored) and verified without difficulty can lead to simpler movement of goods. Interstate movement may have to reckon with VAT/GST and other taxes, which falls outside the scope of this paper and hence not discussed.

v) Regulatory environment

State legislations mandate that the first sale from the farmer to the buyer shall take place in a designated regulated market. Some states make exceptions providing for direct purchase or farm gate procurement; however, in many cases such sales are contrary to the law. That being the case, whatever be the location of the first buyer, unless a national law is enacted, buyers would have to comply with multiple regulations. Multiple compliance requirements are a barrier for participation at the national level. While little can be done to remove these barriers, the methods could be devised in a manner to make the compliance simple. An electronic platform can be established to capture compliance requirements of states, generate necessary documents (like sales invoices and permits) and returns to be submitted to authorities and thus ensure that the buyer does not face any burden in this regard. Thus, a well-manned compliance cell should be a pre-requisite of designing and managing the electronic platform. If the above is designed suitably, pan-India participation can be achieved, with compliance to individual state legislation. Then, complying with the multiple regulatory requirements would not be an issue.

e. **Making the national market a reality:** With this approach, regulated markets functioning at the state level would acquire a federal architecture to transition to a national market for agricultural produce. Critical features for successful national markets are:
    i. Modernizing regulated markets by adoption of technology to cover all market operations, increase competition in the buying process, encourage quality-based bidding and provide information on prices;
    ii. Augmenting IT infrastructure in all markets and states to enable interconnectivity from any location;

iii. Prevailing upon state governments to liberalize license conditions to provide for a single license for all regulated markets in the state and do away with the precondition of owning a premises within the market yard for sanctioning of a license;

iv. Harmonizing quality grades and standards of major commodities, motivate state governments/ regulated markets to establish laboratories for testing of the quality of the produce and enable quality-based bidding by buyers, thus enabling participation from across the country;

v. Removing barriers to free movement of goods by abolishing check posts, substituting these with appropriate IT-enabled solutions;

vi. Enhancing the platform to act as a gateway for licensing by all the states, creating a repository in it for permit verification and handling the compliance and regulatory requirements of each state;

vii. Focus on devising an appropriate regulatory structure, wherein states may agree on the principles to be adopted in regulating market behavior and enforce the same, so as to have a harmonized regulatory environment in the country as a whole; and

viii. Prevailing upon state governments to remove restrictions on commodities for trade only in notified regulated markets, thereby encouraging private investment in this sector, which may eventually lead to private markets at the national level and direct procurement by processors and others. In such an environment, regulated markets would be forced to improve their services to attract clientele.

f. **Pan-India electronic platform:** Thus, the key to create a national market is an electronic platform, designed and operated with market processes in mind. The technology infrastructure would have to be constantly upgraded to over time cater to emerging requirements.

Neither the Department of Agriculture and Farmer Welfare nor the Directorates of Agricultural Marketing and the Market Committees in individual states are currently equipped to assimilate and adopt the use of such highly sophisticated technology. Therefore, involvement of the private sector is imperative for the effort to succeed. The Ethiopia Commodity Exchange (ECX) recently launched a mobile-enabled spot market platform that services smallholder farmers for both export and domestic markets. The CEO of the ECX is willing to share the platform, design and lessons learned with India as part of South-South collaboration. The intimate knowledge required for implementing the reforms outlined and supporting existing APMC markets is available only with the commodity exchanges operating in the country. It is therefore preferable to select one of the commodity exchanges and/or its affiliated entities to support the efforts taken to create a national market.

Commodity exchanges are in operation in the country since the year 2003. Starting with three initially, there are six exchanges currently in operation and are regulated by the Forward Markets Commission, functioning under the Ministry of Finance, GoI.

Of the six exchanges, the Multi Commodity Exchange Limited (MCX) and the National Commodity and Derivatives Exchange Limited (NCDEX) are the most prominent, with NCDEX being the leader in agricultural commodities. NCDEX has been promoted by national level institutions, like the LIC and NABARD. The GoI institutions and domestic institutional shareholders hold 35% and 30% of the shares of the Exchange respectively; international shareholders hold 15% and the Indian private shareholders hold the balance 20%.

Its fully-owned subsidiary, NCDEX e Markets Limited (NeML) has designed an electronic platform, called the Unified Market Platform (UMP) that is adopted by 65 markets in Karnataka (through a SPV with the Government of Karnataka), 2 markets in Andhra Pradesh and 3 markets in Telangana.

The UMP is a tested platform and adopting this platform would reduce the time required for a state to reform its markets, bring them on par with any advanced market and able to join the national market when GST and other policies are in place to support inter-state trade. Therefore, the possibility of adopting the UMP with supporting institutions that can make the reform process faster, scalable, and sustainable as a national market for agriculture have to be examined.

g. **Institutional structure for implementation:** A national level institution, on lines similar to what Karnataka has established, can provide the electronic platform and support reforms by providing know how, standardize market practices, set up quality testing infrastructure, work towards institutional funding of market participants and support the transition for integrated states to a national market. Such an institution would operate with innovative technology and be constantly adapting itself to best international practices. Further, it has to blend public interest with the initiative of private enterprise. While a wholly-owned government entity may satisfy the former, it may not be able to rise up to the challenges of the latter. Moreover, the priorities of a private enterprise may be quite the opposite. From that perspective, a PPP entity may be appropriate. The ways to establish such a national level institution is discussed below. Ethiopia offers a good example of a modern national market platform that serves smallholder farmers by leveraging mobile-enabled transactions and mechanisms to validate and support grades and standards to unlock the full value of a farmer's produce.

   As the SPV has to blend public interest with the initiative of a private enterprise, holding of government/institutions should not exceed 50% of the paid-up equity capital of the SPV. With this structure, the SPV will not be a government company, within the meaning of the Companies Act, 2013 and would have the operational flexibility for discharging its mandate with public interest as the primary objective.

   If the need for a PPP entity is accepted, then selecting NeML as the private partner, which has successfully brought markets in Karnataka, Andhra Pradesh and Telangana on to the UMP could be the natural choice.

   NeML may incubate the new company and enable it to acquire the expertise to provide the UMP to all states and carry forward the reform initiative in those states. Until that time, NeML may be compensated on a cost plus basis for providing the necessary services to the SPV and states. It is proposed that NeML may have 50% of the equity capital in the SPV, with other institutions holding the balance 50%. In order to initiate the process of setting up the SPV, NABARD may be designated as the lead institution, which can invest 50% of the capital to begin with and later on divest it in favor of banks and other financial institutions.

   The authorized and paid-up capital of the SPV is proposed at Rs 15 crore. NeML can bring in its contribution by providing rights to use the UMP, which can be valued and equity shares for Rs 7.50 crore can be issued to it. The balance of Rs 7.50 crore would be brought in as cash by NABARD, which would then be divested in favor of banks and other financial institutions. In addition to equity capital, a sum of Rs 20 crore is proposed as seven-year debentures, to be contributed by the promoters. While the contribution of NABARD and others may be through cash, NeML may provide services during the initial period against the issue of debentures. Any services exceeding the debentures issued would be paid for by the SPV. Thus, the initial cash requirement for creating the institution is Rs 7.50 crore, excluding the debentures, which would be repaid eventually.

   A shareholder agreement may be concluded between NeML and NABARD providing for the functioning of the SPV, ensuring that the need to retain the private character of the SPV is not diluted. The operational expenses of the company would be met by all the states that avail its services, through a transaction charge.

h. **Infrastructure in states:** State governments/individual markets have to provide for necessary infrastructure for operating the UMP which includes,
   i. Providing necessary computing infrastructure like tablets, laptops, printers, uninterrupted power supply systems, air-conditioning arrangements, reliable internet connectivity, and other such requirements in the markets;
   ii. Establish laboratories for quality testing of the produce and maintaining such laboratories, and providing for consumables;
   iii. Deploying adequate data entry personnel or bar-coding at the market and warehouses for recording of lots, at the gate entry and exit.

The outlay for (i) and (ii) would typically cost Rs 30 lakh and 500 markets in the first phase may require Rs 150 crore. This may be met through various GoI schemes (like Rural Infrastructure Development Fund and Agritech Infrastructure Fund) and can be given as outright grant from the GoI funds. Ongoing expenses, namely (iii), has to be defrayed by the individual markets out of their income. As this would be in the order of ₹10 lakh to ₹12 lakh per annum per market, the same should not be a burden, at least for the larger markets. For smaller markets, arrangements may be worked out in due course.

i. **Execution at state level:** A State Implementation Unit (SIU) may be established in every state that would coordinate all the activities essential for implementation. An officer of suitable seniority, who can liaise with all the concerned departments, take the Directorate of Agriculture Marketing and the State Marketing Board into confidence and implement the reform agenda, may head the SIU. The SPV shall have complimentary staff at the national level for every state and support the SIU appropriately in implementing reforms.

j. **Funding and timeline:** The initial outlay required is ₹ 177.50 crore. Details are available in Annexure 3. The time schedule for implementation may be seen in Annexure 4.

Creation of a Special Purpose Vehicle (SPV) for initiating and implementing reforms

a. Create a **state level agency** that brings together various APMCs/Warehouses/Testing Laboratories/ Agricultural Markets/Participating financial intermediaries. The Karnataka Model of starting a Special Purpose Vehicle (SPV) Rashtriya e Market Services (ReMS) with a private commodity exchange NCDEX for technology participation is a viable model. The goal should be to create a not-for-profit institution that would balance the interests of various stakeholders with their financial contributions.

b. Perhaps, there is a need to include other stakeholders with expertise in warehouses, grading, assaying, and finance as equity partners.

c. The SPV should be the engine driving the reforms and can have an individual existence once the reforms reach an advanced stage of sustainability.

d. The SPV will have to carry out the following responsibilities:

- Facilitating ICT implementation at APMCs with the help of various technology partners, including hardware and software;
- Identifying partners for creating scientific warehouses and facilitate PPPs;
- Identifying partners for creating testing laboratories and facilitate PPPs;
- Identifying and enrolling various warehouse management services providers, including logistic services and facilitate their partnerships in creating warehouses;
- Identify the possible technology options for improving the warehousing infrastructure; and
- Facilitate the linkages between such institutions and the concerned regulatory authorities.

e. The SPV will have to pay attention to handle the collusion of interests that are opposed to the interests of producers, while facilitating such partnerships. The linkages of an SPV are shown schematically in Figure 4.

Create a new regulatory structure for agricultural standards

Currently the Agricultural marketing (AGMARK) division of the Ministry of Agricultural and Cooperation owns the responsibility for notifying standards under Agricultural Produce (Grading and Marking) Act, 1937. The department runs 22 testing laboratories of high quality, and has schemes for technician training and laboratory accreditation. Other testing laboratories are recognized either by Bureau of India Standards or by National Accreditation Board for Testing and Calibration. There is a need to review the process of regulation and create a unified regulatory agency for agricultural commodity testing.

a. Create a national level regulator for agricultural commodity standards, such as **National Agriculture Standards and Testing Organization (NASTO),** with representatives from different agencies that would

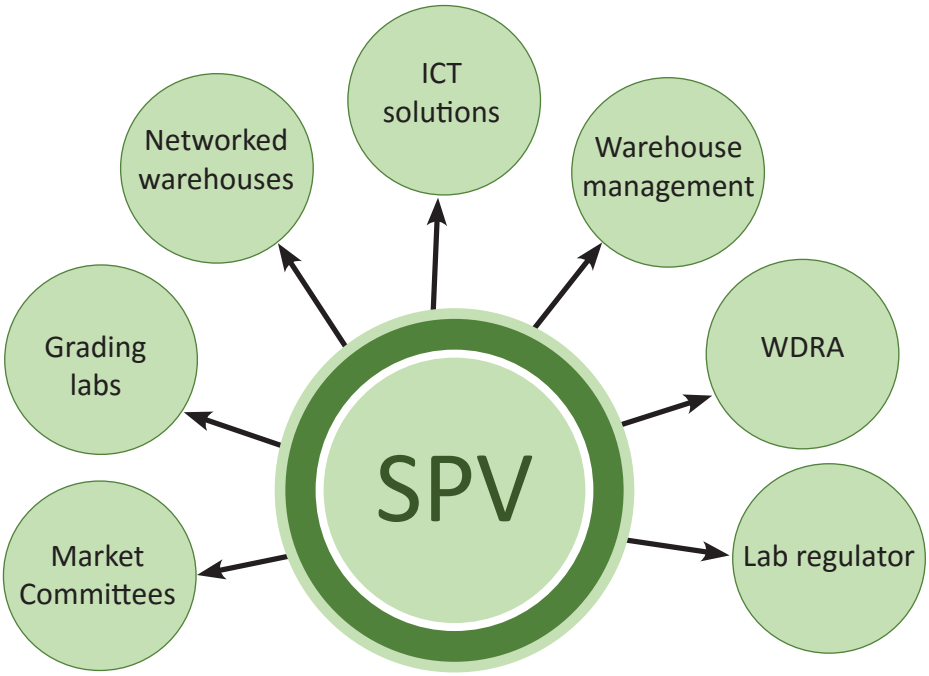

Figure 4. The linkages of the proposed SPV.

have the authority to set the standards looking into all technical aspects of grading and assaying on a continuing basis for commodities that are traded based on the needs of agricultural markets.

b. The standards specified by the authority should be mandatorily adopted in online trading of agricultural commodities.
c. The existing accreditation system of laboratories, as far as agricultural grading is concerned, has to be modified by bringing the accreditation of such facilities under the new authority, since the practices of agricultural assaying and testing are different from each other, like medical laboratory practices.
d. The authority should have linkages with reputed agricultural research establishments across the country for continuous improvement of standards and conducting inspection of grading the facilities.
e. The authority should initiate action to select laboratories across the nation and facilitate their upgrade to international standards, so that these laboratories function as knowledge repositories for the agricultural testing practices. Inputs provided by such elite institutions should be part of the policy reviews.

Change the regulatory practices of APMCs

a. The State Agricultural Marketing Boards (SAMB) and the Market Committees (MC) act as market regulators. There is a need to redefine their role in the proposed setup.
b. The SAMB has to function under a similar apex organization at the national level and it should be functionally independent from the state government.
c. All license holders should be identified with unique numbers and the same is linked to the AADHAAR / Bank Account numbers.
d. SAMB should be allowed to provide state level licenses for trading in agricultural commodities in any of the APMCs across the state or in any of the commodities.
e. Producers should be allowed to participate in any market within the state geographical boundaries.
f. There should be a provision to authorize all the developmental activities.
g. The SAMB should publicly announce a code of behavior for CA and other market participants and announce a binding dispute resolution mechanism for the APMCs.

h. SAMB should ensure operational autonomy for the warehouses and testing laboratories operating in a particular market area.

i. The management at all levels should be made more professional.

2.2.5. Increase importance of FPOs and Producers Company

a. In the current scenario, FPOs and PCs are the best institutional structures to reach out to the majority of farmers. During the first 10-year period (2002-2011) there were about 200 PCs registered all over India. However, during the last three years (2012-2014) there has been a big boom with nearly 1000 new PCs having been formed, and the time is apt to use this institutional structure to enhance the farmer outreach.

b. FPO/PCs have proved to be successful in creating value for the farmers while marketing the produce. This can be done either with or without a future market (Annexure 3). Government can facilitate the creation of such institutions as a 'market maker'.

c. Many FPO/PCs created in the past have experienced mixed outcomes with limited institutional assistance.

    - HAFED – an apex producer cooperative in Haryana – participated in the NCDEX wheat futures during the year 2006-2007 to hedge the member-producer risks. A combination of the closing out position and short hedging helped the cooperative gather profits of Rs 108 per quintal.
    - In the year 2008, MCX tried to promote awareness among cotton growers in Gujarat. NABARD funded the project with the opening of a trading (Demat) account facilitated by the Kotak Securities. However, the initiative was short-lived due to loss in daily settlement.
    - Farmer organizations in Gujarat, Rajasthan, and Madhya Pradesh are well poised to harness the market potential of soybean, refined soya oil, rapeseed-mustard, cumin seed, castor seed, and coriander among others.
    - Some of the initial entrants in the market include SEWA (Gujarat), Ram Rahim Pragati Producer Company and Samarth Kishan Producer Company (Madhya Pradesh), and Ajaymeru Kisan Samrudddhi Producer Company (Rajasthan).

d. The relative success of Small Farmers' Agribusiness Consortium (SFAC) has renewed focus on mobilization of collaborative community structures. Capability of these institutions to access the futures markets for price risk management would enable these smallholder aggregates to derive utility from economies of scale.

e. Currently, apart from a few plantation cooperatives, the participation of aggregators in the market remains insignificant, and the ability to take risk in future markets would ensure quality adherence and better price realization for smallholder farmers in the long run, e.g., coffee producer company in Colombia (See Box page 20).

f. Increase market access to small farmers through producer companies. Small farmer production systems need to shift their operations from sub-optimal returns to optimal returns. Collectivization by producers is the key to overcome different gaps in the market. The collectivization/aggregation are possible through producer's enterprises themselves. The PCs can exercise more control over the value chain. Thereby, small farmers would be able to realize more value from their produce.

Procurement of produce at the farmers' doorsteps is a key step. It needs extensive backward and forward integration. The PCs need to provide commercial procurement service. Minimum Support Price (MSP) based procurement will be a part of commercial procurement and be taken up when the open market/ *mandi* price dips below the MSP. This would enhance producer earnings, introduce transparent process in procurement, weighing, direct cash payment, minimize delays in transactions and avoids distress sales.

Some pilots may be taken up across the country to promote PCs and link up with the local markets. It also needs brand building for its products, besides focusing on the following activities:

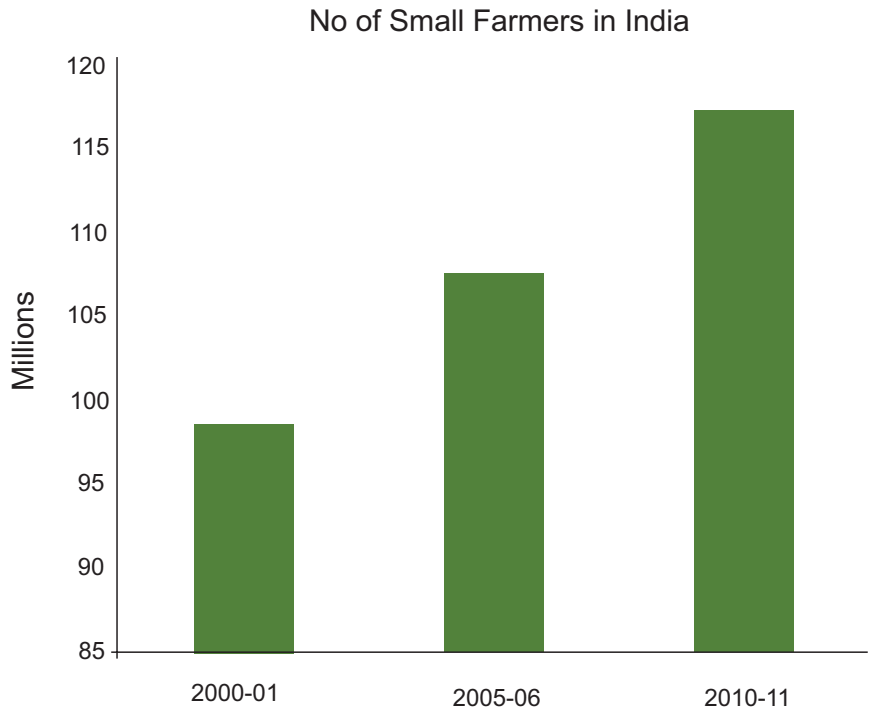

Figure 5. Number of smallholder farmers in India.

- Commercial procurement of agricultural commodities from farmers
- Trading of agricultural commodities after storage
- Establishment of own warehouse, required accreditation and processing unit
- Processing and value addition
- Product development, packing, grading and quality control
- Product promotion and distribution.

Potential Areas for Pilot

- The Himalayan states (J&K, Himachal Pradesh, Uttarakhand and northeast India) could be chosen for the pilot, with a focus on FPOs involved in horticulture/ fruits and vegetables – commodities that benefit the most from mobile-enabled market integration.
- Required Steps are: i) Formulate project Vision, Mission and Deliverables, ii) Develop Operational Strategy, iii) Project Execution
- Approximate Duration: 3 years
- Partners include: Ministry of Agriculture, State Agriculture Department, Donor Agency/ Development Bank, Commodity Exchange Index, Local NGO, Institutional Procurer/ Buyer, Private Sector Procurer/ Buyer, Financial Sector Partner and FPOs.

Marketing Reforms Needed in Horticulture Produce

a. Horticulture produce marketing has been a neglected area. Significant improvements are required in the case of marketing of horticultural produce. Alternative market structures should be encouraged

Coffee Trading in Colombia vis-à-vis Kenya – Need of a strong Producer Company

Kenya is renowned for its fine quality coffee. However, due to the generally uneven quality, the reputation of Kenyan coffee has suffered over a period. The origin differential is much more unstable in Kenya as compared to Colombia. As a result, the Kenyan exporters are reluctant to sell forward to their clients, while the Colombian coffee can be traded up to two years forward.

The difference arises from the presence of a strong producer company. In Kenya, the best quality coffee comes from smallholders, as unlike large coffee estates, they do not economize pulperies. However, this cost is deducted from the farmers' payments, which leads to low yields for the farmer himself. In Colombia though, self-funded powerful and successful farmers' organizations like The Colombian Coffee Growers' Federation have been around for many decades, where élite farmers have collaborated with the smallholders to compete with the global coffee markets rather than competing internally.

for horticultural crops. Horticulture is characterized by the presence of a large number of small-scale producers bearing associated risks of perishability, seasonality, and availability of produce.

b. To assist small farmers located near the urban centers and establish Direct Marketing. For eg, Rythu Bazaar has been very successful in Andhra Pradesh. There is a need to replicate such reforms in other states as well.
c. Encourage producers companies, farmer co-operatives dealing with direct marketing of horticulture products through infrastructure and institutional support.
d. Since liberalization and decontrolling of perishable commodities has been advocated, it has been suggested to delink the same from the APMCs sphere and allow e-trading in such commodities. The Delhi Kisan Mandi supported by SFAC, established in Delhi[2] is a good example.

The platform allows the farmer as well as the buyer to be registered before bringing his produce to the market with the help of a franchisee. The required KYC (Know Your Customer) documents can be submitted online through scanning. The traceability is also not an issue as the machine generates a separate lot number when the entry of the lot is done in the system. This platform also helps the agencies to maintain the database of farmers, buyers, arrivals and price discovered. Online primary sales bill is generated by the system once the farmer approves the price received from the auction platform. Once the delivery is complete and the consent of the buyer is received, the money is transferred to the farmer's account.

a. In the existing APMCs where horticultural produce is transacted, initiate grade-based transaction so that number of times the produce is handled can be reduced and also a proper basis for pricing can be set. Separate sections in the market yard need to be established with proper facility of display and auctioning for perishable products. Electronic processing of bills and automatic payment directly to farmers account needs to be established in order to reduce the role of commission agents and prevent illegal deductions.
b. Develop grading and packing centers, along with facility for cool chain infrastructure, if required at *hobli*/*taluka* level, for the aggregation and sale of horticultural produce in the major producing areas. Introduce electronic transaction facility in these centers. This would reduce the number of times handling is done, reduce wastage of the fruits and vegetables as well as ensure higher prices by preserving the quality. In addition, there is need to train the farmers in using appropriate technologies like proper harvesting techniques, packing, and handling and transportation. Allow the private sector to establish such grading and packing centers with appropriate quality service requirements. Having an accredited assayer to do the grading and packing will help in selling it in the spot exchanges.

2. http://delhikisanmandi.in/how-km-works/

Bangladesh offers a good model for logistics through Amerdesh e-shops[3] that have doubled farmer's realized income for perishable commodities using a network of village packing facilities.

c. Encourage PCs or cooperatives to undertake value addition activities such as grading, sorting, packing and branding of horticultural produce.
d. Encourage large terminal markets to emerge for perishables in major producing centers.
e. Facilitate contract production by actively promoting contract registration at the APMC.
f. Create Electronic Marketing portals to assist the producers of thinly traded commodities such as medicinal plants.

Livestock Market

Presently, there is little or no policy intervention on dairy animal market in India at the local, state and national level. Hence, it is operated by local private traders who have liquid cash and utilize the distress sales situation of farmers, where in animals with high milk-yields are bought at the price of meat and then sold as milk-producing animals to other farmers. Thus, both consumer surplus and producer surplus is captured by traders at the expense of farmers.

As regards dairy animal identification, there is a RFID (Radio Frequency Identification) system in place wherein ear tags are used for animals bought against credit from the formal sector and insured. Here, it is used only for proving identification of the animal after death, at the time of an insurance claim. Less than 5% of the productive animals are said to be insured across the country and identified in this manner. The percentage and number of animals bought on credit are much lower. As a result, dairy animal rearing is one of the potential rural livelihoods that is not being fully exploited due to low debt leverage. So, more than 95% of the total bovine population is not identified uniquely.

Even for animals that are identified, no information related to the animal is collected and linked to it on a dynamic basis. Only some basic details about the animal and farmer are recorded at the time of registration and remains on paper in the loan-cum-insurance application form. It is used only at the time of claim, merely to confirm that the claim being made is against the animal originally insured. Hence, the data so collected is unavailable for further research, analysis and policy formulation.

a) Bovine Identification System (BoIDS)

To begin with we need to uniquely identify every single dairy animal of all ages and both genders using BoIDS. Under BoIDS, all bovine animals across the nation would be ear-tagged using a unique identification number. The number would be similar to the one used by the Road Transport Authorities of different states. It would enable tracking back of the animal to its place of birth or place of first registration.

This would enable all institutions, be it public or private, providing breeding, health and nutrition advisory services to be able to effectively target and monitor their services. For example, disease outbreak, vaccination coverage, number of animals bred or pregnant can be tracked on a day-to-day basis. As a result, policy formulation and strategies on these important issues can be grounded on live-data and tailor-made to local conditions. Further, responsibility at an individual level can be easily fixed for the outcomes expected – in terms of sickness rate, conception rate, calving rate, age at first calving, inter-calving period, etc.

Unique identification of bovine population would have to be done state-wise and district-wise, in a phase-wise manner. Experience in this regard in Gujarat shows that within six months, all dairy animals in a district can be uniquely identified using plastic ear-tags and one-time information related to basic profiling of animal and farmer can, not just be collected but also be collated. As of now, six districts in Gujarat are fully covered under this animal identification program. It was funded by the Department of Animal

3. http://amardesheshop.com/

Husbandry and implemented by the respective milk unions. An analysis of the utility derived from this program at the institution level as well as at the level of the farmer would give us more understanding of how this identification program for dairy animals can be executed in other states across the country.

The cost of a plastic ear-tag is around Rs 10 to Rs 15 per piece. Adding another Rs 5 per animal for actual tagging and related registration work, the cost of animal identification program is expected to work to around Rs 20 per dairy animal. As per 2012 quinquennial census figures, India has about 20 crore bovine population. Hence, it would cost Rs 400 crore to identify every one of them. This amount is expected to be lower as there has been a continuous fall in population after the year 2007, especially indigenous cattle which form 50% of total bovines in the country.

Hence, if all institutions and farmers put together can benefit Rs 20 per year per animal on account of BoIDS, in terms of net output or efficiency, this amount of Rs 400 crore can be recovered within a year. More importantly, there would be saving of Rs 400 crore per year from the second year onwards for perpetuity, for the country as a whole.

In addition, there would be savings on the money being spent on the quinquennial survey for dairy animals, as data on bovine population would be available and updated 24 X 7 and be monitored and analyzed across the country.

b) Dairy Animal Information System (DAISy)

DAISy would firstly enable every farmer to track his/her female animal on individual basis, for all important techno-economic parameters. This information is expected to enable the farmer rear the animal in a more efficient and easy manner and monitor its progress on a dynamic basis. It would also enable them to compare production of their animals with that of their peers in the village.

Secondly, DAISy is expected to play an important part in creating a competitive market for female dairy animals and their progeny (both male and female calves). As of now, seller/owner of the animal (the principal) knows more about the animal than the buyer, financier or insurance company (the agent). Hence, the agent is at a disadvantage compared to the principal, about the true quality of the animal. Therefore, the agent is hesitant to participate in such markets. The agent is willing to value the animal only at a discounted price to the true potential as it accounts for the uncertainty about its quality.

DAISy would reduce the risk due to information asymmetry in the animal market. The animal identification system earlier described would form the foundation of DAISy, as all information related to an individual animal can be linked to it.

Therefore DAISy is expected to enable more buyers to participate in the dairy animal market with higher quality animals coming into the market and also realizing higher prices. Financiers are expected to come forward with new products for dairy animal purchases and more loans and for higher amounts. Insurance companies would be able to offer tailor-made, risk-mitigating products based on the information relating to the animal and farmer. In fact, an animal-cum-farmer specific credit rating system can be put in place, which would free the farmer from past credit history, be it positive or negative and build an independent credit rating system. Hence, this animal-cum-farmer risk rating would enable them to avail credit irrespective of their past records on loans. In fact, this would pave the way for all landless farmers to become eligible for credit, through a single policy change. Not only long-term credit but also short-term credit (even a limited overdraft facility) can be made available. Once such credit is available and financial risk of rearing dairy animals is reduced, more farmers are expected to take up animal rearing and therefore the reduction in population growth can firstly be stemmed.

The Animal Information System would provide information about the animal to the farmer in an easily accessible and understandable format, over the cell phone using FDID readers. Animal data entered is corroborated and confirmed at the time and point of entry, to allow the farmer and the respective agency to take responsibility for the data entered. The data collected is given in the format shown below along with the frequency of collection and the agencies that would be responsible for the same. It can be

seen that the role of the farmer and the farmer's collective is very high as they are involved in all data. The veracity of the information so collected is double checked and maintained by this method. It is also available for cross-verification, on a random basis by accredited local agencies.

A severe penalty system shall be put in place for those trying to beat the system. For example, in case of any discrepancy for the first and second time, the farmer would be given an opportunity to check and correct the error, if any. In case of discrepancy for the third time, then the farmer and all the related persons would be black listed with one black star. For the fourth time, a second black star would be given and if for the fifth time discrepancy is noted then the animal would naturally become de-listed having earned three black stars.It is expected that all genuine and interested parties would work towards not earning black stars/negative rating.

Data would be entered in a dynamic manner 24 X 7 using applications on smartphones and every single identified animal would be locked to the owner, health and breeding service provider and the milk marketer through their individual cell phones. Cost-effective information and communication technology (ICT) available today, beginning with resources available on the cloud by way of low cost smartphones, makes the creation of this platform not only feasible but also affordable and self-sustainable. This would enable tracking and verifying each data entered against an animal in terms of time, place and person.

Peer-to-peer pressure and supervision shall form the foundation of veracity of all information with a severe but transparent penalty system for those entering false data or trying to beat the system. The onus of veracity of information relating to animal would fall squarely on the owner and the respective service provider. DAISy as the animal information integrator shall be an independent agency and be cloud-based. DAISy shall liaise with different implementation partners, area wise, for data collection (Figure 6). This is expected to reduce manpower usage and be economical. The personnel operating the system in implementation and partner organizations shall be accredited for data entry on individual animal basis. The farmer shall be the sole and whole proprietor of the data on individual animal basis in DAISy.

Information collection format.

Sl.	Information detail	Frequency	Agency
1	Milk yield	Daily	Farmer
2	Milk yield & quality	Once in 10 or 30 days	Milk marketer & Farmer collective
3	Breeding, conception confirmation calving and calf identification	As and when it occurs	Breeding service provider & Farmer collective
6	Prophylactic and tests for contagious diseases including sub-clinical mastitis	As and when it occurs	Preventive health service provider & farmer collective
7	Disease outbreak	Immediately on observation	Farmer
8	Disease outbreak	Within 24 hours of farmer reporting	Preventive health service provider & farmer collective
9	Therapeutic intervention	As and when it occurs	Therapeutic health service provider & farmer
10	Animal registration	Within 24 hours of birth or purchase	Breeding service provider & farmer
11	Animal purchase & sale		Dairy animal exchange (NADaX), health/ breeding service provider, milk marketer, farmer & farmer collective
12	Credit for / against animal	Immediately	Farmer, farmer collective and credit agency
13	Animal Insurance	Immediately	Farmer, farmer collective and insurance company

However, this data shall be used to provide public animal information system (DAISy-Network) on village, *taluka*, district level, animal type basis.

At present, National Dairy Development Board is operating an online animal information system under the name National Dairy Animal Production and Health Information System (NAPHIS) and said to be operational in six districts of Gujarat. However, collection of the data is vested with a third party and is to be made over computer. The farmer has no or only a limited role in ensuring its veracity. Most of the time, the data is not available to the farmer or even the agency that records the data and requires an additional monitoring system in place to ensure veracity. Further, it is a "stand-alone" system, being not linked to the market or the credit agency or the insurance company. As a result, neither the farmer benefits from it nor the credit or insurance agencies.

The cost of establishing DAISy (hardware and initial software related to collection, storage and retrieval) is expected to be borne by the Central Government and the respective State Governments (based on the number of animals), whereas recurring cost of running the system is expected to come from individual dairy farmers as well as breeding and health service providers, credit and insurance agencies, etc., on pay-for-use basis. Entry of data would be free but accessible only by a pre-defined person and cell phone. Withdrawal of data by all agencies including the farmer would be on "pay-for-use" basis. The farmer would be able to graphically view information related to his/her animal free of cost 24X7. However, if the farmer requires certification for the data relating to the animal he/she would be charged. All institutions being bulk consumers of such data are expected to provide a regular stream of income.

It is expected that the market would give a higher rating for such animals with data from DAISy and hence fetch a higher price, encouraging the farmer not only to enter such data but also obtain fee-based information relating to the animal. In addition, money spent on annual survey of animal productivity of dairy animals would be saved as this information would be available live on a dynamic basis and be able to be analyzed to effect suitable policy decisions, based on real facts not estimates.

A new technical agency would have to be created to operate DAISy.

c) Dairy Animal Information System Network (DAISy-Net)

DAISy-Net shall collect and provide online public information, based on the private information available on DAISy platform. Some examples of information captured would include lactation curve, mean, median and mode of age at first calving, inter calving period, lactation total, and estimated animal market value.

Such information would be made available free of cost online and shall be updated at regular, pre-defined frequency for every independent variable that is reported. Hence, DAISy-Net would be able to provide an up-to-date suitable "reference point" for all technical and economic parameters relating to a dairy animal against which they can compare any animal, including their own or an animal which they envisage purchasing or selling. In case farmers are willing to pay, certification and ranking services can be provided for an individual animal. Credit and insurance agencies are expected to be bulk users of this rating system and benefit from it. They would provide a regular source of income for the DAISy-Net to operate and take care of its recurring expenses.

However, the establishment cost of DAISy-Net is expected to be borne by the Central and respective State Governments as it would be a public utility service with much positive externalities.

With this rating, it is expected that farmers, farmer groups, villages, *talukas* and districts would compete healthily with each other, improving overall quality of the dairy animal population in the country, village-wise, *taluka*-wise, district-wise, state-wise and animal type-wise. It is expected that an agency like Reuters which is already in the business of providing online information would set up and host the DAISy-Net platform.

d) National Dairy Animal Exchange (NaDAX)

The first step in the creation of NaDAX is to run the BoIDS and DAISy for online trading of female animals and their male and female calves. NaDAX would operate on two different platforms. One is a pure "sale platform" wherein buyers or sellers can quote their price and the type of animal. If a buyer or seller is willing to purchase or sell it at that pre-decided price, they can enter into contract and NaDAX would perform all related functions of an online exchange [on the lines of National Stock Exchange (NSE)]. This would include clearing and payment of the trade. The private information regarding an individual is made available to only prospective buyers for a specified period, under explicit permission from the seller / owner. Post sale, the information related to that animal becomes the property of the new owner.

The second trading platform is an "auction platform" wherein sellers of high quality animals (classified as A-class by DAISy-Net) could put them up with a minimum base price and invite bids higher than that. The bid would end at a predetermined time and if both the parties are willing to buy/sell at the final bid price, the trade gets activated and NaDAX would help in settling the trade. The funds required to establish NaDAX is again expected to come from the Central and State Governments. However, operating costs are expected to be generated from the commission on sales and purchases made on NaDAX.

Farmers are already using private online platforms for the purchase and sale of animals. One such platform is olx.co.in. However, these platforms do not provide any guarantee about the animal or about the seller. Hence, the problem of information asymmetry remains in this market though of course their market reach has increased through online dissemination of information about the sale. It is expected that the National Commodity Exchange has the technical capability and wherewithal to operate both the sale and auction platform of NaDAX.

e) Summary

Information asymmetry on dairy animals results in sub-optimal pricing and value capture by farmers. By uniquely identifying the dairy animal using Bovine Identification System (BoIDS) followed by establishing Dairy Animal Information System (DAISy), information regarding individual animal and farmer is documented and privately maintained. Thirdly, public information is generated from this private information and made available as a public service under Dairy Animal Information System – Network (DAISy-Net). Finally, the animals are marketed (either sold or auctioned) using the online National Dairy Animal Exchange (NaDAX) sales or auction platform. This is conceptually shown in the figure below:

It is suggested that states run this on a pilot-mode in a step-wise manner enabling the personnel involved to get a hands-on-learning experience and then spread it to the entire state.

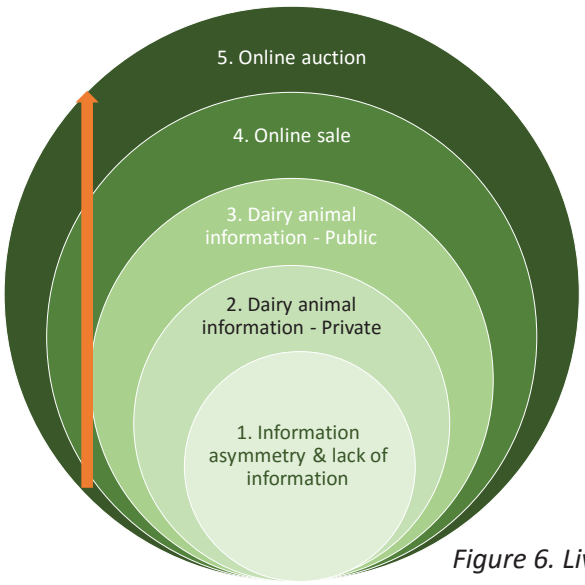

Figure 6. Livestock information system.

2.3. Financing

Appropriate payment arrangements will go a long way in redressing farmers' grievances in many ways. It enables price discovery, incentivizes agriculture, saves them from unfair interest rates and improves self-dignity. It has also other positive social benefits.

Initiate electronic payment system

a. After billing the amount payable to a farmer, it should be transferred to the farmer's account if the farmer agrees to sell at the tendered price.

b. The money payable to the farmer is automatically transferred to her/his account from the buyer's account.

c. Farmers can withdraw money at the bank counter in the APMC premises or at any other place, they can also use a Kisan Credit Card account.

d. The account number should be recorded in the farmers' database.

Linking warehouse with financial institutions

a. Warehouses need to be linked with banking gateways to enable the direct transfer of payments. (Haryana Warehousing Corporation)

b. Technology would enable creation of digital NWR. (Annexure I)

c. The farmer should have the option of selling the produce immediately or in future.

d. If the producer opts for an advance on his NWR, an automatic trigger should enable the banking partner to deposit a predetermined percentage of value of the product into the seller's account.

e. Upon sale of the produce, the balance payment due to the producer should be credited into his account immediately and the bank will have the right to recover the dues, if any, from the producer's account.

f. The operational costs of a producer for depositing his produce in a warehouse should also be paid to the warehouse by the banking partner as an overdraft that can be a part of agricultural lending portfolio of the bank. This amount can be recovered while selling the produce.

g. WDRA should independently verify quality of commodities stored in warehouses and, in case of automated systems; they should verify the equipment used for the purpose.

Technological upgradation for FPOs and PCs

a. Information Technology (IT) is the primary tool that can optimize the agri-value chain to minimize revenue leakage at the grassroots. With the launch of NAM and the aggressive approach towards operationalizing *e-mandis*, establishing the infrastructure and building knowledge capacities of farmers to sell through these electronic channels would require substantial initial investments.

b. Through this scheme, the government would provide financial assistance to the FPOs and PCs in need of financial assistance to improve their physical infrastructure in the office domain / trading node infrastructure and procurement/ upgradation of IT-based infrastructure.

c. Only FPOs and PCs should be eligible. This would help in focusing on collaborative groups of smallholder farmers.

d. Access to Finance and Markets is one of the primary reasons why smallholder farmers are expected to collaborate in groups. However, in the absence of clear guidelines, the crucial aspects of developing a commercial business interface and ensuring up-to-date IT infrastructure can make the difference between a successful and a debt-ridden producer company. This leads to a chicken-and-egg situation where despite credit deployment, the farmer groups are not able to harness the capital in a profitable manner.

Focus on 'Women' in Northern Rural Growth Program (NGRP), Ghana

The Northern Rural Growth Program (NGRP) focuses on strengthening linkages among the various actors in agricultural Value Chains (VCs) – including producers and their organizations, suppliers, service providers, financial institutions, aggregators, "off-takers" (such as processors, traders and exporters), researchers and administrators. The program supports private-public partnership arrangements to ensure that smallholders have access to finance and markets. The program includes a specific window for "women's crops" to promote VC development. This has facilitated women's access to land and other productive resources. Women have been able to triple their incomes through direct linkages to international markets.

Women have also increased their participation in other commodity windows and women VC actors are now represented on district Value Chain committees. Women account for two-thirds of program participants. The program works with the gender desk officers of district assemblies and government institutions and has also engaged with paramount chiefs to enhance women's economic empowerment through access to land.

e. This scheme would envisage benefiting at least 1 million farmers across the country by inducing investment into infrastructure upgrades along with enhancing the technical skills of individual farmers.

f. Potential Areas for Pilots**:** The Himalayan states (J&K, Himachal Pradesh, Uttarakhand and North East India) could be chosen for the pilot, with a focus on FPOs involved in horticulture/ fruits and vegetables.

g. Required Steps: i) Formulate project Vision, Mission, and Deliverables, ii) Develop Operational Strategy, iii) Project Execution. Approximate duration will be three years.

h. Partners include: Ministry of Agriculture, State Agriculture Department, Donor Agency/ Development Bank, Local NGO, Institutional Procurer/ Buyer, Private Sector Procurer/ Buyer, Financial Sector Partner.

Budgetary support

- For creation of NAM, Rs 200 crore fund has been created with the help of Small Farmers Agribusiness Consortium (SFAC). Similar arrangements can be explored to focus funding on agricultural market reforms.

2.4. Policies

Immediate

a. The identification of producers, CAs, traders using unique identification like AADHAAR and linking of bank account numbers.

b. Enabling e-tendering in all APMCs.

c. Creation of a grading standards authority and harmonizing grading standards. Specifying standard testing methodology and making the same binding for agricultural commodity trading.

d. Creating warehouses or upgrading existing warehouses with private investment. Bringing such warehouses into a network with financial partners, testing labs, and APMCs for monitoring of lot level transactions.

e. The systems and procedures that are to be adopted by a warehouse, the testing units, financial partners and traders have to be codified and laid down as binding guidelines by the concerned regulators.

f. Creating transparent and openly announced dispute resolution mechanisms.

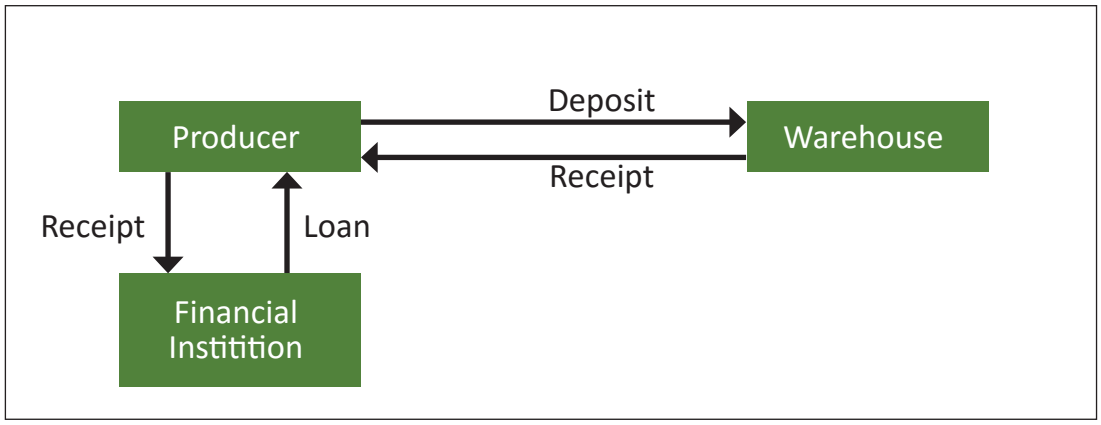

Figure 7. Warehouse receipts on financing process.

Warehouse financing

a. Creating new norms for financing, changing the agricultural lending policies to include automatic credit and debit from account holders from the sale of warehouse stocks.

b. The insurance requirements for warehouses add substantial costs to warehouse operations. Technology based warehousing will bring down the operational costs to a substantial extent.

c. Warehouse regulators need to review the norms of risk assessment also in addition to the physical inspection norms.

d. Insurance providers also have to be sensitive to these changes and have to bring in innovative solutions, like real time premium adjustments on a day-to-day basis.

Facilitating

a. Creating producer and buyer databases and linking them with other databases. Capturing agricultural production and trade data using standard quality specifications.

b. The AGMARKNET currently provides real time *mandi* prices. The same network may have to be integrated with the future commodity exchange data, so that the price discovery based on future price movements is integrated with the current prices.

c. Recognizing the mobile testing and grading labs and organizing the mobile markets.

d. There should be a rationalization of revenue realization for different operations of the market, so that the present system of charging market fees from the traders can be dispensed with.

e. Market committees have to be recognized as a form of local bodies and they have to raise their finances through other tax avenues.

2.5 Capacity building

a. Adequate education of all stakeholders needs to be undertaken as a confidence building measure.

b. It may be difficult to immediately source skilled manpower to run the standard labs at APMC premises. Along with the initiatives to improve assaying and grading at APMCs, a scheme for training young educated youth in assaying and grading needs be taken up.

- For instance, during *chana* (chickpea) procurement by SFAC, various collection centers were opened at the village level. The assaying was required to be done every time any farmer brought his produce. Hence, as the technical and logistic support partner of SFAC, National e Markets Ltd (NeML) was given the responsibility to train some of the young people at the village level to assay *chana*. Portable moisture checking machines were installed in all the collection centers.

c. Farmers have to be educated about the benefits of improving the quality and role played by the warehouse based agricultural marketing. The educational process needs to be strengthened by making use of the existing network of agricultural personnel at the field level and other media channels.
    - For instance, Krishi Vigyan Kendras (KVKs) can play a major role in educating and capacity building of the farmers. The new and advanced practices of farming can be taught to the farmers in a practical way by means of KVKs. The good thing is that KVKs are open at the district level and are accessible to everyone at a small fee.
    - Capacity building programs can be run in association with the NGOs as resource institutions and FPOs as the enabling body. This will strengthen the institution of the FPOs as well.
    - The Kisan channel of Doordarshan can be extensively used for this purpose.

d. A partnership between government, agricultural universities, and institutions dedicated to rural development can be explored along with the integration with the existing agricultural extension schemes.

e. There is a need to professionalize APMCs management. A PPP model of managing APMCs may be tried out to improve the management and make it farmer centric.

f. Provide training to the departmental staff to prepare for implementing the plan of action. In addition there is a need to focus on capacity building of various market functionaries (farmers, traders, brokers, processors, etc.)

Developing PPP Expertise – Institutions for Training Farmers, Agriculture and Financial Institutions

PPPs were built based on the idea that private companies provide capital for investment and technological innovations, while public bodies provide knowledge, distribution services, and global networks to understand the implications of this new development paradigm. Successful PPPs in agriculture are ideally global networks of private and public sectors, rather than single projects. These global networks have three important advantages: project-based learning, potential for up-scaling, and knowledge transfer across geographical locations and sectors.

A few successful PPP projects have developed in India and implemented global sustainability standards across food chains and trained farmer cooperatives in sustainable farming techniques and making food more marketable and safe by engaging multinational companies. However it requires the engagement of the community to achieve long-term implementation of comprehensive food security strategies.

Without a well-organized rural population with accountable, effective, inclusive rural governance, there is very little likelihood that the private sector and value-chain development will contribute to successful and scalable partnerships. There is a need to understand how to build trust and provide incentives to share knowledge and participate. Partners may not only have different interests, but also follow different norms, values and principles of action, including non-hierarchical forms of community-led cooperation.

Suggestion: Center for PPPs and Stakeholder Convergence in Agriculture

This center would specialize in conceptualizing and assimilating the theoretical as well as the implementation aspects of PPP projects in agriculture, and create

a. a centralized repository for agricultural and financial institutions to tap

b. a hub-and spoke model for knowledge dissemination to farmers/ farmer groups

The unique aspect of this institution would arise from the fact that it will solely research on PPPs in agriculture, and there would be a strong focus on implementation. Developing such project specific capacities will be crucial to ensuring the success of National Agriculture Markets while operating in varying geographies as well as languages, trade mechanisms among others.

2.6 Other suggestions

a. Develop proper action areas for APMCs considering the use of technology in transaction such as e-trading platform. In the current design of APMCs space is used horizontally, not vertically. The building should also be amenable to easy cleaning.

b. Use modern equipment for loading, unloading, handling, packaging, and cleaning.

c. Set up biomass energy stations in each APMC to generate power for the use of APMC utilizing the waste generated each day.

d. While Private Equity investors have already incubated new businesses in crop care, we can look at opening up investment avenues for these funds to aggressively enter agri-infrastructure and value chain opportunities.

e. Integration with Payments Banks: Recent approval for 11 payment banks can be used to enhance the linkages of electronic payments through mobile phones or dedicated hardware at the *mandis.*

f. Another option is to look at crediting the amount directly to the individual farmers' account with these banks, including the option of value added services, and insurance services through the Post Offices among others.

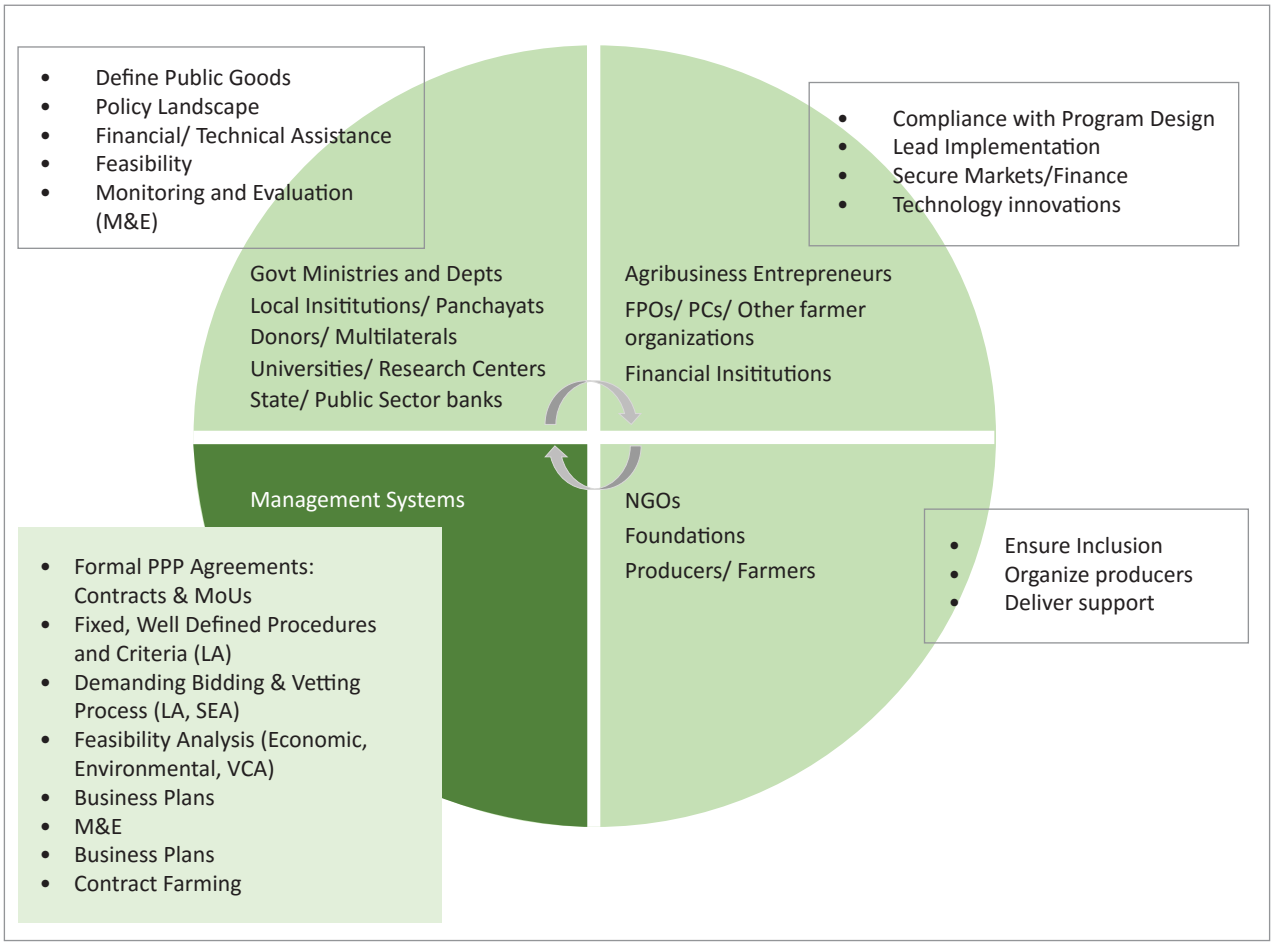

Figure 8. Management Systems to integrate learning, design and evolution of a modern national marketing platform for smallholder farmers.

3. Action Plan

The suggested Action Plan is broadly discussed under the following categories:

1. Group action/collectives-Pos/PCs/Associations to link small farmers to markets
2. Transaction facilitation for inputs and produce
3. Improving competition through optimized value chain logistics
4. Creating conditions for investment in agriculture marketing infrastructure
5. Good governance: Government as a facilitator and not regulator
6. Co-existence of regulated markets and emerging formats of marketing
7. Marketing extension as a strategy to link farmers to markets

3.1 What is new?

a. **Transaction facilitation:** The new design gradually improves the level of technology adopted in agricultural marketing. The proposal in the first stage envisages that the currently available technologies (ICT and cloud computing) have to be adopted with limited disruption to the existing arrangement. At the same time selected markets with better technology awareness, infrastructure and capacity need to be prepared for online trading, scientific grading and warehouse based marketing. In due course, selected markets will adopt advanced technologies of warehousing with computer-controlled silos and real time monitoring currently used in advanced economies.

b. **Improving competition:** The present day markets are dominated by the local monopolies and intermediaries that add to transaction costs without adding much value to farmers and consumers. To a great extent this proposed system will result in disintermediation and high levels of value addition at each stage. It achieves the same with better grading and storage that improves the shelf life of produce and secures higher prices.

c. **Infrastructure development:** The existing grading facilities in the country are quite inadequate for meeting the quality standards. The proposal envisages a big leap in the creation of infrastructure and employment in the field of agricultural grading. There will be a steep demand for skilled technicians trained in assaying and grading work. Similarly, the current technology in storage and warehousing results in high wastage and quality deterioration in a short span with high handling costs. Investments in creating the necessary infrastructure results in greater economic activity.

d. **Good governance**: the model has many innovative features, namely,

- It envisages high levels of private participation in grading, warehousing, and scientific movement of commodities.
- It envisages coordination between various stakeholders for setting standards and monitoring their implementation.
- It ensures transparent and hassle free payment process for the producers.
- It includes a part of unaccounted economic activities into mainstream accounting process.
- It improves the regulatory process.
- It mandates stipulation and regulation of standards for agricultural commodities in an effective and efficient manner that increases farmer welfare and food safety.
- There is tremendous potential for upgrading the skill level of personnel operating in the agricultural markets and create economic opportunity for young women and men.

3.2 Proposed activities

The roles and responsibility of the existing or the proposed organizations and departments at the national and state level.

Organization	Anticipated immediate role	Sources of funds	Anticipated future role	Regulation
Warehouse management companies	Market for these organizations is negligible at present.	Predominantly private. Scope for joint or public sector firms	Employed by warehouses for facility management and logistics.	Ensured through Market. SPV
Warehouses	In private, public or joint sector	Private, PPP or public funds	Enter into contracts with market committees. Network with smaller storage places with improved infrastructure and mobile testing facility.	Warehouse Development and Regulation Act.
Market Committees – existing local institutions	APMC regulator	Market fee (Rationalized), Budgetary support, and rent	Licensing of traders, warehouses	State Agricultural marketing Board
Testing laboratories	In the private, public or joint sector	Private, PPP or public funds	Operate in close proximity of APMCs and warehouses. May add mobile services.	To be regulated by a separate entity
Proposed SPV State level organization	The Market facilitating body at the state level	Equity, Budgetary support	Provider of online auction marketplace	Commodity spot exchange regulator
State Agricultural marketing Board	Regulation of APMC activities	Regulatory charges from APMCs	State level regulator. To be designated as a professional body	Government of India/ Concerned State Govt.
State Agricultural marketing Department	Policy making, regulation and administration	Budget	Policy making	
National agricultural standards organization (NEW)	-	Regulatory fees	Specifying and disseminating standards, Regulation, accreditation and training	Dept. of Agricultural marketing, Government of India
Dept. of Agricultural marketing, Government of India	Policy, regulation, accreditation, administration, etc	Budget	Policy	
Universities/ ICRISAT /KVKS	Technical support/ Market extension	Budget support from State Govt/ Marketing Boards	Advisory/ build farmer groups/Capacity building	Government

3.3 Scale-up chart

For creating the pilot on warehouse based trading, the following scale up program is shown as example.

Crop	Stage of operation	Volumes In tons	No of Households	Value Crores/year	Spatial spread
Copra	1	41,000	35,000	520	Tiptur, Karnataka
	2	54,500	100,000	680	Other important markets of the state (11)
	3	57,500	300,000 to 500,000	710	All copra trading markets in Karnataka

Potential Areas for Pilot for creation of FPO/PC and assist them in marketing, especially in futures market: The Himalayan states (J&K, Himachal Pradesh, Uttarakhand, and North East India) could be chosen for the pilot, with a focus on FPOs involved in horticulture/ fruits and vegetables. The results will be apparent within a period of three years.

Funding

Various options – private, PPP, state or central funding of different activities. Grading standards have to be funded initially from budgetary support within a regulatory framework

Budgetary support is needed for creating the e-trading facilities and creation of FPO/PC.

Convergence

- Funds meant for Rashtriya Grameena Bhandar will be used for creating warehouses.
- The agricultural standards units within Directorate of Marketing and Inspection (DMI), FASSIA and British Standards Institutes (BSI) should be converged to create the National Agricultural Standards Organization
- SAMB should be designated as the state level regulator with professional expertise and delinked from the state agricultural marketing departments.
- Professional Management of APMCs should be encouraged.

4. Process of Implementation

The implementation will have two phases. The first phase is to pilot in an action research mode in a few markets based on best global practices. Real-time monitoring will be done to support agile implementation to ensure smooth functioning of the markets. Once pilot markets are successful, detailed documentation will offer the key drivers, incentives, infrastructure, technology, human resources, systems and processes required to run state markets in an efficient manner. This will help in preparing a detailed manual to scale up the implementation on a national scale. The second phase involves primarily scaling up. Based on the experience of pilot markets, a strategy for effective scaling up will be prepared.

The first phase of developing pilot markets needs careful planning. Considering the current state of inefficient market there are many obstacles to overcome to streamline these markets. The key obstacles are:

1. Benefits of reformed markets may not accrue to farmers immediately. Farmers will participate only when they see substantial benefits. Initially only progressive farmers may take advantage of integrated markets. Building a threshold level where benefits start accruing will take time.
2. The roles of some value chain actors, like commission agents, will change in the new system which means they will not be supportive. It will take time for many players to change their practices with consistent effort.

3. Transparency in trading is not welcome by all players in Indian business. Democratization of information will meet with resistance but social pressure from farmers realizing a higher income will overcome this resistance as has been observed in Bangladesh and Ethiopia.
4. Developing national grades and standards is critical for success. This is particularly true for agricultural commodities where there are multiple parameters for grading and they may also change due to change in the production conditions. This requires a system where there is a continuous research taking place to upgrade the system over time.
5. Warehouse receipt system is another cornerstone for e-trading and bank finance facility has to develop significantly in order to reap the benefits of the NAM. This requires proper facilities, knowledge base in warehousing of different commodities and management skills to effectively offer such facilities.
6. Logistics development to ensure transport of transacted commodities to their destination without delay and deterioration in quality has to take place. Also, quality services in this area is critical to the success of NAM.
7. Capacity development in managing markets and SPV is another critical area for the success of NAM.

Considering these constraints it is important to run successful pilots to showcase the benefits of NAM. Therefore the approach will be as follows (Figure 9).

The recent Budget Speech 2016-17 of the Government of India[4] has clearly stressed on providing access to markets, which is critical to enhance the income of farmers. The Government has decided to implement the Unified Agriculture Marketing Scheme (from 14 April 2016) which envisages a common e-market platform that will be deployed in selected 585 regulated wholesale markets. Amendments to the APMC Acts of the States are a pre-requisite to join this e-platform. Till January 2016, 12 States have already amended their APMC Acts and are ready to come on board. More States have shown willingness to join this platform in the coming year.

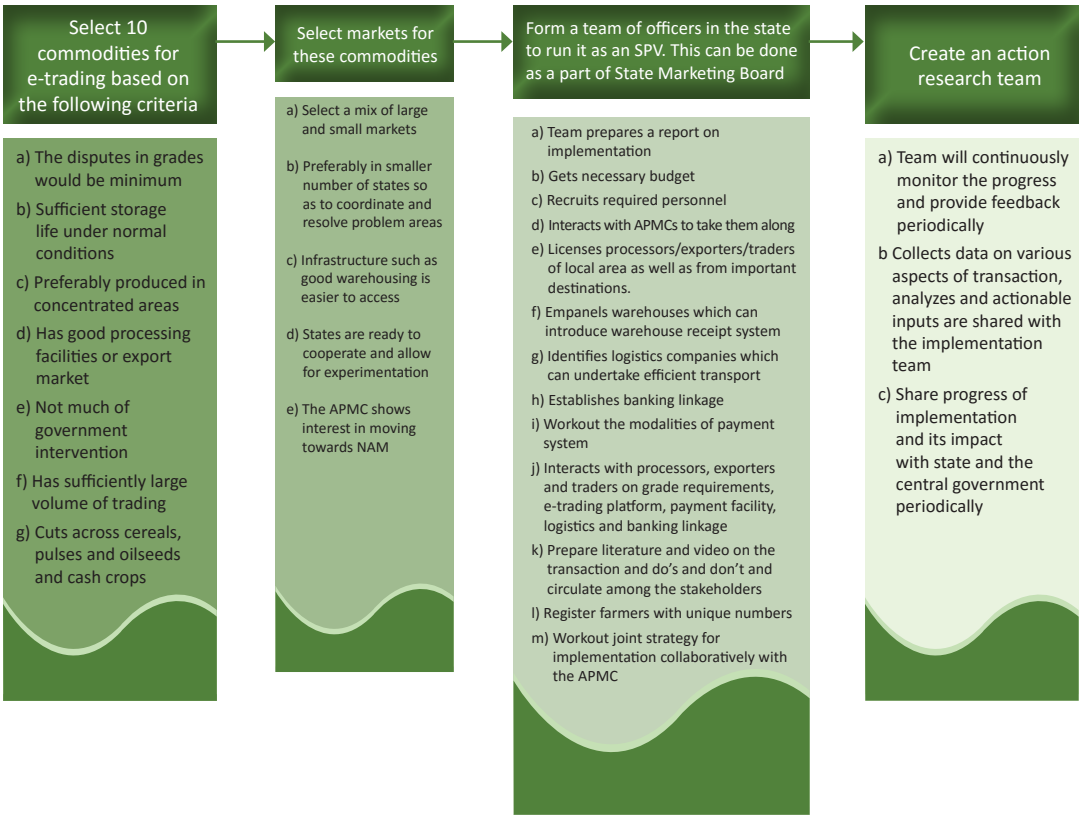

Figure 9. Implementation process.

4. Annual Budget Speech 2016-17 of the Government of India was presented in the Parliament on 29th February, 2016. (point no. 26). Www:finmin.nic.in/29-03-2016/6pm.

5. Monitoring and Learning

5.1 Monitoring indicators

a. Number of fully functional e-tendering centers
b. Time between auction and settlement
c. Arrivals as % to total production
d. Price stability
e. Coverage of grades
f. Number of testing laboratories set up and functioning satisfactorily.
g. Demand for graded produce
h. ICT Infrastructure for online trading
i. Number of warehouses in the network and their technology level
j. Number of outstation bids and their success rates
k. Differences in prices between markets in terms of:
    - Level of banking support and integration of banking services
    - Level of APMC governance

5.2 Monitoring mechanism

- Strengthening current reporting mechanisms
- Introducing regulatory checks
- Creating a coordination cell at the state and central levels
- Periodic independent outcome surveys

5.3 Learning and adoption mechanisms based on seasonal and annual review

- Start an independent mission center, that disseminates the learnings' through periodic conferences
- Reviews based on independent evaluations and real-time dashboards based on market transactions

Types of Direct Marketing by farmers

Raithu Bazaar (Farmer market) in Andhra Pradesh and Telangana states, is an initiative to create infrastructure facilities to enable farmers to sell their products directly to the consumers. Producer's share in consumer's rupee is more by 15 to 40% as compared to the other markets and consumers get at 25-30%less prices. Typically, a Raithu Bazaar covers 10 to 15 villages and at least 250 farmers including 10 groups (Self Help Groups) selected by a team of local government officers and operating at the bazaars. Transport facilities for producers are arranged through the State Road Transport Corporation. In addition, online information of prices and commodities movements is provided on the internet. More than 100 Raithu Bazaars are benefitting 4500 farmers and large number of consumers.

Shetkari Bazaar (Farmer market). In 2002, the Government of Maharashtra had set up Shetkari Bazaars in the state and the Maharashtra State Agriculture Marketing Board was appointed as the nodal agency for implementing this scheme. The Shetkari Bazaars are located in all the districts and key taluka places and managed by the Agriculture Produce Market Committees (APMC). The produce brought by farmers is levy free. There are 12 Shetkari Bazaars operating in the state and 33 additional markets are coming up.

The innovative scheme "Uzhavar Sandhai" was introduced by the State Government of Tamil Nadu in the year 1999-2000 for direct selling of fruits and vegetables by farmers to consumers at a fair price without any intermediaries. At present 164 Uzhavar Sandhais are functioning in the state. In these markets, the team of officials including agriculture officers and represantatives of farmers groups have fixed daily price for the products. The rate fixed is about 20% more than the prevailing wholesale market price and consumers are benefited by getting about 15% less than the prevailing retail price. No market fee is levied for transactions in Uzhavar Sandhai.

Annexure I

Comparison of IT centered approach with that based on Market Process centered approach			
Parameter	IT centered approach – distributed architecture	Market process centered architecture	Remarks
IT infrastructure & operations			
Number of servers required	Not more than 10	As many as the number of markets taken up	Additional hardware procurement, maintenance and licensing costs
Advantage of Cloud Technology	Possible. Resources can be allocated as per load. Updating software is easy.	Not possible	Hardware has to be planned for peak load in each market. Handling multiple software versions is complicated.
Availability of server	Availability of 99.99 % can be assured.	Difficult to assure more than 90 %	-
Requirement of skilled manpower	Required only at the main data center.	Required in every market.	Increased operating costs.
Real Time Monitoring	Feasible and easy	Difficult to manage	-
Data management and security	Standard and secure. Possible economies of scale in storage	Difficult, due to local administrative access	-
Remote participation and virtual markets			
Quality based bidding	Available	Not available	-
Warehouse based selling	Easily accomplished, with warehouse linked to the mother market.	Not easily feasible.	Convenience to farmers, as eventually they need not come to the market.
Integration of markets to create a state-wide market	Easy	Unmanageable	-
Warehouse based funding of stocks	Possible	Not possible	-
Increasing competition amongst buyers through remote participation	Possible	Not possible	-
Post sale process			
Integration of weighing, etc., with the auction engine	Available	Not available	-
Sale proceeds to farmers directly through the banks	Possible	Not available	-
Market fee accounting	Built as a part of the platform.	Not available. Developing such a system is complex.	Simplifies back office work of the market committee
Reconciliation of inventory	Available	Not available	-
Integration with Banks for Payments and Collections	Possible and accomplished	Not feasible	
Legal and regulatory environment			
Changes to Act and Rules	Useful and can be implemented	Not possible to implement easily	-

Annexure II

Average daily turnover in commodity exchanges

	Years						
	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16 (up to July)
Name of the exchange	(₹ in crores)						
ACE Commodity Exchange		96	464	585	156	89	3
Indian Commodity Exchange		7	26	2	122	0	0
Multi Commodity Exchange	243	379	657	918	573	432	525
National Commodity and Derivatives Exchange	3,054	3,687	5,547	5,296	3809	3415	4,607
National Multi Commodity Exchange	536	428	450	364	443	140	144
Universal Commodity Exchange					158	27	34
Grand Total	3,833	4,597	7,144	7,166	5261	4104	5,279

Annexure III

Outlay required for implementation

	Contributor					
	NeML	NABARD and others	Government of India	State governments	APMCs	
Purpose of expenditure	(₹ in crores)					Total
Equity capital*	-	7.50	-	-	-	7.50
Debentures	-	20.00	-	-	-	20.00
Local infrastructure	-	-	150.00	-	-	150.00
Total	0.00	27.50	150.00	0.00	60.00	177.50
Ongoing expenses (for 500 markets per annum)**	-	-	-	-	60.00	60.00

Note –* The contribution of NeML would be by giving rights to use the UMP and supporting the SPV till it can manage its operations.
** Not an initial outlay. Met out of market income.

Annexure IV

Time schedule required for implementation

Activity	Quarters											
	1	2	3	4	5	6	7	8	9	10	11	12
Shareholder agreement between NeML and NABARD												
Setting up of the SPV												
Office infrastructure of the SPV												
Identifying major markets in 10 states												
Setting up local infrastructure												
Commence implementation to cover 500 markets												
Amendment to Act and Rules by states												

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ICRISAT-India (Headquarters)
Patancheru, Telangana, India
icrisat@cgiar.org

ICRISAT-India Liaison Office
New Delhi, India

ICRISAT-Mali (Regional hub WCA)
Bamako, Mali
icrisat-w-mali@cgiar.org

ICRISAT-Niger
Niamey, Niger
icrisatsc@cgiar.org

ICRISAT-Nigeria
Kano, Nigeria
icrisat-kano@cgiar.org

ICRISAT-Kenya (Regional hub ESA)
Nairobi, Kenya
icrisat-nairobi@cgiar.org

ICRISAT-Ethiopia
Addis Ababa, Ethiopia
icrisat-addis@cgiar.org

ICRISAT-Malawi
Lilongwe, Malawi
icrisat-malawi@cgiar.org

ICRISAT-Mozambique
Maputo, Mozambique
icrisatmoz@panintra.com

ICRISAT-Zimbabwe
Bulawayo, Zimbabwe
icrisatzw@cgiar.org

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