



सत्यमेव जयते
Ministry of Agriculture &
Farmers Welfare

Report of the Committee on Doubling Farmers' Income

Volume IV

**“Post-production interventions:
Agricultural Marketing”**

**Capturing Value from every Grain, every Ounce,
every Drop of agricultural produce**

Document prepared by the Committee on Doubling Farmers' Income,
Department of Agriculture, Cooperation and Farmers' Welfare,
Ministry of Agriculture & Farmers' Welfare.

August 2017

Foreword

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

12th August, 2017

Ashok Dalwai
Chairman, Committee on
Doubling Farmers' Income

About Volume IV

The fourth volume of the Report of the Committee on Doubling Farmers' Income (DFI) examines the status and reforms needed in the agricultural marketing system. This is the other component that comprises the process of monetisation. A clear differentiation is proposed between the system that facilitates marketing of agricultural produce and the modes to connect the produce to markets. The latter is a physical function, and is discussed in the preceding volume. The former is the environment and the logic behind that function, to guide and enable the ways that agricultural produce can realise optimal value.

Various avenues or market channels are available for farm produce, such as food or agro-processing industry, wholesale into retail and other consumer channels, institutional sales, etc. Yet, the farmers' primary earning capacity is typically restricted to their first point of sale, usually to agents, or near-farm *mandis* (primary wholesale agricultural markets), which are not always the best of options. All transactions, further up the value system, are remote from a farmer's viewpoint. This volume describes the immediate options for farmers to undertake next level activities, to connect directly to the wholesale market or processor, or at least a level above their current stage of transaction.

This volume discusses the market network and system, which was earlier designed to address a state of subsistence farming and is now found to be falling short of the current and emerging situation of surpluses. The distress to farmers today, arises from production not finding markets. The Committee draws emphasis on an enabling environment that opens up to a larger number of stakeholders to drive competition. The mere availability of market yards is not sufficient, and to be effective, they must also serve to channel the produce of farmers and facilitate transactions at remote market locations. In this connection, a new market architecture is proposed, as well as various reforms to transition the agricultural marketing system into a truly unified 'National Agricultural Market' and to expand the market range beyond borders.

The Committee considered the changing consumption patterns, to conclude the need for a market-led approach that will stimulate demand-driven production including nutrition delivering commodities. While price signals are important, they are mainly *ex-post facto* signals, and the marketing system needs to also monitor demand, and this volume informs of the requisite to provide demand based analytics. Such inputs will progress the agriculture sector from a push mode into markets, towards servicing a pull from consumers. Marketing as a support activity, should enable farmers by contributing value added inputs, on what to produce, where to send their harvest, and to administer their input and output costs accordingly.

The role of marketing is to become the key enabler that takes the agriculture sector beyond the function of cultivation only, into the arena of business. The following fifth & sixth volumes of this Report, discuss respectively the sustainability concerns and sustainable practices, as these are equally critical to ensure consistent and continued production growth.

Ashok Dalwai

Doubling Farmers' Income

Volume IV

“Post-production interventions: Agricultural Marketing”

Contents

Foreword	i
About Volume IV	v
Chapter 1 Why Marketing?	1
1.1. INTRODUCTION	1
1.2. OBJECTIVES OF MARKETING	4
1.3. OUTCOMES FROM AGRICULTURAL MARKETING	5
1.4. SUBSISTENCE TO SURPLUS FOOD ECONOMY	6
1.5. ROLE OF MARKETING IN MONETISATION	7
1.6. GOVERNMENT'S ROLE IN MARKETING	8
1.7. TRANSITIONS IN THE MARKETING SYSTEM	9
1.8. ANNOTATION	10
Chapter 2 Marketing Effectiveness & Market Efficiency	11
2.1. EFFECTIVE MARKETING SYSTEM	11
2.2. EFFICIENCY OF MARKETS	13
2.3. IMPORTANCE OF EFFECTIVE & EFFICIENT MARKETS – THE COBWEB	13
2.4. CONTAINING THE INEQUITY	14
2.5. INDICATOR OF MARKETING EFFICIENCY	16
2.6. CROP SPECIFIC EXAMPLES OF MARKET EFFICIENCY	17
2.7. MARKETING POLICY	20
2.8. ANNOTATION	21
Chapter 3 Evolution of Agricultural Marketing	23
3.1. MARKETING PERSPECTIVE	23
3.2. HISTORICAL INTERVENTIONS IN AGRICULTURAL MARKETING	24
3.3. OPERATION FLOOD	27
3.4. MARKET SUPPORT BY GOVERNMENT	27
3.4.1. <i>Regulation of markets</i>	28
3.4.2. <i>Input subsidies</i>	28
3.4.3. <i>Minimum support prices</i>	28
3.4.4. <i>Food subsidies</i>	28
3.5. FIRST STEPS TOWARDS LIBERALISATION	29
3.5.1. <i>Liberalisation of Control Orders</i>	29
3.5.2. <i>Model APMC Act 2003 and Rules 2007</i>	29
3.6. SOME NOTABLE CHANGES IN THE MARKETING SYSTEM	30
3.6.1. <i>Direct Marketing</i>	30

3.6.2.	<i>Contract farming</i>	31
3.6.3.	<i>Private wholesale markets</i>	32
3.6.4.	<i>Organised retailing</i>	33
3.6.5.	<i>Farmer producer organisations (FPOs)</i>	34
3.6.6.	<i>Cooperatives in agricultural marketing</i>	34
3.6.7.	<i>Food & agro-processing</i>	34
3.7.	CHALLENGES TO AGRICULTURAL MARKETING.....	35
3.8.	NEED FOR NEXT LEVEL OF REFORMS	37
3.9.	NEXT STEP IN REFORMS	39
3.9.1.	<i>National Agriculture Market</i>	39
3.9.2.	<i>Firm push for robust reforms</i>	41
3.9.3.	<i>Other reforms needed</i>	44
3.10.	STRATEGIC VISION.....	44
3.11.	ANNOTATION	45
Chapter 4 Capture every Grain, every Ounce & every Drop		47
4.1.	ADMINISTERED PRICE VERSUS MARKET PRICE.....	47
4.2.	MARKETABLE SURPLUS	48
4.2.1.	<i>Market demand for optimal value</i>	49
4.3.	VISION TO CAPTURE SURPLUS	50
4.4.	VALUE CHAIN & SUPPLY CHAIN	51
4.4.1.	<i>Value chain analysis</i>	53
Chapter 5 New Market Architecture		57
5.1.	BACKGROUND	57
5.2.	EXISTING MARKET ARCHITECTURE	58
5.2.1.	<i>APMC markets</i>	58
5.2.2.	<i>Rural Periodical Markets</i>	59
5.3.	DENSITY OF MARKETS.....	60
5.3.1.	<i>Assessment of Gap</i>	60
5.4.	NEW APPROACH TO MARKETS	65
5.5.	PRIMARY RURAL AGRI-MARKET (PRAM) CENTRES.....	68
5.6.	LOCATION AND FACILITIES	70
5.6.1.	<i>Location</i>	70
5.6.2.	<i>Systems and Infrastructure</i>	70
5.7.	NATURE OF PRAMS AND FUNCTIONS.....	70
5.7.1.	<i>Producer – Consumer markets</i>	70
5.7.2.	<i>Aggregation platforms</i>	71
5.7.3.	<i>Fund Requirement</i>	71
5.8.	OTHER ENABLERS IN AGRICULTURAL MARKETING	71
5.8.1.	<i>Small farmers, small volumes</i>	72
5.8.2.	<i>Farmer producer organisations</i>	73
5.8.3.	<i>Need to build FPOs/VPOs</i>	77
5.8.4.	<i>Scale up village level, farmer producer organisations</i>	78
5.9.	STABLE TRADE REGIME	80
5.9.1.	<i>Agricultural Trade Policy to support farmers</i>	80
5.10.	FUTURES TRADING	81

5.10.1.	<i>Integrating the physical, derivatives and input markets</i>	83
5.11.	ANNOTATION	84
Chapter 6	MSP and Procurement	87
6.1.	PRICE SUPPORT IN AGRICULTURE	87
6.1.1.	<i>Making MSP more effective</i>	90
6.2.	MARKET SUPPORT IN AGRICULTURE	90
6.2.1.	<i>Procurement Bouquet</i>	91
6.3.	BROAD-BASING PRICE AND PROCUREMENT INTERVENTIONS - NEW INITIATIVES.....	93
6.3.1.	<i>Price Deficiency Payment Scheme (PDPS)</i>	93
6.3.2.	<i>Market Assurance System (MAS)</i>	94
6.3.3.	<i>Private Procurement & Stockist Scheme</i>	97
6.3.4.	<i>Notifying a reserve price</i>	99
6.4.	ANNOTATION	100
Chapter 7	Warehousing	103
7.1.	BACKGROUND	103
7.1.1.	<i>Current warehousing capacity</i>	104
7.1.2.	<i>Brief assessment of warehousing capacity requirements</i>	107
7.1.3.	<i>District level planning</i>	110
7.2.	WAREHOUSE RECEIPTS SYSTEM (WRS)	110
7.2.1.	<i>Elements of a warehouse receipt system</i>	111
7.3.	STRENGTHENING NEGOTIABLE WAREHOUSE RECEIPT SYSTEM (NWRS)	115
7.4.	PLEDGE LOAN SCHEME	116
7.4.1.	<i>Pledge loan scheme implemented by different banks</i>	117
7.4.2.	<i>Pledge loan by State Agricultural Marketing Departments/Boards</i>	118
7.4.3.	<i>Pledge finance by collateral security management agencies</i>	120
7.4.4.	<i>Schemes for pledge financing against electronic warehouse receipts</i>	120
7.4.5.	<i>Interest subvention scheme</i>	121
7.4.6.	<i>Critical Assessment</i>	121
7.5.	STRENGTHENING WAREHOUSING AND THE PLEDGE LOAN SCHEME.....	122
7.6.	ANNOTATION	123
Chapter 8	Value System Partnership Platform	125
8.1.	NATIONAL AGRI-VALUE SYSTEM PARTNERSHIP PLATFORM.....	127
8.2.	OBJECTIVES AND SCOPE	128
8.3.	GOVERNANCE STRUCTURE	129
8.4.	BEGIN WITH 100 DISTRICTS	132
8.5.	FUNDING THE PLATFORMS.....	132
8.6.	OPERATIONAL GUIDELINES	132
8.7.	OUTCOMES FROM VALUE CHAIN INTEGRATION	133
Chapter 9	Supply, Demand and Price Forecasting	135
9.1.	INTRODUCTION.....	135
9.2.	THEORETICAL UNDERPINNINGS.....	135
9.3.	CURRENT STATUS OF PRICE FORECASTING	137
9.3.1.	<i>Agricultural outlook & situation analysis for food security</i>	137

9.3.2.	<i>Network Project on Market Intelligence</i>	137
9.3.3.	<i>Project to forecast prices of major 19 agricultural commodities</i>	141
9.4.	CASE STUDY - INITIATIVES BY KAPC.....	142
9.4.1.	<i>Collaboration with Experts</i>	145
9.4.2.	<i>Collaboration with private sector</i>	146
9.4.3.	<i>Web and Android based software</i>	146
9.5.	LIMITATIONS AND REMEDIES.....	146
9.5.1.	<i>Quality of Time Series data</i>	146
9.6.	MEASURES TO IMPLEMENT MARKET INTELLIGENCE	149
9.7.	RESTRUCTURING DMI.....	149
Chapter 10 Agricultural Trade Policy		153
10.1.	INTRODUCTION.....	153
10.2.	PRODUCTION VERSUS EXPORTS: A STATUS CHECK.....	154
10.2.1.	<i>Current export status</i>	156
10.2.2.	<i>India's share in global markets</i>	157
10.2.3.	<i>State level data on exports</i>	160
10.3.	AGRI-EXPORTS NOT COMMENSURATE WITH PRODUCTION: CAUSE AND EFFECT.....	160
10.3.1.	<i>Supply side constraints</i>	161
10.3.2.	<i>Demand side constraints (Trade Barriers)</i>	163
10.4.	FRAMEWORK TO PROMOTE EXPORTS	168
10.4.1.	<i>Market intelligence</i>	169
10.4.2.	<i>Trade management</i>	170
10.4.3.	<i>Production cluster</i>	170
10.4.4.	<i>Trade agreements</i>	171
10.4.5.	<i>Impact of WTO</i>	171
10.5.	RESTRUCTURING OF AGRICULTURAL TRADE DEVELOPMENT.....	174
10.6.	STRATEGY FOR AGGRESSIVE TRADE	175
10.7.	NEED FOR A STABLE TRADE REGIME	176
10.7.1.	<i>Import restrictions</i>	176
10.7.2.	<i>Export limits</i>	178
10.8.	LONG TERM AGRICULTURAL TRADE POLICY	178
10.9.	ANNOTATION	179
Chapter 11 Livestock and Fisheries Marketing.....		181
11.1.	BACKGROUND	181
11.2.	LIVESTOCK PRODUCE AND PRODUCTS.....	181
11.3.	PRIMARY LIVESTOCK CONSUMPTION	182
11.4.	STATUS OF MARKETING OF LIVESTOCK COMMODITIES.....	186
11.4.1.	<i>Marketing of live animals</i>	186
11.4.2.	<i>Marketing of livestock products</i>	188
11.4.3.	<i>Marketing produce of live animals</i>	193
11.5.	INTERVENTIONS IN LIVESTOCK MARKETING.....	203
11.5.1.	<i>NCDFI eMarket - Digitalization of dairy cooperative trade</i>	203
11.5.2.	<i>Markets and online trading in livestock and produce</i>	206
11.6.	FISHERIES MARKETING	209
11.6.1.	<i>Status of the fish processing Industry</i>	209

11.6.2.	<i>Status of domestic fish marketing</i>	210
11.6.3.	<i>Value to fishermen</i>	212
11.7.	INSTITUTIONAL SUPPORT FOR FISH MARKETING (DOMESTIC / EXPORTS).....	212
11.7.1.	<i>National Fisheries Development Board</i>	212
11.7.2.	<i>Marine Products Exports Development Authority (MPEDA)</i>	213
11.8.	ANNOTATION.....	214
Chapter 12 Nutrition led marketing		217
12.1.	CONTEXT.....	217
12.2.	CHANGED AWARENESS FOR A CHANGED FOOD PLATE.....	217
12.3.	HEALTH IMPLICATIONS OF CONSUMER HABITS.....	219
12.4.	EXAMPLES OF UNEXPLOITED NUTRITION.....	223
12.5.	INFLUENCING DEMAND, FROM THE CONSUMERS PLATE TO FARM.....	226
12.6.	INTERVENTIONS TO EDUCATE ON FOOD CHOICES.....	228
12.7.	ANNOTATION.....	231
Chapter 13 Recommendations		233
13.1.	SYNOPSIS.....	233
13.2.	RECOMMENDATIONS.....	233
References		237
Annexures		239

Index of Figures

Figure 2.1	Cobweb relationship.....	14
Figure 2.2	Price Dispersion at farmgate - select crops.....	16
Figure 2.3	Price wedges between farmgate and wholesaler.....	18
Figure 2.4	Price wedges between wholesaler and retailer.....	20
Figure 3.1	State-wise licenses issued for Direct Marketing.....	31
Figure 3.2	State-wise progress of Contract Farming.....	31
Figure 3.3	State-wise progress of private market.....	33
Figure 4.1	Illustrative of Demand-Value mismatch.....	48
Figure 4.2	Range of system-wide activities & items for analysing the integrated value chain.....	54
Figure 5.1	Existing market structure – which enforces an intermediary exchange at every stage.....	58
Figure 5.2	PRAMs as foundation of market structure will generate a directed flow of trade.....	66
Figure 5.3	Primary Retail Agri-Market centres to organise village level handling.....	68
Figure 5.4	PRAM in the hub and spoke logistics network.....	69
Figure 5.5	FPO model of market connectivity.....	76
Figure 5.6	City-proximate farms and marketing operations.....	76
Figure 7.1	Components of a Warehouse Receipt System.....	111
Figure 8.1	Synergising value chain interventions with GOI priorities.....	126
Figure 9.1	Price Forecast Training Using Historic Data.....	143
Figure 9.2	Price Forecast, MSP, and Cost.....	143
Figure 9.3	Arrival Seasonality Index.....	144
Figure 9.4	Price, Costs, MSP and Arrival Seasonal Index Superimposed.....	144
Figure 10.1	Supply and demand side issues.....	161
Figure 10.2	Circle of inefficiencies hurting agri-export potential.....	162

Figure 10.3 Managing the export supply chain	169
Figure 11.1 Meat consumption trends in India (OECD-FAO data).....	183
Figure 11.2 Trends in mutton consumption (per capita annual)	184
Figure 11.3 Trends in chicken consumption (per capita annual)	184
Figure 11.4 Trends in Egg Consumption (per capita annual)	185
Figure 11.5 Trends in milk consumption (per capita annual)	185
Figure 11.6 Trends in milk consumption (per capita annual)	185
Figure 11.7 Milk production and corresponding Growth Rate	193
Figure 11.8 Share in milk production by species (2016-17).....	193
Figure 11.9 Egg production and corresponding Growth Rate	196
Figure 11.10 Share in egg production – backyard and commercial (2016-17).....	196
Figure 11.11 Eggs market chain	197
Figure 11.12 Egg exports from India (numbers in crore eggs)	199
Figure 11.13 Wool production and corresponding Growth Rate	200
Figure 11.14 Wool Production by animal source (2016-17)	200
Figure 11.15 NCDFI eMarket Forward Auction process	204
Figure 11.16 NCDFI eMarket Reverse Auction process	205
Figure 11.17 Trends in fish consumption (per capita annual)	210
Figure 12.1 Anaemia in Children	219
Figure 12.2 Underweight in Children below 5 years - Weight for Age.....	220
Figure 12.3 Overweight or Obesity in Women.....	221
Figure 12.4 Overweight or Obesity in Men.....	222
Figure 12.5 Food Pyramid for Indians.....	229

Index of Tables

Table 1.1 Five major transitional stages witnessed in Indian agriculture	9
Table 3.1 Major Policy Interventions in marketing	24
Table 3.2 Milk Production and share in market channels.....	27
Table 4.1 Surplus occurs at each stage in marketing	48
Table 4.2 Breakup of sources to capture the 100 per cent of surpluses	50
Table 4.3 Range of value capturing activities and items by actors in the larger value system	53
Table 5.1 Basic data on marketing linked information from major States -	61
Table 5.2 Comparative market coverage by States – across all market types.....	62
Table 5.3 Market Density Assessment	64
Table 5.4 State-wise land holding patterns.....	72
Table 5.5 State-wise number of FPOs promoted by SFAC	74
Table 6.1 Percentage margin of profit on A2+FL for the year 2016-17	88
Table 6.2 Status of production, marketed surplus and procurement for the year 2016-17	97
Table 7.1 Total Warehousing capacity available	104
Table 7.2 Warehousing created under ISAM scheme.....	105
Table 7.3 Marketed Surplus estimated for major crops for storage requirement.....	107
Table 7.4 MSR of various crop types	108
Table 7.5 Marketed surplus, distribution, warehousing assessment	109
Table 7.6 Number of warehouses registered with WDRA	112
Table 7.7 Pledge finance against produce stored in State Warehouse Corporations in different states.....	118
Table 7.8 Pledge finance against produce stored in Central Warehouse Corporations in different states	118
Table 7.9 Pledge finance provided by APMCs in different states	120
Table 7.10 Pledge finance provided by collateral manager NBHC	120
Table 10.1 India global status in production.....	155

Table 10.2 Production versus Exports: India's status versus World.....	156
Table 10.3 Trade balance in APEDA monitored products during 2016-17	156
Table 10.4 Export of APEDA products	157
Table 10.5 India's share in global Imports	158
Table 10.6 Global position of India's agro exports	159
Table 10.7 Examples of Indian exports facing high tariff peaks	163
Table 10.8 Tariff escalation in major importing regions	164
Table 10.9 Examples of green box measures.....	173
Table 11.1 Livestock Population in India (in million) – Livestock Census, 2012.....	182
Table 11.2 Export of carabeef and poultry (2016-17)	189
Table 11.3 Export of small ruminants, processed meats, casings (2016-17).....	189
Table 11.4 Egg wholesale price (monthly average over 5 years) - Rs per 100 pieces.....	198
Table 11.5 Raw wool imports by India.....	201
Table 11.6 Dairy Auctions on NCDFI eMarket.....	204
Table 11.7 Overview of Reverse Auctions on NCDFI eMarket.....	205
Table 11.8 Quantity of ornamental fish sold in selected markets of India (2015) (In lakhs).....	211

Chapter 1

Why Marketing?

All produce - every grain; every ounce; every drop - from agriculture sector must find gainful end-use. Demand-driven production of agricultural produce, rather than production-propelled marketing, is the need of the day now. India is one of the largest markets for agricultural produce and markets need to function as a unified platform to make all consumers accessible to all the farmers in the country.

1.1. Introduction

There are often overlaps and ambiguities in the expectations from agricultural marketing and its outcomes, both as a system of governance and as a function of business. India has seen a transition in agricultural marketing, from the period of subsistence farming, to one which is developing into a surplus food economy. The scope of agricultural marketing, its role in monetisation of agriculture produce and the creation of value from delivering relevant flow of market information, for farmers to be demand linked in all their farming and post-production activities are discussed in the volume.

Agricultural marketing as a term, is used to refer to different facets, as an academic study, as a function of the supply chain, as well the marketing regulations and associated policy. In actual application, the core function of providing market intelligence is frequently overlooked, consigned to providing information on market status only.

As an academic discipline, “Agricultural Marketing is the study of all the activities, agencies and policies involved in the procurement of farm inputs by the farmers and the movement of agricultural products from the farms to the consumers”.¹ In developing countries, it is understood to compose of product marketing and input marketing. The actors in product marketing include farmers, traders, wholesalers, processors, importers, exporters, marketing cooperatives, regulated market committees and retailers.

Marketing is also defined by Philip Kotler² as a human activity directed at satisfying the needs and wants through an exchange process. The American Marketing Association defines marketing as the performance of business activities that directs the flow of goods and services from producers to users. Emphasis is drawn to the qualifying function to direct the flow of goods from producers to meet the demand from users. This direction comes from understanding the consumer, converting such information into demand matrices and standards, and sharing it as market intelligence with producers, to deploy the relevant means to execute the exchange.

The term agricultural marketing, is conversely, used indiscriminately to infer an umbrella label that comprises all the activities involved in the supply of farm inputs and output - including all those operations which are related to the procurement, collecting, grading, storing, food and agro-processing, transportation, financing and selling of the agricultural produce. In effect,

¹ Agricultural Marketing in India, SS Acharya & Agrawal, 6th Edn 2016

² Marketing Management: Analysis, Planning and Control, Kotler 1972

marketing is imagined to include all overarching aspects of agribusiness, while excluding the core activity of cultivation. This all-encompassing interpretation actually covers the full range, of pre-production and post-production functions; the input and output supply chain, agri-logistics, food & non-food processing, distribution, retailing, etc., of all agribusiness. Nonetheless, each is a specialised sector, some even assigned the status of industry. On the other hand, the market demand analytics and associated information that inter-connects these business operations, and a core function of marketing as a service, has largely been neglected.

Although, as an academic subject, the study of agricultural marketing may embrace all topics of the supply chain, the intention of such study is to arrive at an understanding of the physical flow of goods to and from farms. This operational understanding is for the purpose to ensure that marketing services, can be pragmatic when providing market information and intelligence, and be relevant in guiding the material flow. This market intelligence normally flows backwards from fork-to-farm, in making the output supply demand-linked. These tenets of come into play when an individual opts to start any venture for any commercial purpose.

For a farmer engaged in an agricultural enterprise, both input and output marketing determine the net income from the venture. The comparatively higher growth rate in production, implies that inputs to farms have, in contrast, been systemically marketed. The ongoing food losses, coupled with inflationary pressure on most output and food items, indicates that output marketing has not kept pace with production. The output from farms has not met equal and necessary support from agricultural marketing in India. As a result, though the inputs find farmers as ready consumers, the output is unguided in finding optimal value. The farmer is effectually a bad purchaser of the inputs, as well a poor seller of his/her outputs.

Marketing in the agricultural value system implies both input and output marketing. Input marketing uses information that will lead to evidence based planning for the timely and reasonable supply of seeds, fertilizers, plant protection technologies and other equipment and machinery that contribute to farming. Output marketing starts when the produce attains a form in which it could be collected for further economic purposes and exploitation.

This volume lays emphasis on output marketing, while input marketing will be discussed in the later volumes dealing with production and productivity.

The farmers' produce is evacuated through market places that act as a platform for exchange. Prior knowledge about consumer demand, across regions, is critical to develop efficiency in the sourcing, supply and distribution across the country. This is also influenced by various economic considerations, and on the technical and logistical capabilities to connect the produce, involving post-production activities of aggregation/assembly/pooling, sorting/assaying/testing, transportation, food/agro-processing, storage, distribution and retail. Marketing, as a support function, helps to direct the other activities, for greater optimisation of the costs involved and for improved value realisation.

To make the agricultural enterprise cost-efficient, and to achieve desired growth, the foremost input relates to understanding of the past, current and future demand for each agricultural produce - which is the purposeful role of all marketing.

For the purpose of this volume of the report, discussions on marketing will therefore also refer to providing intelligence and information that helps to direct the supply of agricultural produce to consumers in sufficient quantity, at the time and place, as needed by them. Two main scenarios emerge from a failure in this function;

- a) when the marketing system fails to provide such relevant information of demand, any growth in production has little value and little contribution to farmers or society;
- b) further, if the surplus produce does not move to the appropriate markets and bring additional revenue to farmers, the situation is a disincentive for future production.

Understanding the market, means comprehensive forecast of demand by locations, compliance with food safety and applicable standards, acquiring new consumers to support farming growth, observing applicable rules and monitoring regulatory changes. While the activities to take the produce to market, are driven by enterprises and supported through Ministries and agencies for their infrastructural needs, the essential backing of information on demand and the freedom to trade, is frequently observed to be incomplete in India.

The Agricultural Marketing System refers to other governmental systemic interventions in rules, regulations and policy. From a governance perspective, marketing as a system, will include reforms to enhance farmers' access to a unified market, formulation of standards and adherence to food safety standards. The government also regulates the flow of goods, to and from farms, and therefore maintains a role to provision the related market infrastructure and provide the other basic enabling infrastructure for agri-businesses to flourish. The agricultural marketing system therefore also relates to economic growth of the agriculture sector and ensuring safe and affordable food to consumers, both of which are directly linked to the food security of the country. Managing the agricultural ecology and the impact on the climate, are other matters of concern that relate to the agricultural marketing system.

Since the agricultural markets in India are regulated, the agricultural marketing system is, therefore, a meld of government support mechanisms for marketing infrastructure, rules and regulations. Marketing is a specialised service that provides market demand analytics and information, to guide the farmers' production and expedite other post-production activities, for meeting the desired outcomes.

The National Commission on Agriculture (1976), as well the National Commission for Farmers (2006), had emphasised that it is not sufficient to produce a crop or animal product; it must be marketed so as to return value to the producer. Increased production resulting in greater marketable surplus, is complemented by increase in demand from the population. However, the surplus produce does not always find a suitable market, leaving demand unsated. This situation of surplus conjoined with unfulfilled demand, necessitates a rethink on the agricultural

marketing system in the country. The discourse on marketing needs to be about how it contributes to the supply chain, and not as an outlier of the integrated value chain system.

1.2. Objectives of Marketing

The report of the National Commission of Agriculture (1976), discussed agricultural marketing in Part XII of its fifteen part report (under supporting services and incentives).

The Commission stated that the objectives of an efficient marketing system, are³:

- (a) to enable the farmers as primary producers to reap the best possible benefits;
- (b) to provide facilities for lifting all the produce the farmers are willing to sell, at a price incentive;
- (c) to reduce the price spread between the primary producer and ultimate consumer; and
- (d) to make available all products of farm origin to consumers at reasonable price without impairing the quality of the produce.

A recent addition to the objectives of agricultural marketing, is to contribute to the doubling the famers' income by 2022-23.

After almost 40 years, although the basket of produce has changed shape and the technologies have altered the way goods and information are moved, the above objectives continue to remain relevant. Nevertheless, in 2017, marketing is no longer an afterthought and has far greater prominence, tending to supersede all other interventions in priority. Marketing is now the forethought to develop agriculture into sustainable agri-business.

As a corollary, the marketing system has greater responsibility to deliver relevant flow of market information, for farmers to be appropriately demand linked in all their farming and post-production activities. Without associated demand information, farmers will seek cost plus pricing rather than optimal demand linked value for their produce. The information from the marketing plays two crucial roles to empower the producers capable of producing marketable surplus. The first, by providing them with relevant demand linked information on desired quality, standards and specifications of the produce. The second, to provide information that helps the supply chain to become efficient by functioning to service a pull mode into markets.

From the perspective of doubling farmers' income, market linked farming, investment in the supply chain, market expansion and minimising losses are the desired outcomes from agricultural marketing policies. These outcomes can help affect a transformation in the income status of farmers.

³ Report of the National Commission on Agriculture, 1976

1.3. Outcomes from Agricultural Marketing

Agricultural Market networks were originally conceived to channelise the production of foodgrains, fibre crops and spices, and for regulating their trade. This originated at a time of deficit production and the marketing infrastructure was accordingly designed into handling yards and bulk warehousing networks, and did little to encourage direct participation of farmers with other new marketing opportunities. The new opportunities came from crop diversification and changed consumer preferences, which resulted in a value and volume shift, away from the original set of targeted crops.

The consumer demand shows a marked preference and growth in dairy, fruits, vegetables, poultry and meats, each with a distinctive mechanism for their supply chain and marketing requirements. Future market development intervention, will need to cater to the full basket of agricultural produce. The value and market linkage will be differentiated for this varied produce basket, compared to the earlier focus on foodgrains and fibre crops.

The result of a good marketing system are several, but some desired common outcomes are:

- i. Monetising the Produce:** marketing facilitates the sales of agricultural products. The monetised exchange or sales transaction of goods, is a result of the value assigned to the quantity of produce being exchanged. The value is factored by the demand and supply status, which in turn is impacted by the marketed volume and the asking price. The monetisation of the agricultural produce is very important as it integrates agriculture with the national economy and contributes to the GDP. Hence, intelligence on market demand to establish quantity and quality, as well as transparent price discovery is necessary to outcome the equitable monetisation of the farmers' produce.
- ii. Demand Signal Platform:** Barring cases where demand is artificially buttressed, marketing systems have purpose to balance the demand with supply. The bridge in the form of agri-logistics, function to execute this purpose. The sum value realised and even the unit price of goods being exchanged for money, depends on this balance. The balance depends on the quantity being supplied and the total cost of supply. When this balance results in a price point that is higher than the total cost of supply (production plus logistics), the ensuing margin is shared by the stakeholders involved in the supply chain. Misinterpreting the demand results in either making the product too dear, which impacts by lowering the offtake, or by feeding a glut like situation to impact the unit price downwards. Unchecked, both scenarios result in reduced value and wasted efforts. Moderation of demand supply gaps is a desired outcome of marketing.
- iii. Market growth:** India's agricultural environment is transitioning from a state of deficit towards a status of surpluses. This has been mainly brought about on the back of intensive farming efforts, inducting new technologies, improved seeds and planting materials, better irrigation, etc. The market realities have also changed due to increasing liberalisation, privatisation and globalisation, as well changes in consumer preference. Agri-logistics technologies have also modernised to allow farm produce to connect with

demand further afield. These are opportunities to grow the markets in size and diversity. An aware and competitive marketing system, will attune itself to suit this evolution in India's agriculture, and adjust to capture and exploit new markets. The opening up of the markets to promote competition and long term growth as a desired outcome.

- iv. **Capital formation and investment in technology:** Marketing is no longer a simple activity of arranging the assembling of produce at an open yard and finding ready takers for the value assembled. The produce being output, the quantity being collected, the distance to secondary user or consumption market and aspired quality of produce, stipulate unique demand on the type of facilitation needed from the logistics chain. As marketing gets more effective and determines the specifics to meet its objectives, it will generate the need for investment in modern supply chain infrastructure, and in suitable information technologies. An effective marketing system also involves the flow of information to guide the cropping cycles, and therefore, also has a role in incentivising the use of technology across the full range of farming practices. The outcome is added investment in agriculture allied activities and job creation.

As the country advances in its economic development, there are discernible shifts in consumption patterns. Agricultural marketing can assist to tap into these changes and enlarge the market range of farmers, provide inputs to guide associated policies, such that it inspires the development of economies of scale, both in production and the post-production activities.

1.4. Subsistence to Surplus Food Economy

A few decades ago, in 1970, when the National Commission on Agriculture was constituted, agriculture had a more dominant role in the Indian economy, contributing nearly half of the national income, and providing employment to about 70 per cent of the working population. The country had emerged from a state of high food insecurity in the mid-1960s. The period of insecurity, brought immense attention on regulating the agricultural markets, not only to protect the farmers and provide an environment of fair trade, but to monitor and control the status of production and availability of foodgrains. The marketing system and government interventions were thereby devised with the agenda to give impetus to agricultural production, to regulate the supply of food and to assure the country its food security.

This was achieved through policy measures, initially adopted in the mid-1960s, such as input subsidy, minimum support price, public storage, procurement and distribution of foodgrains, trade protection measures and regulation of markets. The policy interventions from 1960s, were primarily meant to avert situations which may again lead to a deficit.

At a time of sustained deficit, it was obligatory to regulate, to control and monitor the production and the flow of food across the country. Comparison is recalled from times when supply of cement and rubber was in deficit, and it was common practice for the government to regulate the supply of these items, to prevent monopolistic marketing and other unfair practices. However, these controls were done away with, once the supply side was developed, and the market was freed to function in an open and a competitive environment.

India's agriculture has travelled a long way from a period of subsistence farming to that of surplus output, calling for a paradigm shift in the earlier stance taken with the agricultural marketing system. It emerges that agriculture markets, established in 1960 to handle a situation of deficit production, are now inefficient in handling marketable surplus efficiently. The marketing system needs to promote alternate concepts, e.g. provisioning of alternative market channels, participation of private sector, using e-platforms for market expansion and enabling a stable and farmer friendly market environment.

Compared with the production at the start of the 1960s, India now harvests 40 times as much tomato, 14 times more potato, 8 times more wheat, thrice as much in poultry and meat, 13 times more fish, 8 times more milk and almost 40 times more eggs. The scaling up of our food production far surpassed the growth in population – in comparison, the population grew only 2.9 times, from 460 million in 1961⁴ to an estimated 1325 million in 2017⁵.

The agriculture marketing system is needed to help the agricultural sector to adjust to this changed scenario, from a marketing environment that was designed for a time of subsistence to one where marketing of surpluses is required. Volume-I of this report, shows historical trends in production of a wide variety of agricultural produce.

1.5. Role of Marketing in Monetisation

In India, as late as 1960, it was estimated that at least one third of India's agricultural production and about one fourth of its Gross National Product (GNP) was non-monetised⁶. It is well known that subsistence farmers sell a part of their output to enable themselves to buy a few necessities and to carry out other minimum money payments. They also sell their labour, however, with the same purpose in mind. In subsistence farming system there is low marketable surplus due to which exchange function is stunted. The absence of income or savings had made agriculture a non-monetised sector in pre-1960's.

However, the situation changed in the post green revolution phase. Market infrastructure in agricultural markets, policies and institutes were developed so as to facilitate the sale of farm produce, and these market yards became the first point of monetisation. Agricultural markets geared up to play an exchange function, with the agenda to allow agriculture become a profit oriented commercial activity. The flows and interconnections that interplay in agri-markets can be summarised as follows:

- The flow of agricultural produce, mediated by transportation, storage, processing, etc.
- The flow of money, reconciled through cost, price, income, margin, saving, credit, etc.
- The flow of information on demand, manifested in quality, volume, specifications, etc.

These will transpire through a series of coexisting activities that are undertaken by a range of

⁴ Census India, 1961

⁵ MoSPI, 2017

⁶ The Role of Marketing in Economic Development of Developing Countries, Alex N. Ifezue (2005)

operators. A field research in the region of Coimbatore, in early 1980s by Harriss-White⁷, found a total of 51 different activity combinations, among 149 “marketing” firms. The activities like buying, selling, brokering, transport, packaging, grading and processing are the operating links of the value chain system, resulting in the tangible flows and the fungible exchanges.

Monetary exchange can be directed through instrumented arrangements such as vertically linked contract farming, leased farming, commodity futures, or horizontal access to multiple spot markets. Each is an opportunity option, decided by capabilities of the interacting farmers and consumers of the produce. The transactions can be initiated by individual farmers, farmer groups such as cooperatives, FPOs, associations, industrial farms, etc.

Since a market is intended to function as an exchange, where goods are monetised, any monopolistic arrangements need to be warded off. The marketing system, therefore, needs to open up the markets to generate greater competition and transparency for the benefit of farmers.

To monetise agricultural products, the marketing system has to be effective, so as to promote transparency and cross-stakeholder linkage, such that each related activity can be performed efficiently. An effective marketing system needs to be responsive to changed dynamics, and streamline the flows that relations between input suppliers, farmers and consumers. As production sees enhancement through productivity measures, the marketing system is seen having a major role in enhancing income of farmers.

1.6. Government's role in Marketing

From the perspective of the government, agricultural marketing has a role to make production, supply and trade of agricultural produce sustainable, economically beneficial and equitable. The added objective of securing the nation's food, also makes the government a buyer of produce, and this too has an impact on how agriculture progresses.

The marketing system had focused on informing market price (status) and not on market intelligence (demand forecast). At a national level, the government can also provide market intelligence as a service, as well as tweak its regulations to expand the market footprint of farmers, internally and internationally. Impetus to streamline and grow agricultural trade will showcase that India can be the forerunner that breaks the trend, that economic development dilutes the business of farming.

Agriculture can be the core service of India, provided that policies and information flow emphasises on linking agriculture with markets, expands the range of markets and makes the market channels compete for tapping into the Indian farmer.

With agriculture having gone through various transitions in its development, the policies of the government also require to adapt to the changed scenario in agricultural marketing.

⁷ Three roles of Agricultural markets, Economic and Political Weekly, Vol KLVII no. 52, Harris-White, Ali Jan (2012)

1.7. Transitions in the Marketing System

Along with a transition of agriculture, the Agricultural Marketing System has also evolved to a certain level.

Table 1.1 Five major transitional stages witnessed in Indian agriculture

Phase	Status and Approach	Remarks
Phase I : Pre-Green Revolution Period (1950-65)	Status: Deficit in food production Approach: Marketing system designed to handle deficit, regulate trade and manage food security.	<ul style="list-style-type: none"> • Improved food security through agrarian reforms & large scale investment in irrigation and power. • Enacted Zamindari Abolition Act (1950) - organise agriculture and animal husbandry on modern-scientific lines, abolish <i>begari</i>
Phase II : Green Revolution Period (1965-80)	Status: Self Sufficiency in Food grains, start of 'Operation Flood' Approach: Marketing system to incentivise output and manage its distribution through procurement.	<ul style="list-style-type: none"> • Advent of Green Revolution (distribution of high yielding varieties) • Number of important institution set up during 1960 and 1970 (Food Corporation of India, CACP, CWC and State Agriculture Universities) • Nationalisation of Commercial Banks • NABARD and Regional Rural Banks (RRB) established • Cooperative Credit Societies strengthened
Phase III: Post-Green Revolution Period (1980-91)	Status: Diversification Approach: Expansion of technology to other produce types and regions	<ul style="list-style-type: none"> • Diversification towards high value produce • Focus on commercial horticulture, setting up of Coconut Development Board and National Horticulture Board
Phase IV: Economic Reforms Period (1991-2015)	Status: Approaching surplus Approach: Liberalisation and toward greater international market access	<ul style="list-style-type: none"> • Improving the functioning of markets and liberalising agriculture trade. • Model APMC Act 2003 to increase private sector participation in marketing and processing. • Signing of AOA of WTO
Phase V: One nation, One market, One tax ICT enabled marketing (2015 onwards)	Status: Food Secure but problem of plenty emerges Approach: Towards a National unified market	<ul style="list-style-type: none"> • Electronic National Agricultural Market • Model APML Act 2017 allowing for operation of alternate markets and unified national markets • GST roll out, streamline inter-state trade.

The Agricultural Marketing System in the country, had for a long period, mainly focused on market infrastructure and regulations, where strategic strengthening of the distribution and the supply chain network for agricultural produce was largely ignored. Farmers were provided options to off-load their produce at the nearest market yard, while the option and ability to directly connect with markets farther afield was not part of the strategy.

However, markets are moving in a direction where greater private sector participation is envisioned, as well as in other supply chain infrastructure. To strengthen private sector operations, the marketing system needs to divert attention on its own key role. This role is to manage and inform the quantitative demand from markets, in advance of final price discovery,

so as to make the other functions more demand linked and be efficient.

1.8. Annotation

The reasoning behind marketing requires a rethink, to move away from overseeing the flow of produce (from farm-to-consumer), towards a function that underlines the flow of market linked information (from fork-to-farm), to guide and mentor the market and logistics networks to efficiently handle surpluses that are generated.

Agricultural marketing entities have focused on informing market price (transaction status) and not much on market intelligence (demand forecast). Marketing as a service requires to provide both intelligence and information, to allow producers to adjust to the changes taking place in the external market environment, to make farming market linked and economically sustainable.

The Agricultural Marketing System incorporates government policies and strategies, for enabling efficiencies in the supply chain activities for agricultural produce. The marketing system, needs next level reforms to give impetus to modernise the markets, expand upon the market network and promote more market linked activities at village level.

Agricultural marketing as a system has the main objective to catalyse and support the monetary exchange from farm produce, to organise the commerce that a farmer commences upon, starting from when the farmer plans to sow the first seed. The agricultural marketing system of the government, must adopt market intelligence as a function, to provide scheduled marketing inputs to all stakeholders, as an important and ongoing undertaking.

Key Extracts

- Marketing is a vital role as a link mechanism, between producers with consumers. Marketing function is intended to direct the flow of goods to crystallise demand, for productive effectiveness & efficiency of agriculture as a business.
- Marketing systems function through policies to build competitiveness with in-built mechanism to reduce monopolistic and oligopolistic operations.
- Marketing policies are expected to create an enabling environment for varied instruments such as contract farming, farmer producer companies, direct marketing, futures market, etc.
- The agricultural marketing system needs to be revisited on the basis of efficiencies achieved and its effectiveness, keeping in mind the larger produce basket.

Chapter 2

Marketing Effectiveness & Market Efficiency

Effectiveness and efficiency – Being effective is about doing the right things to pursue purposeful goals, while being efficient is about doing these things right in a gainful manner for maximum productivity.

2.1. Effective Marketing System

The changes in the agrarian environment in India, requires an associated adjustment to the goals pursued by the marketing system. A mind-set shift, from facilitating and protecting agricultural trade at predefined locations readily accessible to farmers, towards one that expands the market ecosystem, encompasses a wider array of participants and empowers farmers to access locations further afield is required.

The farmers no longer cater to just the local demand as their produce is channelled to populations remote from production areas. Whereas earlier, a marketing system was considered effective if it provided for market yards and transactions within immediate range of farms, the yardstick today needs to include, the interconnectivity between markets and the value dispersion between farms and consumers.

An effective marketing system is not deterred by operational inefficiencies in the flow of produce, but counters those inefficiencies by the effective dissemination of market intelligence (demand) and information (price), and by easing the rules and regulations to promote more relevant and responsive supply chains.

The effectiveness of an agricultural marketing system will vary depending on the situation of the target regions, consumer, product and technologies in hand. Besides, global factors can come into play for certain commodities, where forecasting and pre-empting factors outside of own region is also expected to contribute to marketing effectiveness.

From perspective of enhancing farmers' income, to demonstrate the efficiency and effectiveness of the marketing system, the specific goals and factors to adopt can be as follows:

Demand signals to supply side – a well organised marketing system will communicate backwards from Fork-to-Farm, in advance to production, such that the entire supply chain will function to service the forecasted demand. Market intelligence, on basis of past trends and predictive analysis is a key driver, especially in times of undirected surplus production. An effective marketing system will strive to minimise the blind push into markets and instead promote a pull mode from markets.

Increase in revenue generation – a well organised marketing system will increase the sum total of revenue generated in the agricultural value chain system. An effective marketing system will also aim to persuade that there is more equitable sharing of the net revenue generated, among all the stakeholders in the value chain system.

Market expansion rate – organised marketing will always seek to open markets and support extensive supply chain networks. Agricultural trade, when encompassing cross regional demand and supply, results in providing a stabilising influence on the economics involved. The effective marketing system will always promote the expanding of the market range of the producer/supplier and provide a choice of purchase for the buyer. Market expansion also boosts vibrancy in domestic agricultural trade.

Unified market – a well organised domestic marketing system will integrate by developing extensive connectivity across a network of demand centres and supply regions, creating uniformity in the market arena. Treating the country as one market is essential. Effective integration of the marketing system would reduce price dispersion across the country (variation in prices across sellers of the same item), especially that which occurs due to regional demand inconsistency. A unified market dampens value fluctuations.

Increased competitiveness – a vibrant marketing network will create a competitive market environment. Transparency and optimal price discovery is a major consequence from competition, which is one of the aims of effective markets. Competitiveness also leads to improved resource optimisation and brings about cost efficient practices. An effective market system, therefore leads to efficiency in output marketing, and measures would include food loss, cost of holding inventory, inventory-turn ratios, etc., and profitability.

Facilitate selling channels – an effective marketing system would create alternate market channels to widen the consumer base. The agricultural market yards currently function as singular transaction points. A primary transaction with farmers happens at first instance, with no option of facilitating the sale at another market location. No option is available to a farmer at these yards, to avail marketing services to do a transaction at another market location or channel (e-commerce, institutional, etc.). Therefore, a marketing system is effective if it promotes multiple selling or market options.

The National Commission on Farmers (NCF), constituted in 2004, had recommended a single market for farmers. The Commission also recommended that agricultural marketing be placed on the Concurrent List. The NCF further stated that marketing, storage and processing of agricultural produce needs to shift to one that promotes grading, branding, packaging and development of markets for local produce, domestic and international. The distinction made is that the marketing system needs to become effective through developing better post-production care and open options to access and connect with new market channels.

Marketing effectiveness is a matter of strategic intent, whereas, the factors to assess efficiency are a measure of operational or tactical results.

2.2. Efficiency of Markets

Markets are operational hubs where the consolidated movement of goods from producers to consumers is initiated. The main objective of these operations is to fulfil the physical delivery as per the individual transactions. Where such operations are done at the lowest possible cost, consistent with the provision of the services desired, it can be termed as efficient.

Efficient market operations for farm products ensures that⁸:

- (i) Increase in the farm production is translated into a proportionate increase in the level of real income in the economy, thereby stimulating the emergence of additional surpluses.
- (ii) Good production years do not coincide with low revenues to the producers achieved through effective storage, proper regional distribution and channelizing of latent demand.
- (iii) Consumers derive the greatest possible satisfaction at the least possible cost. An efficient marketing system is an effective agent of change and an important means for raising the income levels of the farmers and the levels of satisfaction of the consumers. It can be harnessed to improve the quality of life of the masses.

A number of approaches are there for assessing marketing efficiency in a particular market channel of a produce. Thus, market efficiency depends on: (i) the effectiveness with which a marketing service is performed (ii) the cost at which the market operations are performed (iii) the effect of this cost and the impact of the service on production and consumption.

An ideal measure of marketing efficiency, particularly for comparing the efficiency of alternate markets / channels, should be such that it takes into account: (i) total cost of operations; (ii) net operating margins; (iii) income received by the farmers, and (iv) prices paid by the consumer.

Any change that further reduces the costs of accomplishing a particular operation without reducing consumer demand, indicates an improvement in the market's efficiency. But a change that reduces costs, and also reduces consumer satisfaction, does not indicate increase in its efficiency. And a high level of consumer satisfaction, even if at a higher operational cost may mean increased marketing efficiency, if the additional satisfaction derived by the consumer results in increased demand to outweigh the added cost incurred in the marketing operations.

2.3. Importance of Effective & Efficient Markets – the Cobweb

In the current day situation, the surplus production is not finding markets. The unfulfilled demand is reflected in higher prices in different part of the country. It is important that consumer has a choice and free trade be promoted.

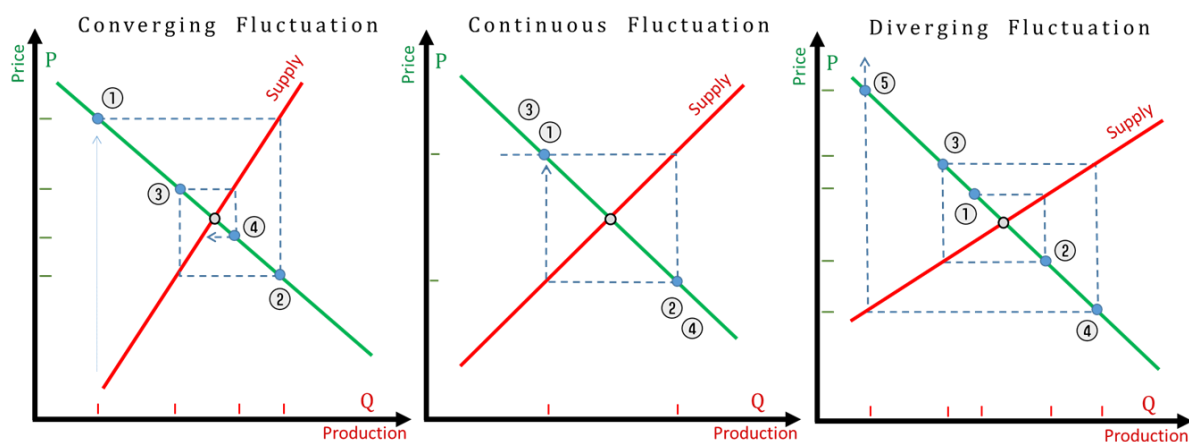
The shortfall in the marketing system, to assess and project demand signals in advance, has

⁸ Source: Agricultural Marketing in India, Acharya and Agarwal, 6th edition, pg 475-476

resulted in farmers following price trends as indicators to supply. Price is a measure that is post-circumstantial. The circumstances may not repeat next season or even within a season, and reaction on production side, to price alone, is a weakness of the system.

In Figure 2.1, points 1 to 4 depict price points against supply status. When price goes up (1), farmers produce more next season and price falls down (2) - farmers change crop, the supply reduces next season, and the seesaw cycle repeats (3) & (4). This seesaw, can result in decreasing the extremes in the swings, both in production and price, towards an eventual state of equilibrium. This convergence in fluctuation is a result of unguided, action and reaction, as a result, future growth is stunted, while price and supply balance to reach a steady state.

Figure 2.1 Cobweb relationship



Numbers represent sequential harvest (supply) cycle, each price point indicates the response to associated change in supply. Represented in the other two charts above, the spiral of fluctuating price can also sustain a continuous or cycle of fluctuation, or even a diverging spiral of increasing price with seesawing supply. All of these are indicators of marketing inefficiencies. Agricultural marketing systems must aim to dampen the cobweb reactivity through advance and strategic information sharing. The trigger to supply needs to be forecasted demand and not the price.

The imbalance represented by the lag effect between surplus output and price drops, can result in a gradual fall in production and lowering price fluctuations until an equilibrium is naturally found. However, the reverse can happen, where the situation can spiral out of hand.

Currently the marketing system, though the Agmarknet portal shares price information and not projected demand. Therefore, the system is geared to provide price information as indicator of the ongoing transactions, whereas, the producer needs to know forecasted demand projections (volume) to take informed decisions, all the way back to crop planning. Therefore, the outcome of the information from the system is mismatched from the need of the farmers.

2.4. Containing the Inequity

An increase in price is not always good for the marketing system and indicates inefficiency in the system. Increase in price can result in stifling the demand, triggering a shortage in

production in the next season (cobweb model) and eventually a reverse swing occurs. This market inefficiency is also to the advantage of commodity traders that have capacity to hold inventories until the next upward price swing. For the farmers, the temporal increase in price of a crop, is a false signal to sow more of that particular crop for the next season.

This lag effect between price signal and sowing patterns is an acute failure of the marketing system. The price signal is ex-post (after sales), and the farmer's reaction is ex post facto (after the fact has relevance). Marketing system is efficient if it provides a price signal that is ex-ante (e.g. before the next sowing season). Demand forecasting with volumetric information and prospective price determination, even if with some elasticity, is a far better signal to farmers than the current system with an annual lag in its effect.

Price, production, consumption are intrinsically correlated. A fall in price is not a failure too, if met with equal or higher increase in volumes, as the net value is a factor of price and quantity. However, any fall in price local to a region (at *mandis* around a producing area), or in a period of time (around harvest season), is a sign of inefficiency when left unattended by the marketing system. This happens when markets are not spatially and temporally integrated.

The marketing system is inefficient when it cannot address imbalance between demand and supply. The tactics used to meet demand include operations over place, time and form.

The inefficiencies in the system impact the farmer negatively, but become opportunities for others. Commodity traders will make procurements at harvest season and store the foodgrain for transactions at a higher price point after some time, when supply is limited. Farmers could do the same, provided they had the economic capacity to bear the inventory holding cost. Credit against warehouse receipts and other solutions can satisfy the cash flow requirements of a farmer, while allowing them opportunity to avail the price arbitrage over time. Storing capacity dedicated for use of small farmers, or group of farmers, especially possible in case of foodgrains, can also serve this purpose.

There can be many reasons for surplus production not finding a market, but the main reason is lack of marketing linkages for a large number of produce types. The market infrastructure does not have the capacity or capability to handle the production and link it with the rest of the country. This lack of integration of markets needs to be corrected. Most of the market development is done at state level, which ignore the concept of a national market system, focusing on intra-state marketing only.

Lack of information from demand side to farmers results in reverse interrelation between production and income. Production gluts with price slumps, and production slumps with price bumps are commonly seen, at times to extremes. While it is natural to have an inverse relationship between market supply and pricing, demand analytics plays an important role to understand and address the extremes. A drop in price should not automatically translate into a drop in income, since larger volume is available to sell and income should ideally be

maintained. By mapping demand at markets, the available surplus can be spread and the quantum of production can be directed to other destinations of demand.

Unlike for crops with long holding life and having a “spread in time”, in perishables, a production glut is more local to a region, while a supply slump may exist in another part of the country. Marketing needs to appropriately develop a “spread in place” by spatial movement of the goods to a place where demand exists. Such monitoring and linking of demand is a capability that the marketing system has to develop.

In case of Central Pool procurement, holding the stock close to population centres, makes the system more efficient and spreads its availability in advance of demand. This tactic also avoids large inventory build-up in the production areas – this normally happens because warehousing infrastructure was developed on the basis of production and not linked to future demand. The distribution of warehouses can be rationalised depending on demand projections (from public distribution and from secondary processors).

2.5. Indicator of Marketing Efficiency

Marketing efficiency analysis has generally focused more on transaction levels or the overall efficiency of the supply chain operations. As such, most assessments on marketing efficiency highlight broken links in the value chain system.

There is also the need to have a marketing intelligence mechanism that monitors and analyses other economic signals for purpose of marketing inefficiency.

A measure of the efficacy of the national marketing system can be the extent of price dispersion for the same produce, across multiple markets in the country. Price dispersion for farmgate prices was presented in the Economic Survey of India (2015-16) for select crops.

The graph indicates the ratio between the lowest to the highest price for the same crop in the country. This price dispersion, at farm-gate, is clear indicator for the need for a single “one market” ideal. Some reasons for farm-gate price dispersion would include onwards connectivity from farm-gate to next level market, the concurring demand

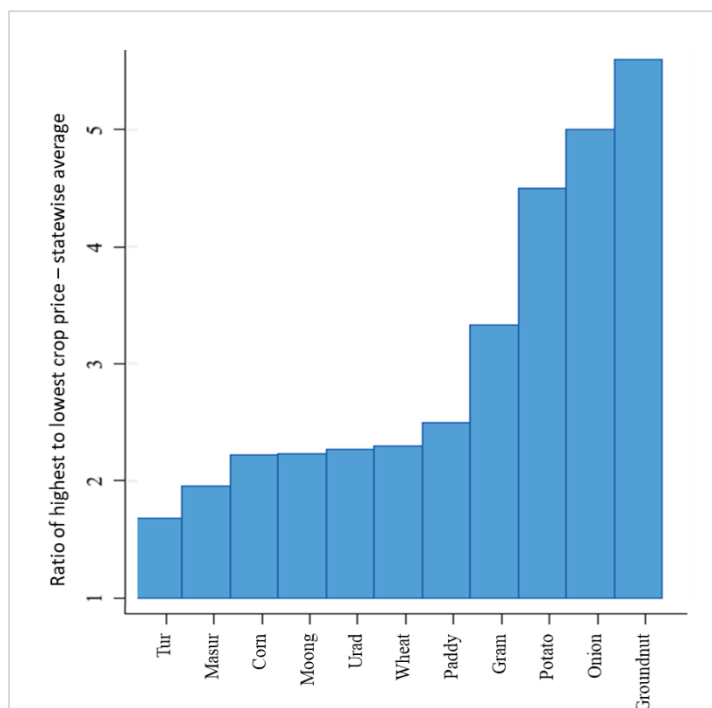


Figure 2.2 Price Dispersion at farmgate - select crops

Source; Economic Survey of India, 2015-16 (NSS- SAS 2013)

or supply fluctuation at the time of farm-gate sale, the storability and sensitivity of crop to other dynamics, etc. However, the marketing effectiveness is measured through efficiency achieved in reducing the overall price dispersion at farm-gate.

Price dispersion also happens between farm-gate and consumer. Some dispersion is expected due to reasons which include the associated logistics cost to connect farm-gate with wholesale market at consumer end. Crop that has regional specialisation for production will normally have a cost plus increment at consumer end in other regions. The causes of market segmentation are many – differences in remoteness and connectivity (rural roads), local market power of intermediaries, degree of private sector competition, propensity of regional exposure to shocks, local storage capacity, mandi infrastructure and farmers access to them, storage life of the crop and crop specific processing cost⁹.

The prevailing cost efficiency also has impact on price dispersion, with some natural dispersion being expected and inherent to the system.

Equation 2-1: Natural price dispersion

$$(1) \quad (2) \quad (3) \quad (4)$$

Cost of production + cost of logistics + risk + marketing margins = Natural price dispersion

Logistics (2) and risk (3) are correlated to food mile (distance) and fuel, holding life or sensitivity of the produce, technology used, monitoring and regulatory compliance, inventory holding cost, etc. However, extreme price dispersion that cannot be explained by the cost of risk and the logistics involved, indicate inefficiencies in the marketing system and results in acute price wedges between the consumer and farmer.

Marketing margins (4) are unnaturally escalated in a multi-layered marketing network that has numerous intermediaries between the farmers and wholesale market. This factor also makes for longer supply chains, despite the destination markets being at short distances. **A long supply chain results from multiple stakeholders in the chain of custody, as the produce moves to market, and dilutes the total share of value to be portioned across all players.**

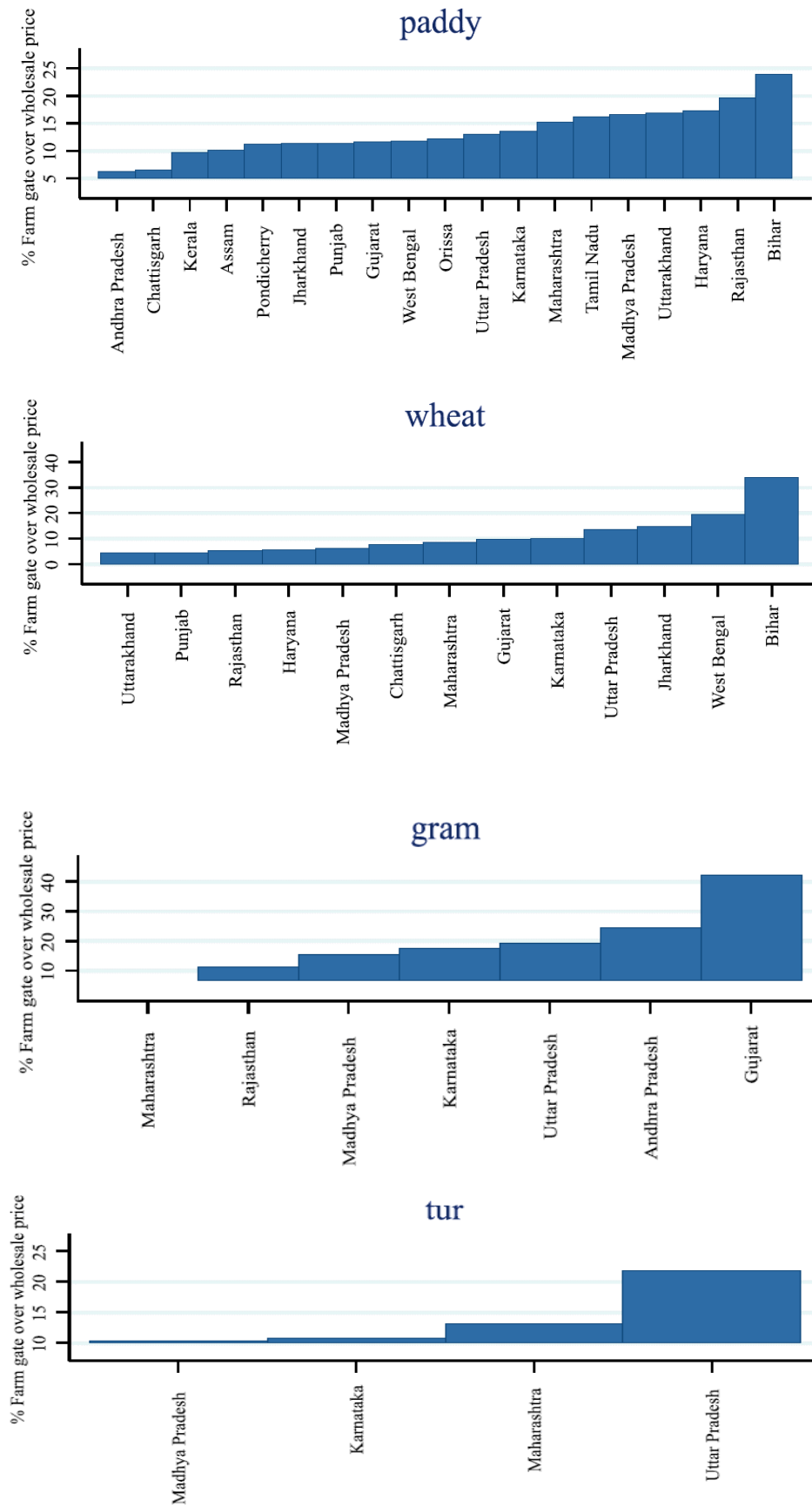
High price dispersion is also the result of value leakage due to high level of value chain segmentation and non-transparent pricing structure. Both impact upon the total value that is recovered at the end of the supply chain and normally such inefficiencies get passed on to the farmer. A few crop specific examples of price wedges presented in the Economic Survey are repeated in the next section, indicating the efficiency or lack thereof, in the fork to farm chain.

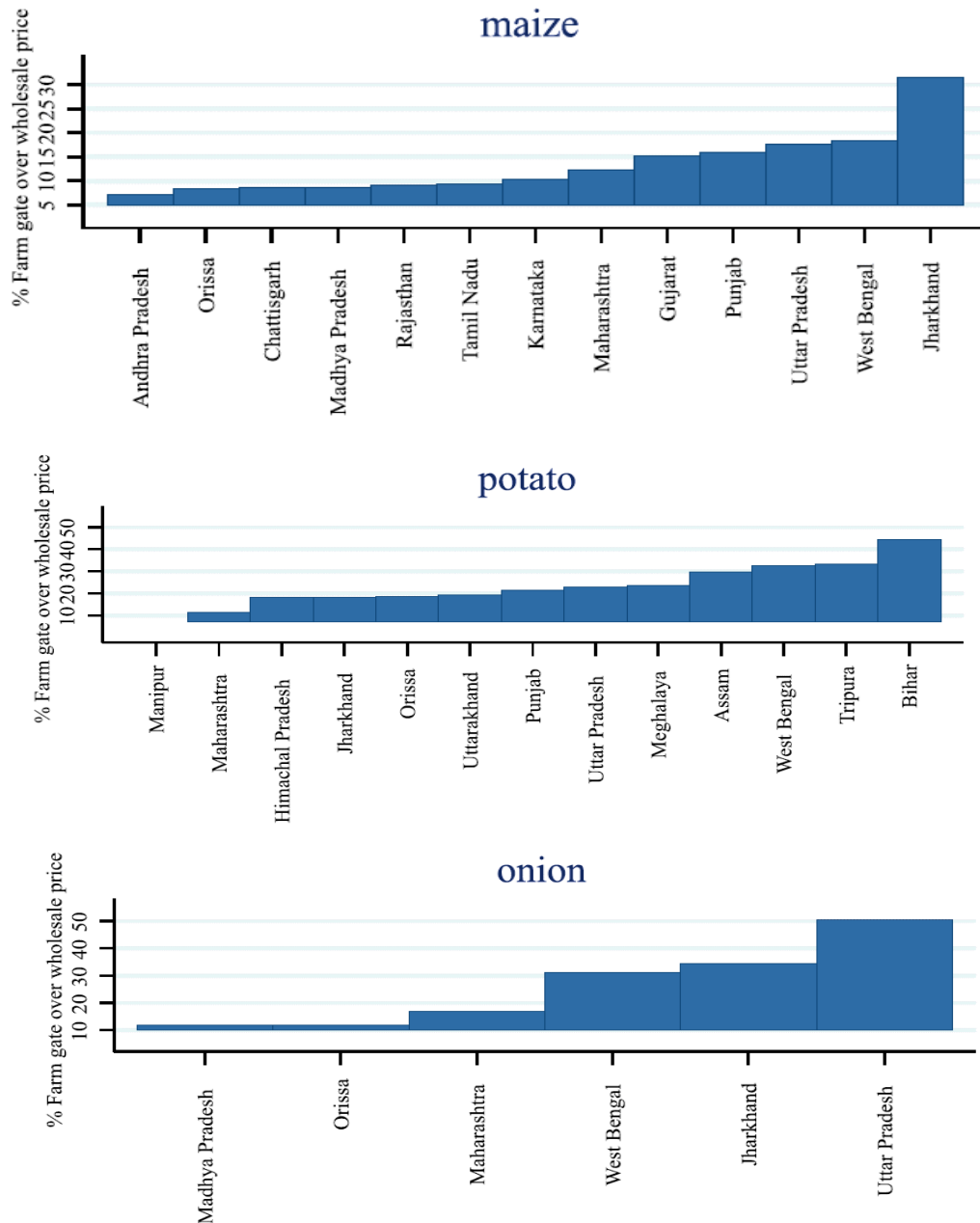
2.6. Crop specific examples of Market Efficiency

The price dispersion between farm-gate and whole sale market (price wedge), is extracted from the Economic Survey of India 2015-2016 and symptomatic of the efficiency status.

⁹ Economic Survey 2015-2016

Figure 2.3 Price wedges between farmgate and wholesaler





These price wedges also provide clear indication of opportunity for agri-business entrepreneurs. High inefficiency areas, are target areas for businesses, to select and build models that can readily compete with the existing inefficiencies.

Among the crops represented, the biggest price wedges are for the perishable types, potatoes, onions and groundnuts. The wedges are lower for rice, wheat (two commodities where MSP notification is followed by government procurement).

Greater market integration is essential for farmers to get higher farm-gate prices. While the GST bill is a step in the right direction, a lot more needs to be done by the states, including, creating better physical infrastructure, improved price dissemination campaigns, and removing laws that force farmers to sell to local monopolies.

Additionally, similar price dispersion, or wedges, exist between wholesaler and retailer, which are also important indicators on the efficiency at last mile operations.

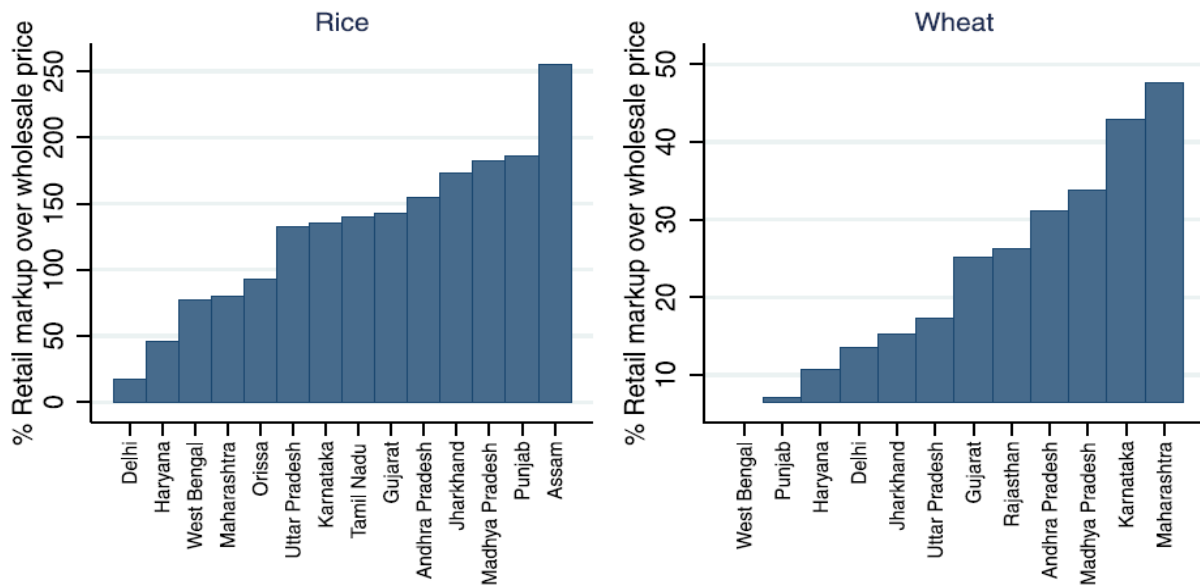
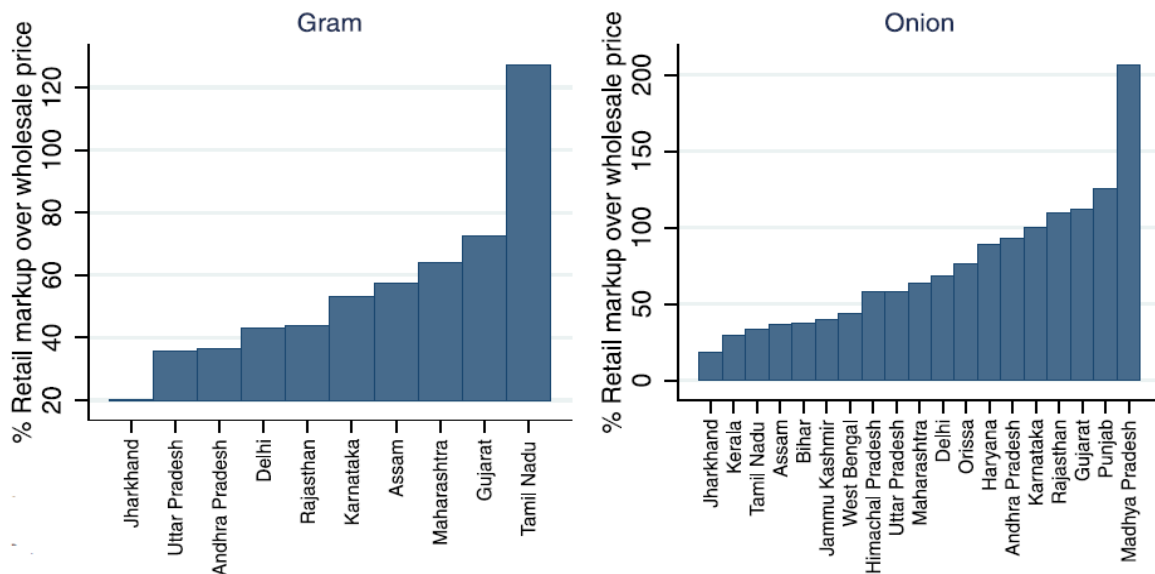


Figure 2.4 Price wedges between wholesaler and retailer



Extracted from Economic Survey of India, 2015-16

2.7. Marketing Policy

Growth and development of agriculture and allied sectors directly affects the well-being of a large population base, both rural and urban citizens. The immediate impact is also reflected in the prosperity and employment opportunity in the rural economy.

The development trajectory of the country is closely linked to the socio-economic development in the rural areas of the country. The larger share of the country is located in villages and they are contributors and growth drivers of the nation. In a country as diverse as India, the human

backdrop and situational realities vary and development is not always uniform. There is frequently the need for government level interventions to give direction for more equitable and inclusive growth.

Therefore, agricultural marketing, besides having function of managing market information, also has involvement of government, which intervenes to support agricultural trade, domestic and international. The purpose of agricultural marketing policies and regulations is to protect farmers from exploitation from market intermediaries and traders and also ensure transparent transactions and timely payment for their sale proceeds.

The Government, Central and States, implement various support mechanisms and undertake other interventions with intention to make agriculture more competitive and enhance income to farmers. The support provided ranges from price intervention, market intervention, provision of market infrastructure, other infrastructure, procurement of select commodities, etc. The procurement intervention by the government, makes it a market channel for the farmers. In doing so, the government influences the market dynamics. When procurement is done without objective planning on final end-use, the government can also upset the demand metrics, artificially buttressing crop production, without any strategic aim. Therefore, a close look at the procurement system is warranted, to align strategic reserves and gratuitous buying with consumer demand and future growth for farmers.

Effectiveness of government policy can be measured through assessing how much of the local produce connects, and is directly traded by farmers, with markets outside the production region. At the moment, a farmer will normally off load her produce at the first instance, in the hands of agents or local markets, leading to a larger than necessary layering of actors in the delivery system. This happened, since efforts were made to ease the farmers' first mile transaction due to past constraints in logistics connectivity.

This system provides farmers immediate access to primary level monetisation of their produce, and is necessary. Nevertheless, as the capabilities of the farmers develop, there is also the need for policies to support direct market connectivity. The concept of market infrastructure need not be only focused on developing centres of transactions, but also as village level assembly/pooling/packing to facilitate onwards connectivity to cross regional markets, with the operations under custody of the primary producer or first mile aggregator.

2.8. Annotation

Marketing effectiveness in a measure of expanding the market system to generate larger revenue streams and competitiveness. Market channel efficiency depends on reduction of marketing cost, adoption of technology in grading, packaging, transportation, storage, value addition, wholesaling, retailing and exploring economies of scale through aggregation.

The one-India market concept may benefit from placing agricultural marketing under the Concurrent List. While cultivation is limited to the land and area of farming operations,

marketing has no boundaries and needs to operate on a pan-India level to meet demand across the country, and further afield.

Among the crops represented, the biggest price wedges are for the perishable types, potatoes, onions and groundnuts. The wedges are lower for rice, wheat (two commodities that are produced by a large majority of farmers and where MSP declaration is followed by government procurement).

Greater market integration is essential for farmers to get higher farm-gate prices. While the GST bill is a step in the right direction, a lot more needs to be done at the State level, including, creating better physical infrastructure, improved price information dissemination campaigns, and reforming regulations that force farmers to sell to local monopolies.

Future marketing intervention by the State governments need to be align with the One-nation, One-market concept by laying greater emphasis on long term connectivity for agricultural produce, across states and geographies.

Key Extracts

- Marketing system helps to direct and crystallise demand, for making agricultural trade more productive, effective & efficient.
- Marketing systems develop capacity to ensure operational and pricing efficiencies in the market channels of different produce.
- Marketing systems play a vital role in servicing a link mechanism, for producers with consumers and allows price discovery mechanism to be transparent.
- There is a need for a market intelligence system that monitors and analysis other economic signal for the purpose of marketing efficiency.
- Marketing efficiency is also to be achieved by reducing farm gate price dispersion by creating better physical infrastructure, improved price dissemination and marketing policies to ensure transparency and timely payment to famers.
- Marketing systems function through policies to build competitiveness with in-built mechanism to reduce monopolistic and oligopolistic operations.
- Marketing policies can create enabling environment for varied instruments such as contract farming, farmer producer companies, direct marketing, futures market etc.

Chapter 3

Evolution of Agricultural Marketing

A historical perspective on agricultural marketing and the price support, through a system of policies, regulations and market interventions. The system has been evolving over the years and denotes that the system is influenced with market realities. Reforms are needed in response to assessments in socio-economic growth and to suit the changing business environment and the strategic needs of the country.

3.1. Marketing Perspective

Historically, the government has been largely focused on providing markets to provide farmers the platform to trade and meet regional demand. The government also extended support to provide price support, with the establishment of Food Corporation of India in 1964 and the Agricultural Price Commissions in 1965. The price support was initially in the form of notifying a minimal floor price and through direct procurement by FCI at a price that was higher than the minimal price.

Prior independence, the key concern of the Government related to agricultural marketing was to keep the prices of agro-raw materials for the industry and food items in check. The first regulated Karanjia Cotton Market was established as early as in 1886 under Hyderabad Residency Order. The first marketing legislation was the Berar Cotton and Grain Market Act of 1897, which became the Model Act for legislation in other parts of the country.

The provisions of this Act empowered British Resident to declare any place in the assigned district a market for sale and purchase of agricultural produce and constitute a committee to supervise the regulated markets. The then Government of Bombay Province was the first to enact the “Bombay Cotton Market Act” in 1927 and this which was the first marketing law in the country, which attempted to regulate markets with a view to evolving fair market practices. The then government, also constituted the Royal Commission on Agriculture in 1926 which made several recommendations for regulation of marketing practices and establishment of regulated markets.

The establishment of the Directorate of Marketing and Inspection in 1935, the enactment of the Act for grading and marking of agricultural produce in 1937, the conduct of commodity market survey and the establishment of regulated markets in the States are some of the other measures taken before Independence to improve the marketing situation.

After independence, during the sixties and seventies, most State governments enacted the Agricultural Produce Market Regulation Act (APMR Act). It authorized the States to set up and regulate marketing practices in wholesale markets. In the initial five year plans, the main thrust was on intensive agriculture. The expressed objective was to concentrate resources and efforts in specially endowed areas with adequate production agricultural potential in terms of water and infrastructure to achieve a quick break-through in production. Coinciding with the Green Revolution wherein productivity enhancement was achieved, the country witnessed

emergence of State regulated markets.

All primary wholesale assembling markets were brought under the ambit of these Acts. Well-laid out market yards and sub-yards were constructed and for each market area, an Agricultural Produce Market Committee (APMC) was constituted to frame the rules and enforce them. To cope up with the need to handle increasing agricultural production, the number of regulated markets has been on the rise. While by the end of 1950, there were only 236 regulated markets in the country, now the number is more than 6600. These are primarily wholesale principal markets comprising 2339 principal with their attached sub-market yards. In addition, the country has more than 22,000 Rural Periodical Markets or *Grameen Haats* under the control of local bodies, panchayats, councils, APMCs, etc., which lack even the basic amenities and marketing infrastructure.

Under the APMR Act, only the State Government could set up markets, thus preventing private players from setting up markets and investing in marketing infrastructure. Development of primary agricultural produce markets was taken up as an institutional innovation and construction of well laid out market yards was considered as an essential requirement for regulating the practices in primary wholesale markets. These markets had specific farm catchment areas, and resulted in fragmentation of markets within the State, hindering the free flow of agro-commodities from one market area to another.

3.2. Historical Interventions in Agricultural Marketing

Over time, the range of agricultural produce, and the quantity of production has changed, and these markets became bottlenecks to the free movement of produce. The markets became opportunistic trading platforms under control of a few, rendered restrictive and monopolistic, falling well below the intended objectives. Further, the existing regulatory framework does not support free flow of agricultural produce; it restrained the direct interface of farmers with the processors/exporters/bulk buyers/end users, and as such, led to a large number of intermediaries who may or may not be adding any value to the farmer, along the agri-value system. There arose multiple staging points and handling in the flow of agri-produce, with multiple levels of mandi charges, and this ended up in escalating the prices for consumers without commensurate benefit to farmers.

Table 3.1 Major Policy Interventions in marketing

Year	Major Policy & Legislative interventions
1897	▪ Berar Cotton and Grain Market Act
1898	▪ Livestock Importation Act
1930	▪ Indian Sale of Goods Act
1937	▪ Agricultural Produce (Grading and Marking) Act
1938	▪ Rice Milling Industry (Regulation) Act
1947	▪ Rubber Board Act
1947	▪ Vegetable Oil Products (Control) Order

Year	Major Policy & Legislative interventions
1950	▪ Zamindari Abolition Act
1952	▪ Indian Standards Institutions Certification Marks Act
1952	▪ Forward Market Control (Regulation) Act
1954, 1964, 1976 & 1986	▪ Prevention of Food Adulteration (PFA) Act
1955	▪ Essential Commodities Act
1955, 1997	▪ Fruit Products Order
1956	▪ Sugar Control Order
1956	▪ Agricultural Produce (Development & Warehousing) Corporations Act
1957	▪ Wheat Roller Flour Mill Licensing and Control Order
1958	▪ Trade and Merchandise Marks Act
1958	▪ Standards of Weights and Measures Act
1959	▪ Sugar (Movement Control) Order
1959	▪ Sugarcane (Press-Mud-Control) Order
1960s & 1970s	▪ Intensive Agricultural District (IADP, 1964) & Area Programme (IAAP, 1965); Agricultural Produce Marketing (Regulation) Act
1962	▪ Warehousing Corporations Act
1962	▪ National Cooperative Development Corporation Act
1963	▪ Gur (Movement Control) Order
1963	▪ Export (Quality Control & Inspection) Act
1964	▪ Food Corporation of India Act
1964, 1980	▪ Cold Storage Order (under EC Act, repealed in 1997)
1965	▪ National Dairy Development Board Act
1965	▪ Fruit Products Order (FPO)
1965	▪ Agricultural Prices Commission (renamed CACP in 1985)
1966	▪ Sugarcane (Control) Order
1967	▪ Solvent Extracted Oil, De-oiled Meal and Edible Flour (Control) Order
1969	▪ Monopolies and Restrictive Trade Practices Act
1970	▪ Cotton Corporation of India Act
1970	▪ Sugar (Packing and Marketing) Order
1971	▪ Jute Corporation of India Act
1972	▪ Sugar (Restriction on Movement) Order
1973	▪ Meat Food Products Order
1975	▪ Tobacco Board Act
1975	▪ Packaged Commodities Order
1975	▪ Vegetable Oil Products (Standards of Quality) Order
1977	▪ Vegetable Oil Products (Control) Order
1977	▪ Pulses, Edible Oilseeds and Edible Oils (storage control) Order

Year	Major Policy & Legislative interventions
1979	<ul style="list-style-type: none"> ▪ Levy Sugar Supply (Control) Order
1980	<ul style="list-style-type: none"> ▪ Prevention of Black Marketing and Maintenance of Supplies of Essential Commodities Act
1982	<ul style="list-style-type: none"> ▪ North Eastern Regional Agricultural Marketing Corporation (NERAMAC) Act
1984	<ul style="list-style-type: none"> ▪ National Horticulture Board Act
1985	<ul style="list-style-type: none"> ▪ Agricultural and Processed Food Products Export Authority Act
1986	<ul style="list-style-type: none"> ▪ Spices Board Act
1986	<ul style="list-style-type: none"> ▪ Bureau of Indian Standards (BIS)
1986, 1991, 1993 & 2002	<ul style="list-style-type: none"> ▪ Consumer Protection Act
1986	<ul style="list-style-type: none"> ▪ Cotton (Control) Order
1992	<ul style="list-style-type: none"> ▪ Milk and Milk Product Order (MMPO)
1997	<ul style="list-style-type: none"> ▪ Standards of Weights and Measures (packed goods) Act
2000	<ul style="list-style-type: none"> ▪ National Agricultural Policy (NAP)
2000	<ul style="list-style-type: none"> ▪ Jute and Jute Textiles (Control) Order
2003	<ul style="list-style-type: none"> ▪ Model Agricultural Produce Marketing (Development & Regulation) Act
2004	<ul style="list-style-type: none"> ▪ Ban on futures trading of 54 commodities (including, rice, wheat, oilseeds, pulses) were removed. ▪ Processed food items exempted from licensing under Industries (Development & Regulations) Act 1951, except those reserved for small scale industries (SSI) and alcoholic beverages. ▪ Food processing & cold-chain added to list of priority sector for bank lending. ▪ Automatic approval for FDI upto 100% for most processed foods, except alcohol and beer and those reserved for SSI.
2006	<ul style="list-style-type: none"> ▪ Food Safety and Standards Act
2007	<ul style="list-style-type: none"> ▪ National Policy for Farmers (NAF)
2007	<ul style="list-style-type: none"> ▪ Warehousing (Development and Regulation) Act
2013	<ul style="list-style-type: none"> ▪ National Food Security Act
2014	<ul style="list-style-type: none"> ▪ Schemes for commercial horticulture development subsumed into Mission for Integrated Development for Horticulture (Baagvani Mission)
2016	<ul style="list-style-type: none"> ▪ National Agriculture Market (e-NAM) launched ▪ 100% FDI in marketing of food products produced & manufactured in India
2017	<ul style="list-style-type: none"> ▪ Model Agricultural Produce & Livestock Marketing (Promotion & Facilitation) Act

Above list identifies the broad measures taken by the government over more than a century to in regards to agricultural produce and product marketing, to build the market structure as it exists today.

Before the phase of economic liberalisation in 1991, the government support was robust in terms of infrastructure and market support. The advent of economic liberalisation was expected to lead to the liberalisation in the agricultural marketing system as well and release the spirit of enterprise in the agriculture sector. However, the expected benefits of an increasingly liberalised national environment did not manifest in the agricultural marketing arena.

The agriculture sector did not witness much of new ideas and the APMC controlled marketing mechanism continued.

3.3. Operation Flood

In the dairy sector, the setting up of National Dairy Development Board in 1965 was the precursor to Operation Flood. India is today the largest producer and consumer of dairy and in the year 2015-16, milk production is cross 155 million tons. The market size was assessed at US\$ 70 Bn in 2014-15, of which the organised formal sector was sized at about US\$ 12 Bn.

Table 3.2 Milk Production and share in market channels

	Production (tons per day)	Market channel % share of production
Milk Production daily	4,26,000	100
Consumed in production areas	1,96,000	46
Surplus sold from production areas	2,30,000	54
Surplus handled by formal sector	1,41,600	33
Surplus handled by informal sector	88,400	21

After local consumption, about 54 per cent of the production is the surplus that is marketed outside the production area. About 33 per cent of the milk production (62 per cent of the surplus), is channelled to consumers through the small and informal sector such as local sweet shops and other retail. The organised formal market channels, operated by large scale processors through Cooperatives and Private enterprises, handles about 21 per cent of the total production (38 per cent of surplus). The National Action Plan for Dairy Development is targeting 300 million tonnes of milk production with 50 per cent channelled through the organised formal sector by 2023-24.

3.4. Market Support by Government

India's main policy goals remained with focus to attain food self-sufficiency, to ensure remunerative prices to farmers, and to maintain stable prices for consumers. To meet these goals, India continues to rely on a number of policy instruments:

- regulation of markets,
- input subsidies for producers,
- minimum support prices (MSP), and
- food subsidies for consumers.

3.4.1. Regulation of markets

The Agricultural Produce Market Committee (APMC) Act requires that farm produce be sold only at regulated markets through registered intermediaries. The Essential Commodities Act (ECA), allows central and state governments to place restrictions on the storage and movement of commodities deemed essential by governments. Notwithstanding moves to deregulate, fragmented market players continue to dominate the industry. The transportation, marketing and distribution of agri-food commodities did not develop in a scientific manner, linked or directly linked to demand from growing markets and the demand for what was earlier an essential commodity has also undergone changes.

3.4.2. Input subsidies

The starting point of Indian agriculture and concerns on food insecurity, necessitated provision of subsidies on fertilizer, electricity, fuel and irrigation. Intensive farming and production growth were motivators for policy interventions.

Prices of both domestic and imported fertilisers are subsidised and in most states, electricity is provided to agriculture at very low prices or free, among other support which led to distorting demand and the response from farmers. Prior assessment of soil health, or impact of unfettered irrigation on the agricultural environment had not been part of regular planning. Excessive use of subsidised inputs, rising soil salinity and ground water depletion are some of the resulting concerns. When these inputs result in outputs that do not find associated demand, the outcome is discontent.

3.4.3. Minimum support prices

Price Policy of the Government is an important instrument in the marketing arena. The Government of India (GoI) supports producers by announcing minimum prices for certain commodities considered key to its agriculture. The MSP are set on recommendations of the Commission for Agricultural Costs and Prices (CACP), based on cost of production and other factors. The MSP mechanism has recently been extensively evaluated for its efficacy¹⁰ by the NITI Aayog in 2016.

There are other associated schemes such as the Price Stabilisation Scheme and Market Intervention Scheme that also come into play as minimum support systems for farmers. At one level, these support programs act as demand influencers, on the other these are measures to protect farmers from unrequited farming efforts. Conversely, the procurement made to mitigate fluctuations in farm-gate prices, are at times reactive to the retail prices at the consumer end.

3.4.4. Food subsidies

India has enacted the National Food Security Act 2013, to protect and assure low income consumers of access to affordable food. The Food Corporation of India (FCI) and other Govt. and State agencies procure food grains from farmers at the MSPs and sells at subsidised prices

¹⁰ Evaluation Report on Efficacy of Minimum Support Prices (MSP) on Farmers, NITI Aayog - 2016

through the public distribution system (PDS). MSP linked benefits have been realised largely in areas where such MSP associated procurement happens and has tended to contribute to higher production and pressures to raise MSPs every few years. Food subsidy expenditures have almost trebled in the past decade.

3.5. First Steps towards Liberalisation

After 10 years of opening up the Indian economy and in the beginning of the new millennia the first seeds of agricultural reforms was sown.

3.5.1. Liberalisation of Control Orders

Stock limits in respects of essential agricultural commodities are imposed through Control Orders issued under the provisions of the Essential Commodities Act, 1955 by the States from time to time. With effect from 15 February 2002, the Government of India removed 11 classes of commodities in full and one in part from the list of essential commodities declared earlier. The Government issued the Removal of Licensing requirements, Stock limits and Movement Restrictions on Specified Foodstuffs Order, 2002 on 15 February 2002 allowing dealers to freely buy, stock, sell, transport, distribute, dispose, etc., any quantity in respect of wheat, paddy/rice, coarse grains, sugar, edible oilseeds and edible oils, without requiring any license or permit under any order issued under the Act.

In order to facilitate free flow of market forces and for the overall benefit of consumers, two more commodities have also been deleted from the list with effect from 31 March 2004. At present the list of essential commodities contains 15 items.

In the context of ongoing liberalisation of Indian economy, a rationalising and progressive dismantling of the system of control and restriction in the agricultural economy is warranted.

There is need to differentiate the stock held for captive end-use viz the inventory held for opportunistic market arbitrage (not having their own end-use). At the first instance, there is need to differentiate the genuine requirement of inventory by the food/agro-processing industry and food retail chains. Given the operating cycles of these stakeholders, the required inventory-turns to assure their business can be assessed and immediately permitted. Normally inventory is held to de-risk from input supply disruptions and is a factor of the type of product (safe holding life) and operating capacity of these captive users/stakeholders.

Similarly, the stock limit on exporters can be eased so that their secondary market connectivity is not effected. A multiple of the weighted average of the annual trade by such actors can be the starting point to rationalise and eventually remove the stock limits for more commodities.

3.5.2. Model APMC Act 2003 and Rules 2007

In 2003, the Department of Agriculture, Cooperation & Farmers' Welfare (DAC&FW) formulated a Model Agricultural Produce Marketing (Development and Regulation) Act, followed by Model Rules 2007 for the States/UTs to adopt. These were intended to usher in

the desired reforms in the erstwhile APMR Acts, to induce commensurate private investment in agricultural marketing. However, many States carried out partial reforms only, on a pick-and-choose basis, thereby defeating the objective of creating a uniform trade environment across the country.

As a result, there was no noticeable ground level progress and all desired results were not forthcoming. Nevertheless, on the evolutionary chart, they did help to open the shut doors to alternative marketing channels in some progressive States. However, even thereafter, the necessary changes in the agricultural marketing system did not happen as was expected. The reforms as adopted by the state governments has been largely ineffective. One of the reasons appears to be depriving private markets a level playing field.

3.6. Some notable changes in the marketing system

It would not be complete to review the existing marketing system without mention of emergence of changed marketing situation in some of the States in the country. Alongside, the evolution of regulated markets, some alternative marketing systems have developed. Alternative marketing systems such as cooperative marketing, contract farming, retail chain linkages etc., got an impetus in the aftermath of the first level of marketing reforms. Alternative marketing systems provide other marketing platforms for farmers to sell their produce.

3.6.1. Direct Marketing

Direct marketing in the context of agricultural marketing, where farmers directly transact with the produce consumers. These operates in two basic formats (i) Farmers' Markets, and (ii) Direct sourcing from farmer's field by processors (primary consumers).

These markets are proven to be beneficial to both producers and consumers. These markets have helped in mitigating the problems of fragmented supply chain. Further, the quick movement of produce from farmer to consumer, saves losses considerably. In these markets no market fee is charged but service charges are collected from sellers. About 488 such farmers' markets are operating in different States in the name of *Apnamandis* in Punjab, Haryana, *Rythu* bazaars in Andhra Pradesh and Telangana, *Uzhavar Sandhai* in Tamil Nadu, *Shetkari Bazaars* in Maharashtra and *Raitha Santhe* in Karnataka. As per a study¹¹ on these bazaars it is revealed that the producer's share in the consumer's rupee and marketing efficiency was more in case of *Rythu* bazars (Farmers' market in Guntur) when compared to organised retail outlets and the least was in case of hawkers and petty vegetable enterprises.

However, footfall is limited to the local consumer and therefore future growth is limited. Any production that is in surplus to the absorption capacity in the market region requires physical connectivity with demand that is further afield.

The other variant of direct marketing is by way of direct sourcing of the produce from farm-

¹¹ Rao *et al* (2013)

gate by the processors, exporters, retail chain players, etc. Direct marketing and direct sourcing allows farmers to skip multiple layers in their transactions and benefits by skipping of intermediary margins. Though recommended in the Model APMC Act & Rules, very few of States have issued such licenses for direct sourcing.

Figure 3.1 State-wise licenses issued for Direct Marketing

SN	Name of State	No. of Direct purchase licences issued
1.	Madhya Pradesh	1
2.	Andhra Pradesh	2
3.	Gujarat	3
4.	Rajasthan	3
5.	Telangana	3
6.	J&K	3
7.	Punjab	11
9.	Himachal Pradesh	12
10.	Karnataka	37
11.	Maharashtra	219

Direct sourcing can manifest as contract farming instruments.

3.6.2. Contract farming

Contract farming can address many traditional ills, such as lack of market connectivity, long chain of market intermediaries, ignorance about the buyer demands, etc. Contracts from bulk consumers can serve to offer regular and consolidated demand to farmers and an assured exchange against predetermined quality and quantity. This allows farmers to vertically integrate with specific and organised market channels.

Figure 3.2 State-wise progress of Contract Farming

State	Crops under Contract Farming	No. of Companies under CF
Punjab	Malting Barley	1
Haryana	Barley, Basmati, Ordinary Paddy, Potato	4
Chhattisgarh	Bitter Gourd, Bean, Green Chili, Tomato, Lady finger, Bottle gourd, cucumber	2
Gujarat	Cotton	1
M.P	Cotton	1
Maharashtra	Sponge/Ridge gourd, Lady finger, Chili, Tomato, White Onion, Potato, Baby corn, Soybean, Beans, Pomegranate, Sweet corn	5
Karnataka	Organic Cotton	1

DAC&FW through model Act, 2003 suggested that States promote contract farming and by now 20 States provided contract farming provision in their APMC Acts while Punjab legislated a separate Contract Farming Act in 2013. So far, 14 States only have notified the Rules to

actualize the contract farming on the ground level and only States of Maharashtra, Haryana, Punjab, Karnataka, Gujarat, M.P and Chhattisgarh have registered companies/ firms for undertaking contract farming in their States.

Contract farming is frequently extended to non-crop activities also. Poultry farmers for both eggs and broilers function under large enterprises in many States of the country particularly Tamil Nadu, Kerala, Karnataka and Andhra Pradesh. Of late, most of the food processing units have shown keen interest to enter into some form of contracted supply for their feedstock from producers.

The reasons identified for this slow progress include (i) conflict of interest perceived by APMCs/Marketing Boards which are designated as the registering, agreement recording and dispute settlement authorities in most of the States; (ii) complex and long procedures for registration and recording of agreement; (iii) provisions of stockholding limit under Control Orders issued at any point of time deters buyers to enter into contracts to aggregate the contracted produce, even for the intended purpose of processing, exporting, linking to retail chain; and (iv) poor publicity of contract farming among the farmers about its benefits.

Several studies reveal that contract farming is a mode of marketing that can marry small farmer efficiency to large scale of economy of processors. The vertical integration promotes transfer of management skills to the field, provides assured buyers for the produce, reduces risks from unplanned transaction and opens avenues for institutional credit.

Contract farming has a constraint from farmers' perspective, in that they are limited in their production to the direct demand and their growth is linked to the contractor's capacity to grow the market share. Further, large processors have option to source globally, depending on cost efficiency and quality requirements.

The opening of markets will however, help farmers decide on the optimal market opportunity, contracted or other wholesale. Though contract farming is not a sole solution for problems in agricultural marketing, it can very well be leveraged in certain regions and for specific crops for increasing farmers' income.

3.6.3. Private wholesale markets

So far 21 States/UT have made enabling provisions for setting up of such markets and only 11 States have notified the rules thereunder to implement the provision. Various restrictive and hindering stipulations in the amendments like permitting one limited crops for trading in private market, prescribing certain distance from existing Mandi to set up private market, exorbitant licence fee for setting up of such market and more importantly asking such licensee to collect market fee at applicable rate and pass on the same to the Mandi Board are proving deterrent to come up private markets.

States need to liberalise the marketing regulations to promote development of private markets

and not doing so hinders the intended reforms and dilutes the desired impact.

Figure 3.3 State-wise progress of private market

SN	Name of State	No. of Private Market licences issued
1.	Maharashtra	43
2.	Gujarat	27
3.	Rajasthan	9
4.	Karnataka	3

3.6.4. Organised retailing

Retail is the last mile connect with end-consumers, either food or for non-food items. The food and agro-processor have a forward distribution channel for their retail needs and their enterprise level marketing is handled by individual processor and brand owners. In the fresh food segment, consumers are predominantly linked through small and fragmented retail merchandising (small grocers and street hawkers). However, the example of SAFAL (the fruit & vegetable marketing subsidiary of Mother Dairy) is mentioned as an example of indigenously organised retailing network. SAFAL operates in Delhi out of approximately 400 retail outlets, and sells about 350 tonnes of fresh produce daily in Delhi-NCR markets.

Such front-end organisation has reflected in daily supply from almost 180 farmers associations (comprising about 8000 farmers), as well from other wholesale markets. Effectively, the consolidated demand from their small format outlets generates more than 110,000 tonnes of annual demand for fresh produce, from farms in States adjoining Delhi, and another 15,000 tonnes coming from existing wholesale markets.

The farms, through farmer associations, directly transact with SAFAL to supply the required produce. This model does not involve any contractual arrangements, but is a form of need based collaboration, with farmers free to sell their produce to other agencies. However, the arrangement creates long term mutual interest. Most importantly, though the produce basket keeps changing across seasons, the sustained demand has allowed the linked farmers association to take up farm-gate activities including transport management, till SAFAL receiving centres in Delhi. This has brought value gains to the farmers.

The growth in scale of private operators in food retail sector is also visible. Many Indian companies have organised the supply chain locally, from farm sources, for their own retailing requirements. Some traditional wholesalers at terminal markets have also organised and initiated joint ventures with global majors to get access to capital and to gain expertise in supply chain management. Organised retail of agricultural produce is not only growing from fixed format outlets, but has also shown a spurt in the online space. Increasingly, there are many enterprises that are marketing fruits, vegetables, meats, fish and others from online platforms. Most of these have developed on the back of entrepreneurial spirit that saw opportunity in the

existing inefficiencies in food supply systems.

3.6.5. Farmer producer organisations (FPOs)

There is a need to aggregate farmers in order to offset fragmentation in land holding and bring benefits of economies of scale. Organising producers into formal management practices help to initiate collective decisions on cultivation to make the best use of market intelligence, as well creates opportunities for producers to get involved in value adding decisions and activities such as input supply, credit, pre-conditioning, processing, marketing and distribution. The aggregation of farmer into FPOs (cooperatives/SHGs/FIGs/Producer company), aid their integration into the supply chain, and in taking up roles traditionally by market intermediaries.

Government of India issued guidelines to encourage states to directly support FPO promotion as a regular activity under various Schemes including RKVY (Rashtriya Krishi Vikas Yojana) during the XII Plan. These guidelines are meant to help the states follow a standard methodology for FPO promotion, as well as to provide indicative costs and a monitoring framework. States may directly engage promoters to mobilize the small farmers. Alternatively, SFAC is empanelling suitable Resource Institutions (RIs) on their behalf.

The instrument of Farmer Producer Company (FPC), registered under Companies Act is emerging to be effective. FPCs offer a wide range of benefits compared to other formats of aggregation of the farmers. FPC members are able to leverage collective strength and bargaining power to access financial and non-financial inputs and services and appropriate technologies leading to reduction in transaction costs. Members can also collectively tap high value markets and enter into partnerships with private entities on equitable terms.

FPCs have performed well in states like Maharashtra, Madhya Pradesh and Kerala and farmers have been able to realise higher returns for their produce. Most of the FPOs remain focused on addressing issues of crop planning, technology infusion, input supply and primary marketing. However, it is expected that more would expand their roles further up the value chain, entering into post-harvest management, transport, storage and value added processing and engage in contract production of primary agricultural produce.

3.6.6. Cooperatives in agricultural marketing

Cooperatives were recognized as one of the means to aggregate farmers for establishing scale in their production and marketing activities, besides easing access to credit and other services. Cooperatives have achieved limited success over the years except those in the States like Maharashtra and Gujarat. Notable examples are in the dairy sector (GCMMF-AMUL) and in grapes (MAHAGRAPES) where collective operation has resulted in the reduction of transaction costs and improved the bargaining power of smallholders' vis-à-vis foreign traders.

3.6.7. Food & agro-processing

Historically, agriculture and food processing industries remained stagnant due to low public investment, poor infrastructure, inadequate credit availability and high levels of fragmentation.

A number of reform measures have been taken to promote investment in the sector, including in the logistics for supporting the supply chain from processor to consumer. Most of the food processing enterprises have been exempted from the provisions of the Industries (Development and Regulation) Act, 1951 (except beer and alcoholic drinks, and items reserved for the small-scale sector). For foreign investment, automatic approval is given for up to 100 per cent equity for a majority of processed foods.

Apart from infrastructure constraints, the food processors face problems in procurement of raw materials for processing due to restrictive provisions of the regulated markets. An issue often highlighted by food processors is the variation in the operation of the APMC Act in different states. Most states require food processors to register for direct marketing with the respective marketing committee at multiple locations, but some states allow single point registration. Some states exempt food processors from paying mandi tax on agricultural produce purchased for inputs in other states; other states charge mandi tax at the point of consumption.

Another major constraint faced by food processors is the lack of availability of processing variety crops, especially for fruits and vegetables. This is primarily due to the inadequate extension and linkage between production and processing. For this, the concerned departments, such as processing, agriculture and horticulture could have a joint marketing cell to share the demand and qualitative requirements of the processing industry. This will bring about demand-driven production perspective in the sector. The industry has specific requirements on crop types, food safety aspects and practices at farms. The marketing system would contribute through upstream communication to farmers, such that appropriate supply and vertical integration with processors is made an option. The industry plays a vital role in employment generation and provides an assured demand to farmers, against predetermined quality parameters. It can also, for its competitive benefit, market its demand to domestic farmers.

The food and agro-processing units are important mode for farmers to monetise their produce. The output from these units will benefit from supply side analytics. Global availability of commodities used as feedstock by the industry, as well as local supply side information for processing is important if vertically integrated farming is to be promoted by the production departments.

3.7. Challenges to Agricultural Marketing

There continue to remain challenges to agricultural marketing, despite various positive initiatives, and these are frequently debated. The most recent assessment was by the “Committee of State Ministers, in charge of Agriculture Marketing to Promote Reforms”, the report released in January 2013. The Committee highlighted that agricultural marketing is posed challenges due to fragmented supply chain with inadequate marketing infrastructure, long intermediation and lack of accurate and timely market information/intelligence system.

Various aspects of supply chain infrastructure are discussed in volume III of this report. The output supply chain benefits from market intelligence, to plan and adjust supply to markets

depending on demand projections, making the operations more relevant and efficient. Therefore, a challenge is also to map shifts in demand over time and provide timely information, for supply side to make adjustments in advance to their planned activities. The Committee of States Ministers reported challenges, extracted here¹²:

- (i) **Limited access of agricultural produce markets:** There is huge variation in the density of regulated markets across the country, varying from 118 sq km. in Punjab to 11,214 sq km. in Meghalaya.
- (ii) **Licensing barriers:** The compulsory requirement of owning a shop/godown for licensing of commission agents/traders in the regulated markets has led to the monopoly of these licensed traders and a major entry barrier for new entrepreneurs, preventing competition. Many market yards established long back, do not even have space for construction of added shops, godowns, etc. The traders, commission agents and other functionaries organise into associations, which generally does not allow easy entry to new persons, stifling the very spirit of competitive functioning. The system of licensing is quite restrictive and has outlived its utility and there is need to remove barriers to revitalise the present marketing configurations.
- (iii) **Lack of Market Infrastructure in Agricultural Markets:** Studies indicate that covered and open auction platforms exist only in two-thirds of the regulated markets, while only one-fourth of the markets have common drying yards. Cold storage units exist in less than one tenth of the markets and grading facilities in less than one-third of the markets. Electronic weigh-bridges are available only in a few markets.
- (iv) **High Incidence of Market Charges:** APMCs are authorized to collect market fee ranging between 0.50 to 2.0 per cent of the sale value of the produce. In addition, commission charges vary from 1 to 2.5 per cent in foodgrains and 4 to 8 per cent in fruits and vegetables. Further, other charges, such as, purchase tax, weighment charges and hamal charges are also required to be paid. In some States, this works out to total charges of about 15 per cent which is excessive.
- (v) **High Wastages in Supply Chain:** Study conducted by ICAR (2010) shows that the post-harvest losses of various commodities range from 3.9-6.0 per cent for cereals, 4.3-6.1 per cent for pulses, 5.8-18.0 per cent for fruits and 6.8-12.4 per cent for vegetables. The total post-harvest losses of agriculture commodities were earlier estimated at about Rs. 44,000 crores at 2009 wholesale prices.
- (vi) **Long Gestation Period of Infrastructure Projects and Seasonality of Agri. Produce:** Agriculture marketing infrastructure projects have a long gestation period. The seasonality and aggregation of small surpluses of agricultural produce further affect the economic viability of the projects, which deters investments. There is a strong need of Viability Gap Funding/subsidy and easy availability of finance to attract investment for such projects and also easy availability of concessional funding to attract investment

¹² Extracted from report of the Committee of State Ministers, in charge of Agriculture Marketing to Promote Reforms, 2013

for marketing infrastructure projects.

- (vii) **Lack of national integrated market:** Under the present system, the marketable surplus of one area moves out to consumption centres through a network of middlemen and traders, multiple market areas and institutional agencies. Although, there exists a national level physical market, there is no national level regulation for the same and the existing regulation does not provide for a barrier free market in the country. Therefore, there is a need to develop a national single market for agricultural commodities by removing all the existing barriers of licensing, movement and storage.
- (viii) **Less farmers' price realisation:** The share of farmer in consumer's price is very low particularly in perishables due to a number of intermediaries, lack of infrastructure and poor holding capacity. In order to provide remunerative prices to the farmers, there is a need to reduce intermediation by providing alternative marketing channels like direct marketing, contract farming, etc. for which reforms in agricultural marketing system are necessary.
- (ix) **Large number of marketing channels with long supply chain:** Traditionally, the normal agricultural marketing chain in the country is fairly long with a large number of intermediaries between the producers and the consumers, adding up more of costs without adding significant value.
- (x) **High marketing cost affects small and marginal farmers:** High marketing costs have direct bearing on the efficiency of marketing of agricultural produce. This affects the actual price realisation particularly by the Small and Marginal farmers in the country owing to their lower marketable surplus, higher transaction.

To address these concerns and others, the Department of Agriculture Cooperation & Farmers' Welfare formulated recommendations known as the Model Agricultural Produce and Livestock Marketing (Promotion & Facilitation) Act, 2017, which incorporates various changes to reflect the agenda of a unified national market for agriculture, besides facilitating alternate market channels, including opening up the system to private sector as well for alternate online marketing platform.

3.8. Need for next Level of Reforms

Agriculture like any other enterprise, is sustained only when it generates net positive returns to the producer. A market is a place, where goods are monetised, and price per unit is determined, to result in the total value that a farmer-producer fetches. Value is linked to final demand, in qualitative and quantitative terms and the markets are also a medium to connect to such demand. Therefore, the interconnectivity of agricultural markets and the marketing efficiency are critical to the overall value system.

The country has undergone a phase of liberalisation in the banking, industrial and services sectors. That has made these domains more competitive and responsive to market demand. However, the agriculture including marketing has been bypassed a similar liberalisation. Instead, a more knee jerk response in policy terms is evident, where market dynamics are

coloured with the earlier protectionist perspectives. The best protection to farmers is in promoting long term market linkages, such that markets are connected across place, time and form with farms.

The necessary condition for transferring remunerative prices to the farmers is a competitive environment that facilitates fair and transparent price discovery. Current times, are largely one of marketable surpluses, through there remain certain sectors like oil seeds that face severe deficit despite ongoing demand. This situation is conducive to play of market forces, the only condition being that no monopoly practices are supported. However, the common perception as it stands today, is the inevitability of higher administered prices and government procurements. Given the probability of an agriculture marketing structure not to remain perfect or ideal in real situation, the support by way of MSP and procurement would be necessary and therefore remain relevant. However, in the opinion of the Committee, given the improving levels of production, extent and quality of infrastructure, including agri-logistics, market forces can be deployed to play a more important role than hitherto.

The support by the Government for the welfare of farmers, needs to be rationalised such that the desired outcome is the immediate wellbeing as well as developing the long term self-sufficiency of the agricultural eco-system. The policies need a reoriented direction, such that agriculture does not acquire the characteristics of a public sector, but adopts an enterprise approach. Unplanned and continued subsidising of input and outputs have contributed to fiscal deficits and does not take the country's agriculture on a growth track. Agriculture has reached a stage where it is to be viewed as a commercial activity.

Cultivation has been regular recipient of ongoing and able support, through extension and technology transfer. There will remain the need to continue support to cultivation and improve technology transfer to farms. The input support to farmers are discussed in later volumes of this report. However, the farmer is in acute distress when his/her surplus of produce is unable to link with a market and/or realise equitable value. The breakdown arises from subsequent inability to fully monetise the surplus production. Performance of the agricultural marketing system is directly reflected in the distress of the farmer. Immediate revisiting of the strategies behind the agricultural marketing system is needed.

The erstwhile marketing system, served well the original agenda to incentivise the farmers to ramp up production, for meeting food security requirements. At a time of deficit, it was necessary to regulate and monitor the production and control the flow of food across the country. It was once normal practice for the government to regulate the supply of cement and rubber, when these commodities were in deficit, but these controls were done away with, once the supply side was developed, and market was freed to function in a competitive environment.

A similar and phased opening up of the agricultural marketing system is warranted, especially when large marketable surplus of agricultural produce is being generated, yet the quantities find unbalanced supply into the markets. The basket of agricultural produce has expanded and

policies need no longer be limited to wheat and rice. In all, the country's farms produce far more than one billion tonnes of agricultural produce.

Agriculture now displays a cosmopolitan profile, with a high level of output from horticulture, dairying, poultry and fisheries, besides the customary produce like cotton, sugar cane, cereals, pulses and oilseeds, etc. The existing marketing system requires to adapt to and become future ready. New reforms in marketing are urgently needed as we close the second decade of the new millennium.

Greater reforms in the agricultural marketing system to the farmers' benefit is stressed upon.

3.9. Next step in reforms

Between 2003 and 2016 the agricultural marketing environment did not undergo any desired level of changes to the benefit of farmers. The quantum of produce captured at APMC markets, upgradation of markets or the development of new markets were not satisfactory. The various aspects of the slow progress are discussed earlier in this chapter.

Despite surpluses in various commodities, the deficit in pulses and oilseeds remained or got aggravated. After the first step of reforms, not much was realised in substance and the APMC monopoly continued and a level playing field was into provide. Keeping in mind the limited adoption of the first step towards reforming the marketing system, the changed dynamics in the business eco-system, as well as technological advancements, the government has already introduced the next steps to correct certain imbalances. Next stream of reforms are needed.

The unified National Agricultural Market and the Model Agricultural Produce and Livestock Marketing, (Promotion and Facilitation) Act, 2017 are the precursors to further reforms in the agricultural marketing system

3.9.1. National Agriculture Market

The classical agricultural marketing studies, advocate market integration over space and time, as a basic to marketing efficiency. Today agricultural marketing across the country has been divided and fragmented into a large number of APMCs, which restrict the movement of commodities beyond their notified geographical area. This compromises market efficiency over space, and absence of warehousing and other pertinent facilities like pledge loan dilute the marketing efficiency over time. This understanding, has paved the way for the government to initiate market integration across the country.

The government introduced a Central Sector Scheme for promotion of a National Agricultural Market (NAM) to bring about a transformation in the agricultural marketing environment. A unified market can be best realised through a pan-India electronic platform which can facilitate the participation of buyers and sellers from all over. The e-NAM network was inaugurated on 14-April-2016 and by March of 2018, a total of 585 markets are expected to be on the e-NAM platform. As of July 2017, 455 regulated markets from 13 states have been integrated into the

scheme and 42.18 lakh farmers and 89,199 traders have been registered on e-NAM portal with a turnover of Rs. 16,163.1 crore from the trading of 63.17 lakh tonne produce.

Under this scheme, to operationalise a pan India electronic platform, the key enablers are provision for e-auction, material accounting, trade fulfilment, fund processing and post-sale document creation (like generation of e-bills) which would increase efficiency of intermediation. Generating e-permits for all transactions conducted on the platform would create an audit trail verifiable across the country and simplify movement of goods. In many states, farm harvest prices prevail at sub-optimal price and e-NAM will help check such market imperfections. Better price realisation for farmers will serve as an important incentive for raising productivity and production and in turn lead to higher growth of output.

Some key features that an NAM must have to realise the intended potential are:

- Auction of the produce takes place simultaneously in the same electronic platform in all regulated markets (APMC markets) in the country, as well as private markets, as and when they come to be established.
- Every regulated market is supported by infrastructure for quality assaying of the produce. Harmonised standards & grades are accepted across markets, to allow seamless trade across platforms.
- Collection of sale proceeds from the buyer and remitting it to the bank account of the seller is facilitated by the market.
- Restrictions in transportation of the commodity are removed. A buyer, irrespective of his location, can participate in any market of choice. The required agri-logistics infrastructure for storage and transportation is put in place.
- The institution of agency to support inter-mandi trade, as also the dispute resolution mechanism are in place.

The fortuitous roll out of GST with effect from 1-July-2017 has given a fillip to achieving a single market. India is truly on the way to becoming a nation with one-tax and one-market.

Creating a true national agricultural market

The vision of a full-fledged national agricultural market, is where all types of markets have inter-operability in communication, standards, systems, operating under a common regulatory framework. This can happen when all markets, including alternate models of markets, established or notified as such under the provisions of the model APLM Act 2017, whether in private or public sector, come online and adopt a common electronic platform; for electronic alone has the capacity to transcend the barriers of physical space and integrate the geographically distributed multiplicity of markets.

A critical ingredient would be, to let as many markets and as many models of markets as possible to bloom under different ownership types. This allows for a liberalised and

competitive environment. This entails that there may be more than one software system and these will require an interoperable architecture, built to open and commonly adopted IT system standards.

The way forward is that an online platform like e-NAM, would incorporate inter-operability and serve as a central platform for any number of e-platforms that may come up in the country. However, the virtual trade that online platforms promote, would be conditional upon certain parameters, these include -

- i. Harmonised tradable parameters and standards for the produce
- ii. Network of assaying laboratories and needed technical manpower
- iii. Agri-logistics encompassing cleaning, grading, packaging, storage (dry & cold), transport (multi-modal, dry/cold)
- iv. Services agencies to handle post-sale processes – aggregation, storage transportation as per conditions agreed upon
- v. Dispute resolution mechanism, at the markets – district, state and national level
- vi. Special Purpose Vehicle (SPV) at state and national level to set up, operate and manage the online trading

For this purpose, the Ministry of Agriculture & Farmer's Welfare may consider the need to appoint a dedicated advisor to monitor and evaluate the implementation of the e-NAM, at least over the next 3 to 5 years.

The SPV at the central level would work to ensure that the standards and specifications are in place for an inter-operable IT architecture. It will also work towards the harmonising of all applicable produce and product standards, to serve a unified national market.

A unified national agricultural market would require licensing of market functionaries stakeholders at the national level. For this purpose, the Committee suggests that the government may require adopting a Central Act, which will create a legal framework that will facilitate creation of a truly national unified agricultural market. The states may nominate agri-trade representatives in other states to develop inter-state linkages and promote demand driven inter-state trade, to take advantage of the unified national agricultural market within the country.

3.9.2. Firm push for robust reforms

In the context of less than desired market environment as brought out in the preceding sections, and the new focus on agriculture with particular emphasis on farmers' income and welfare, market reforms became the natural choice as core to the overall basket of agricultural reforms.

To initiate much needed changes, the Department of Agriculture, Co-operation & Farmers' Welfare constituted a Committee in September 2016 to formulate a model that would reflect the current needs, as well as make the system future-ready. This initiative, along with a series

of others, was in harmony with the mandate of this Committee, which was referenced to make necessary recommendations, in parallel to the strategy for doubling farmers' income. This Committee, therefore, provided inputs for the reforms to be initiated in the marketing system, and brought out the Model Agricultural Produce and Livestock Marketing, (Promotion and Facilitation) Act, 2017. This Model Act was shared with all the states and union territories on 24-April-2017.

3.9.2.1. Model APLM Act, 2017

In 2017, Government of India formulated the Model Agricultural Produce and Livestock Marketing, (Promotion and Facilitation) Act, 2017. As per this new Model APLM Act, 2017, the new definition of market area restricts the power of the market committee to enforce regulation in their principal market yards and submarkets yards only. This will go a long way towards removing the entry barriers and trade barriers in the agricultural marketing system of the country, and is something in tune with the concept of unified market for agricultural produce. This will also make the marketing system more competitive by attracting new players and do away with the monopolistic and oligopolistic tendencies of the present players of the APMC markets.

The inclusion of Livestock in the title of the new Model Act is a step in the right direction. In some states the livestock and livestock products are not notified commodities. This will help in introducing good marketing practices in the livestock sector.

The new Model Act will end the monopoly of APMC by allowing more players to set up markets and create greater competition at the markets. The market fee caps under the new Model Act (including developmental and other charges) at not more than 1 per cent for fruit and vegetables, and 2 per cent for food grain. It caps commission agents' fee at not more than 2 per cent for non-perishables and 4 per cent for perishables. This will drive efficiency in supply chain, build a transparency in trade operations, and an equitable environment in marketing. The new legislation will also have provision for promoting online or spot (e-national agriculture market) agriculture market platforms and ensure that all these measures are revenue neutral for States. The distinguishing features of the Model APLM Act, 2017 are:

- (i) Abolition of fragmentation of market within the State/UT by removing the concept of notified market area in so far as enforcement of regulation by Agricultural Produce and Livestock Market Committee (APLMC) is concerned (State/UT level single market).
- (ii) Full democratization of Market Committee and State/UT Marketing Board.
- (iii) Disintermediation of food supply chain by integration of farmers with processors, exporters, bulk retailers and consumers
- (iv) Clear demarcation of the powers and functions between Director of Agricultural Marketing and Managing Director of State/UT Agricultural Marketing Board with the objective that the former will have to largely carry out regulatory functions, while the latter will be mandated with developmental responsibilities under the Act.

- (v) Creation of a conducive environment for setting up and operating private wholesale market yards and farmer consumer market yards, so as to enhance competition among different markets and market players for the farmer's produce, to the advantage of the latter.
- (vi) Promotion of direct interface between farmers and processors/ exporters/ bulk-buyers/ end users so as to reduce the price spread bringing advantage to both the producers & the consumers.
- (vii) Enabling declaration of warehouses/ silos/ cold storages and other structures/ space as market sub-yard to provide better market access/ linkages to the farmers.
- (viii) Giving freedom to the agriculturalists to sell their produce to the buyers and at the place & time of their choice, to whom so ever and wherever they get better prices.
- (ix) Promotion of e-trading to enhance transparency in trade operations and integration of markets across geographies.
- (x) Provisions for single point levy of market fee across the State and unified single trading licence to realise cost-effective transactions.
- (xi) Promotion of national market for agriculture produce through provisioning of inter-state trading licence, grading and standardization and quality certification.
- (xii) Rationalization of market fee & commission charges.
- (xiii) Provision for Special Commodity Market yard(s) and Market yard(s) of National Importance (MNI).
- (xiv) Providing a level playing field to the licensees of private market yard, private market sub-yard, electronic trading and direct marketing vis-à-vis the APLMCs and removing the conflict of interest that the latter are likely to practise, if both development and regulatory functions are centred in the same authority.

The Model APLM Act, 2017 delivers progressive and facilitative provisions for the integration of processors, exporters, bulk buyers, end users, etc. with farmers. To overcome the conflict of interest and rationally paying a fraction of market fee, there is provision that Director of Agricultural Marketing will issue a license to such buyers and buyer will be liable to pay to Revolving Marketing Development Fund at only 25 per cent of the applicable market fee. Apart from above, all other restrictive provisions have been removed.

The provisions made for private markets is with intent of “**ease of doing business**”, as it provides for level playing field both for APMC market and private market. Under the new legislative model, APMC will not be the regulator of private markets and licensee of such markets can collect the user charges and retain with him, thus, making it an economically viable proposition.

The provision for declaring warehouses / silos / cold storages or other such structure or place as market sub yards is made to provide better market access / linkages to farmers. This

development will help integrate the warehouses / silos / cold storages etc., into the online e-platform. This, in turn, will help in facilitating operationalisation of warehouse receipt system and capturing of information for a responsive market information system.

The Model APLM Act, 2017 is recommended for the States to adopt, to initiate greater and relevant marketing changes in agriculture and to encourage a single national agriculture market.

3.9.3. Other reforms needed

In order that the Model Act is adopted by the States and UTs quickly, there need to be hand held by way of organising orientation and training besides. Further, to make the provisions of this Model Act operational, once adopted by the States and UTs, it is also important that the Ministry rolls out the Model Rules at the earliest.

The inadequacies in the provisions relating to contract farming have been elaborated previously in section 3.6. It is obvious, that contract farming can play a substantive role in de-risking the farmers. To facilitate the entering into a contract whereby pre-production purchase price is agreed upon, an independent and robust contract farming act is essential. Such an act should provide for an efficient system for management of both inputs and outputs and create a formula that promotes win-win situation for both parties. This will ensure sustainability and scale up. The common apprehension about contract farming is windfall gains that the promoting company may benefit of, and the unwillingness of the farmer to honour the agreement when it is inconvenient. It is therefore necessary to incorporate safety-net provisions, for the farmers to also partake of any unexpected windfall gains due to any market buoyancy.

It is also important that an independent regulatory authority is brought in and remove the conflict of interest by disengaging the contract farming stakeholders from the existing APMCs. The core spirit of such an act should be to enable the small and marginal farmers to mobilise themselves into groups and operate scales of economy in partnership with an industry. This Committee, as authorised by the Ministry is already working on the APML Market Rules and a model Contract Farming Act.

In recognition of the importance of warehousing as a promoter of optimal prices, and keeping in mind the time bound of doubling the farmers' income, this Committee is also working on guidelines to popularise the pledge loan and e-NWR based marketing.

3.10. Strategic Vision

The vision to capture value from every grain, every ounce and every drop, has to have a strategy that enables that all produce finds avenue to reach a point of value realisation. The value realised has to be demand linked and hence optimal, and not merely linked to cost of inputs.

For long, the general approach towards farmers has been to provide them a minimum price for their efforts. The recent National Commission for Farmers (NCF), also recommended that farmers be provided a minimum price linked to cost of their inputs. These past approaches to farmer's income were not market linked, and instead were guided by the desire to offer farmers

succour in the form of a controlled minimum support price. While this patrician approach may have some merit, this Committee felt there is need to have a more comprehensive approach - one that looks to the future and creates market led growth for the farmers.

Succour is a form of fixed relief against the input costs, and will tend to restrict the farmers from greater growth opportunities that today's market generates. As established through the price dispersions and wedges in the system (see chapter 2), the minimum price is far below the final value that the produce generates. In the opinion of this Committee, the cost plus 30 per cent, or even 50 per cent as suggested by the NCF only complicates matters by strengthening focus on a minimum price structure, and pursuance of which, this Committee feels would be an injustice to the farmers. It would be wrong to presume that markets cannot be made efficient enough to provide farmers much more than the floor price.

The need of the hour is to work towards bringing farmers the optimal value, linked to market prices, rather than a cost plus linked minimum price. There is no alternative to this approach, if farmers are to realise enhanced farm income. For this, the agricultural marketing system needs to have a new strategy, one that targets optimal prices to farmers. The strategy will be overlaid with three broad targets:

- a. To enable an effective flow of farm produce to its point of value realisation through the means of efficient market networks.
- b. To maintain a holistic value based system approach, and hence provide relevant market intelligence to direct the flow of produce.
- c. To match demand with supply so that producers fetch optimal value for their produce rather than seeking a minimal value.

However, markets have multiple variables and are influenced by demand and supply dynamics that can even be global in nature. There are therefore, no ideal or perfect markets and hence there will remain the need, as explained earlier, for government intervention, from time to time.

In sum, the government would remain an active and robust player in the agricultural market environment. The government's intervention should however, not result in disruption of the market environment but should only aim to safeguard the country's food and nutritional security, and as well allow for economic growth to farmers.

3.11. Annotation

In many areas of the country, a situation of surplus is frequently witnessed. The time has come to develop competitiveness in the marketing system, to open the stage to more players, who will compete to source the production and take advantage of the large consumption demand across the country.

The country needs to be careful that events do not lead to the agriculture to develop character of a public sector but constructively advance an enterprise approach towards agriculture. Enterprise approach will require supporting farm to market connectivity and linkage with

demand information through changes in the way institutional support is directed. Further interventions in agriculture productivity, must aim to make marketing equally productive while optimising resource use during cultivation.

The marketing system has to provide farming enterprises market information in advance to crop planning, as well as enable a choice of market channels. Such directional change should aim at long term reduction in cost based support systems to move towards support that makes the farmers more effective in responding to market demands. Systemic reforms can lead to the establishment of an effective agricultural marketing system, and eventually also lead to the complete deregulation, at least in the domestic market, in the coming decade.

Key Extracts

- Growth in farmer's income is intrinsically linked to marketing of their harvested produce, besides other input reforms.
- To develop and promote demand driven inter-state agri-trade, states may nominate agri-trade representatives in other states, to take advantage of a unified national agricultural market within the country.
- India's agricultural marketing policies have undergone frequent changes but still carry the legacy of a past closed economy.
- The past liberalisation in the industry and service sector has not been implemented in the agricultural marketing sector.
- Fundamental reforms are needed in agricultural marketing to bring competition by attracting new players, replacing monopolistic environment.
- The evolution in the marketing policies, with production in focus, have not promoted a participatory market environment but led to subsidy linked production.
- Government support in agricultural marketing must match its ongoing support through procurement, which on its own can disrupt the natural forces of the market.
- New generation reforms must supplement and complement the changes under GST and to promote the concept of a single national market.

Chapter 4

Capture every Grain, every Ounce & every Drop

A comprehensive revisit of marketing policies with an approach to make interventions predictable and aligned with market dynamic is needed. This will also require greater participation of private sector.

The past experience and the constraints mentioned in the previous chapters call for a changed and comprehensive approach to address the formidable issues of agricultural marketing in India. The strategic approach would need to aim at a holistic marketing solutions so as to bring optimal value to the farmers, which is linked to market price rather than minimum price, and a changed architecture to open channels that can capture all the marketed surpluses.

4.1. Administered price versus Market price

This Committee for Doubling Farmers' Income (DFI) realises the importance of setting floor prices of various produce types, as it established the minimum support price. Originally, the price support was indicated by notifying a minimal floor price for specific produce. A separate price was used for direct procurement by FCI, which used to be higher than the minimal price. Today, the notified Minimum Support Price (MSP) is the price at which procurement of notified commodities is carried out by government agencies through FCI and other price support or market intervention schemes.

The DFI Committee observes, that though MSP is an important intervention by the government, it is not sufficient by itself. The honouring of the MSP through its use in procurement is a more substantive condition in making the MSP mechanism effective. Hence, there is the need for a bouquet of procurement tools that can cater to different commodities in different ways.

However, this Committee also observed that MSP as discussed these days, is an administered purchase price, based on a predetermined margin on the cost of inputs. Market prices are observed to be far higher than the cost plus price model propounded under MSP mechanisms, for the large basket of produce types, particularly after a lapse of a certain time period, post the harvest.

The cost plus price proposed for farmers, by implication restricts them to a fixed margin against cost of cultivation. Even if 50 per cent is added as profit margin on the costs, the subsequent value to farmer is far removed from the wholesale price at terminal markets. The price dispersion at farm-gates and between them and wholesale markets is large for most crops. This is a relevant reality to be considered when assessing value of the produce and the share of that value assigned to farmers. A mind-set shift that looks at market linked realisation, instead of administered returns to farms is needed to take agriculture into enterprise mode.

The marketing system has to develop options that address the price dispersion between wholesale markets and farm-gate. This will lead to market led price realisations and not

gratuitous cost plus price mechanism only. Farmers' well-being is directly linked to their ability to carry out exchange at markets of choice, and this vision is discussed further.

4.2. Marketable Surplus

The assessment of the marketable surplus is made after putting aside the own consumption of the farmers. The producer is also a consumer, and marketable surplus is the quantum after factoring in this first consumer. This marketable quantity is the amount that is sent to markets to get monetised. Usually, this surplus undergoes exchange at the closest platform or the primary market channel that is accessible to the farmers.

However, these physical markets are linked to the demand from consumers within their catchment. They, therefore, have a limited capacity to absorb the supply of produce. When the supply is more than the immediate demand, there is a surplus in that region's market – the supply minus the local demand is the next level 'surplus' at these markets.

The system is designed to relieve the farmers of their produce at first instance, its value being ascertained by the demand-supply mismatch, resulting in a drop in the price due to local surplus. However, there remains a large demand at other market centres, which could have returned a higher value for the producer, than that which is generated at the near-farm markets.

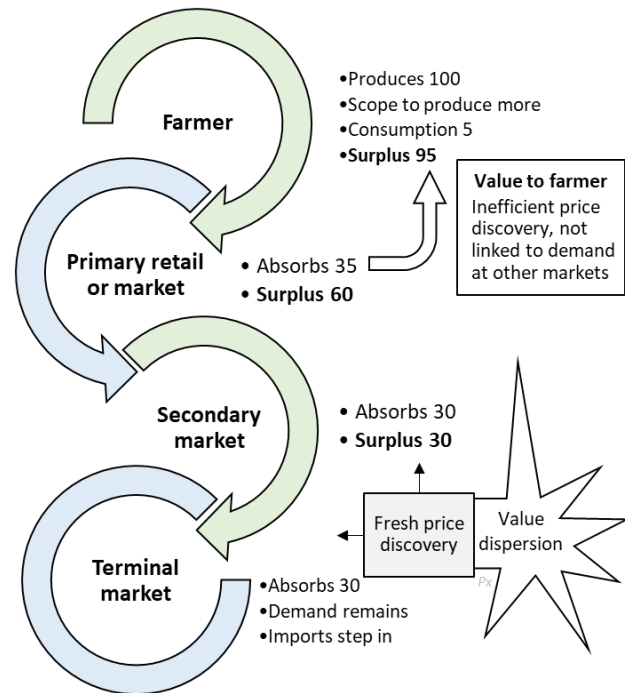


Figure 4.1 Illustrative of Demand-Value mismatch

Table 4.1 Surplus occurs at each stage in marketing

Source Market	Quantity (notional)	Consumer	Surplus (example)	Remarks
Farmer	100	Farmer	97	Marketable surplus sent to nearest market to get monetised
Primary retail or market	97	Consumer catchment	60	Supply can be in surplus to demand at nearest market, which lowers value
Secondary market	60	Consumer catchment	30	Next level market get supplied, which may also be in surplus
Terminal market	30	Consumer catchment	-10	Last mile market remains unsated and seeks imports

Figures as example

The farmer has no recourse to connect with demand farther afield and undertakes an exchange at the first market, off-loading the entire quantity at the value determined locally. The

unstructured system creates opportunity for various intermediaries who undertake the logistics to connect with the wider demand in the country, at more favourable value. The intermediaries actually serve an important function of arranging the onward supply of produce, however, the current system does nothing to structure this flow of produce, or open the market opportunity for small farmers to direct their marketable surplus to other demand centres.

Marketable surplus is a function of consumption and must be evaluated against various stages of demand and not merely at the level of farmer. Each market region has a limited capacity to absorb the production and the remaining is the market's 'marketable surplus'. The value of a farmer's produce is a function of demand and any mismatch with supply will detract from real market value, and will result in regional price dispersions.

The marketable surplus is distinct from the marketed surplus, which is expressed as a ratio of output-marketed to output-produced. Though the marketed surplus ratios are increasing, the marketing system must see that the exchange is possible at markets of choice and not necessarily at the nearest or primary market.

The market architecture needs to be evaluated and re-engineered so that, as a system, it can enable a directed flow of produce, to markets that can offer greater value to farmers.

4.2.1. Market demand for optimal value

Marketing of agricultural produce has at core a vital function, that is, to evaluate and project the market demand for farm products. This is intrinsically linked to the business of agriculture and income enhancement of farmers. This function is important to support agri-business, with the necessary market intelligence, for planning and supply of both farm-inputs and outputs.

Market intelligence as a marketing function, is an important support activity to the overall supply chain. It is important to understand that marketing is not the supply chain, but enables the supply chain to be more of effective and efficient, providing direction and value to the overall agenda of matching demand with supply to achieve optimal value realisation.

The following are the value adding aspects that will guide the operations that take agricultural output to markets:

- (i) Demand capture – ability to capture historical data on consumer behaviour and analyse trends.
- (ii) Demand Analytics – insights on market demand projections, to assess fluctuations in consumption patterns in short term and long term.
- (iii) Communication of demand – upstream and downstream dissemination of demand assessments in advance of undertaking core activities in the supply chain.
- (iv) Price forecasts – besides informing spot price signals, to provide future pricing indicators for produce, on the basis of demand and supply projections.

- (v) Regulatory impact – assess and recommend course corrective measures to rules and regulations that impact the efficacy of the supply chain.
- (vi) Marketing services – to provide services that enable a farmer to avail logistics to connect with other markets (market platforms) to allow the farmer producer/owner to make a transaction at a place and time of his/her choice.

Consumer awareness – making the consumer aware of the value of the agri-produce and product consumed, in terms of nutritional and socio-economic terms. Marketing functions include having influence on shaping the consumer's choice.

4.3. Vision to Capture Surplus

There is no denying the fact that the farmer today feels himself to be languishing at the bottom of the pyramid. The sector is suffering from the dichotomy of plenitude of production on the one hand and poor income for the farmers on the other. Hence, what is needed on priority now is to work out strategies to capture the totality of marketable surpluses generated by the farmers.

First and foremost, this calls for the creation of an enabling market environment with in-built mechanism to absorb as high a percentage as possible or the minimum 60 per cent of the surpluses as mentioned in table below, through an efficient market environment. The same table below also suggests an indicative breakup of various filters that can be deployed to capture the 100 per cent of marketable surpluses of different produce and offer the farmers optimal value on their produce.

Table 4.2 Breakup of sources to capture the 100 per cent of surpluses

SN	Intervention Mode	Primary responsibility	Targeted share in value capture	Nature of Produce
1.	Efficient market Environment	Open market price discovery	60%	All produce types
2	FCI Operations	Government of India	3-5%	Paddy & wheat
3	PSS & PSF Operations			Pulses & oilseeds
4	MAS (Market Assurance System) Schemes & Operations	States primarily with support from GoI	2-3%	All cereals & oilseeds (except wheat, paddy)
5	MIS Operations	GoI and States		Perishable produce
6	Private Commercial Trade Joint venture (majority share by private sector)	Private sector with incentives from Govt.	3-5%	All produce types
7	Cooperatives	Cafeteria of initiatives	25-30%	All produce types (agricultural, horticultural, plantation & livestock produce)
8	Contract farming			
9	Direct marketing (farmer-consumer / farmer-bulk)			
10	Special focus on sensitive trios - potato, onion & tomato – through models like Safal			

DFI Committee

The targeted market share for each intervention mode is a broad based guideline, as the marketable surplus will vary across produce types. The share of surplus (marketed surplus) that

goes to market will depend on holding capability of the farmers and his or her own consumption requirement which they project till the next harvest and the extent of food losses incurred.

The strategy behind market capture is indicated as follows:

- a) The 60 per cent of surplus is to be targeted for capture by the open and free market. This would include the entire basket of agricultural produce, food and non-food. For this, the marketing network needs to be opened to a larger number of actors, including alternate market channels.
- b) The remaining 40 per cent of produce to be captured through other marketing mechanisms, would primarily focus on food output, such as foodgrains, pulses, oilseeds, nutri-cereals, fruits, vegetables and dairy products including milk. This would be categorised under-
 - i. Ongoing procurement by Government, vide operations of FCI, PSS and PSF. Currently, these operations procure about (55 to 65 million tons) of cereals and pulses, which is about 25 per cent of foodgrains produced. This will account for about 5 per cent of the total agricultural produce of the country.
 - ii. A similar quantity can be targeted through private stockists. A special scheme to bring private sector into procurement operations has been proposed in Chapter 6 of this document.
 - iii. The ongoing Market Intervention Scheme (MIS) program of the Central government in partnership with the State governments currently intervenes to procure perishable produce like fruits and vegetables for which no MSP is notified. The procurement is not very impressive as seen from the negligible quantity of fruits and vegetables procured. Along with a new proposed market assurance scheme (MAS), which provides total freedom to the States to intervene, and procure any cereal (other wheat & paddy), pulses and oilseeds, then about 2 to 3 per cent of the total agricultural production can be targeted.
 - iv. Another cafeteria of initiatives, by way of special interventions in case of sensitive crops like tomato, onion & potato; promoting market channels by mode of cooperatives, contracted cultivation and direct industrial marketing can be envisaged to handle the remaining, approximately 28-30 per cent of the agricultural output of the country, that includes livestock, horticultural and plantation produce.

A new market architecture, keeping in mind the key system of value linked supply chain is proposed in the following chapter.

4.4. Value chain & supply chain

Value chain is a term that conventionally refers to the set of core activities and support functions, internal to a business entity, to create and deliver its goods or services. Each core activity is captive to the firm and required to add value to make the individual enterprise more competitive in its functioning viz other firms in the same business. The individual firm or business unit, operates under independent capital and management, to achieve its desired

outcomes. Value chain optimisation refers to optimising the value capturing activities and the internal processes/procedures to improve the efficiency and competitive advantage of individual firms.

Supply chain refers to the process involved in fulfilling the flow of raw materials or goods from source to point of consumption. Very few business entities have the entire external supply chain as a captive activity under their ownership. The supply chain normally requires the system-wide integrated functioning of multiple firms, each actor having his/her own value chain, to connect supply with demand. A supply chain can be product agnostic and the actors can be transient in nature, as each is free to transact functions with others. Supply chain optimisation means managing and coordinating the chain of custody of the goods from supply side to demand. A value system approach requires coordinating and optimising the range of interrelated activities, by multiple stakeholders, each being an independent value chain.

In the agri-supply chain, each actor; the producer, aggregator, transporter, warehousing unit, processor, distributor and retailer; is not operating under any single umbrella of capital or management. Each operates individual business(es), and optimise their internal value adding functions to remain competitive. Single business entities can, through acquisition and mergers, take ownership and internalise all the functions of the larger supply chain, but such vertical integration has high risks and is rare.

As such, the agri-supply chain requires the collaborative functioning of independent value chains as segments of the supply chain system. Since all actors play a role in fulfilling flow of goods for market delivery, they control a share in the final value realisation. This is also referred to as the agri-value system or integrated value chain. India's agri-value system or agricultural marketing system is currently a multi-layered composite of many actors, largely serving a push mode into markets. To take agriculture from push mode to pull mode of marketing, an inverse approach or fork-to-farm value based system needs to be encouraged and developed.

An **Agricultural Value System Platform** is recommended, to facilitate and guide the development of modern supply chains that will be cross regional in nature and promote demand based trade in agricultural produce. The framework of the proposed platform will be in partnership with think-tanks, industry, academia, donor agencies and government (detailed in Chapter 8). The agenda will be to promote commercial projects that will function as a market linked system or an integrated supply chain of agricultural produce. The outcome focus will be to enhance the value captured by farmers to lead to doubling of their income.

The short term approach will be to dovetail ongoing schemes to support projects that improve the throughput of produce from farms to secondary markets, skipping intermediary markets. For the long term, the proposed platform will also serve to optimise the value chain activities of farming units, by providing value added inputs such as market linked crop planning, resource management, partnership with other supply chain actors, coordinate extension activities and assist in improving access to local market channels.

4.4.1. Value chain analysis

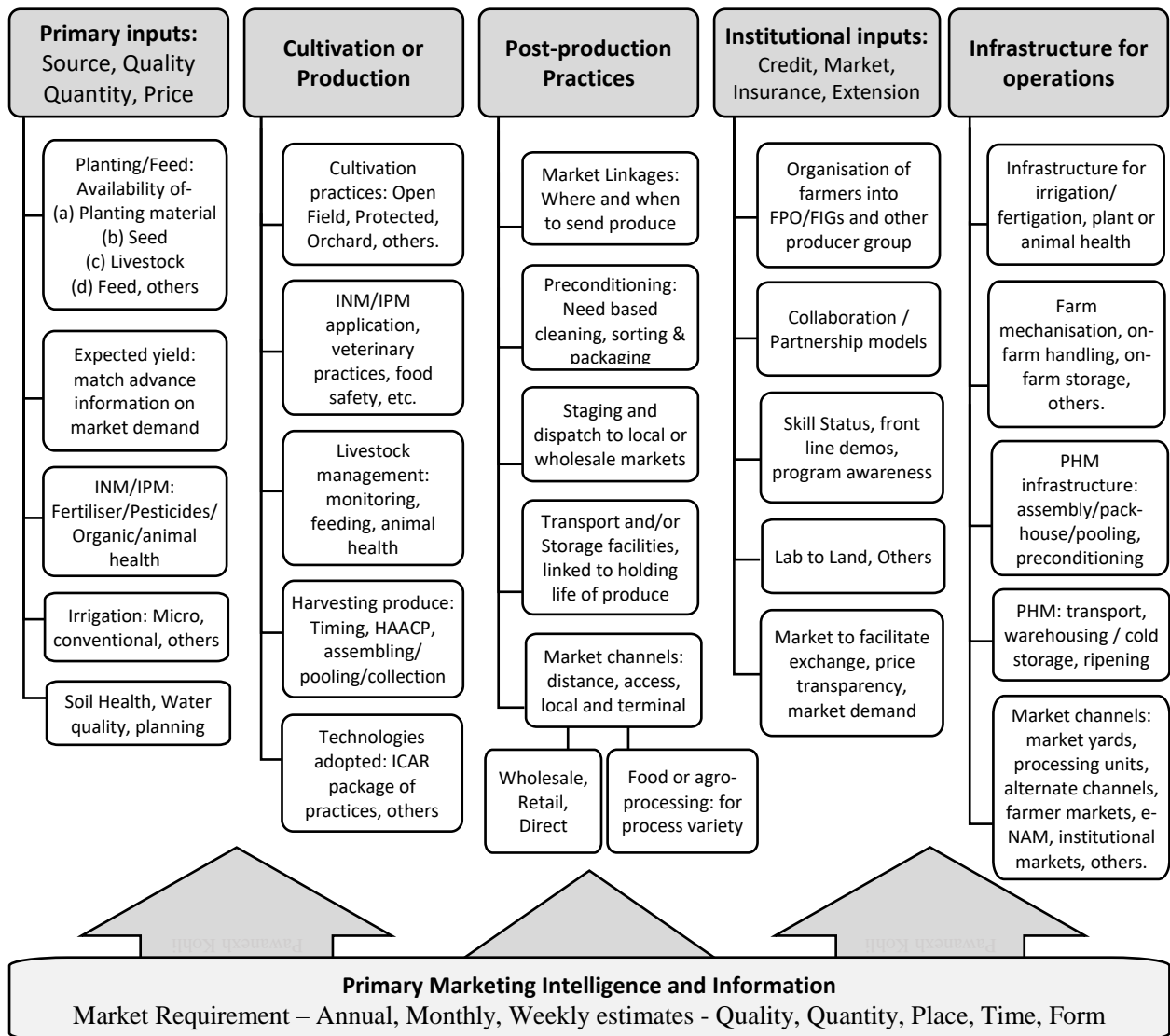
The chain of value adding activities for each individual enterprise will vary depending on its core function, produce being handled, distance to market, volume being handled, capacity of the enterprise and various other factors. The pervading and most relevant information that integrates all activities is primarily the assessment of demand from target market.

Table 4.3 Range of value capturing activities and items by actors in the larger value system

Activity type	Factors effecting Competitive Advantage
Primary inputs <ul style="list-style-type: none"> • Source • Quality • Quantity • Price 	<ul style="list-style-type: none"> - Planting/Feedstock: Availability of (a) Seed (b) Planting material (c) Livestock (d) Feed, (e) others - Expected yield: match advance information on market demand - INM/IPM: Fertiliser/pesticides/organic manure/feed - Irrigation: Micro or conventional
Cultivation or Production	<ul style="list-style-type: none"> - Soil health, water quality - Cultivation practices: Open field, protected, orchard, others. - INM/IPM application practices, veterinary practices - Livestock management: monitoring, feeding, health - Harvesting produce: HAACP, assembling/pooling/collection
Post-production practices	<ul style="list-style-type: none"> - Technology adopted: ICAR package of practices, others - Aggregation, staging and dispatch to local or wholesale markets - Preconditioning: Need based cleaning, sorting & packaging - Transport and/or Storage facilities, linked to holding life of produce - Market Linkages: Where and when to send the produce - Market channels: distance, access, local and terminal market demand
Institutional inputs <ul style="list-style-type: none"> • Credit • Insurance • Extension • Markets 	<ul style="list-style-type: none"> - Food or agro-processing: for the processing variety produce - Organisation of farmers into FPOs and other producer groups - Collaboration / Partnership / Services models - Skill Status, front line demos, program awareness - Lab to Land, capacity building, others
Infrastructure for operations	<ul style="list-style-type: none"> - Infrastructure for irrigation/fertigation, plant or animal health, farm mechanisation, on-farm handling, on-farm storage, others - PHM infrastructure: produce transport, warehousing/cold storage, pooling/assembly/pack-house, preconditioning lines, ripening - Market channels: market yards, processing units, alternate channels, farmer markets, e-NAM, institutional markets, others
Market demand Value assessment	<ul style="list-style-type: none"> - Demand for specific produce types, over time - Quality ranges preferred by produce consumer - Sources to meet the demand cost to meet the demand - Value variations on basis of supply fluctuations

Value chain analysis requires identifying the activities of individual enterprises, and applying a cost benefit diagnostics to aid optimisation decisions. To evaluate the entire value system, the same logic is applied system-wide to a cluster of firms, a region or the whole country, to arrive at a broad analysis of the larger value system. An organised and coordinated supply chain is synonymous with integrated value chain or the agri-value system.

Figure 4.2 Range of system-wide activities & items for analysing the integrated value chain



A system wide evaluation is a policy level tool to target reforms, but the desired value add to the involved actors will eventually result from individual value chain optimisation. Information on targeted demand will make each activity, from pre-production, production and post-production to be market linked. The demand projection is vital information, in any value chain, so as to avoid cost overruns and make the venture profitable. Understanding market demand includes measures of quantity, quality, food safety, and effects price discovery at the time of undertaking a transaction.

The driving force of a business enterprise is timely and accurate information on market demand. Agriculture too, will need information at regular intervals to optimise the agri-business value chain system. The information would not only help to make market linked decisions during crop planning, input sourcing and harvest time-lines, but also provide due cause for the right sized and rightly located infrastructure, such that capacity creation is with market flow and throughputs in mind.

An integrated value chain is customarily product centric, and the players play their respective roles along the combined chain of activities that comprise the supply chain for that product. The system or integrated value chain comprises the series of activities that vertically assimilated actors will undertake, to bring a product from concept to final use and disposal.

In the integrated value chain system, each assimilated actor, can themselves be product agnostic, and can bring their resources into use for various other products. For example, a farmer cultivating and selling mangoes can do intercropping of tomatoes and partake in the tomato value chain, while retaining his role in the mango value chain. Similarly a transporter may be part of the potato delivery system and at the next opportunity, use his/her assets to be a part of the value chain that moves paper rolls. Inter-sectoral shifts of value chain actors is not uncommon, and is in fact important for optimising capacity utilisation – their value offering.

Farmers can adopt new value chains when they diversify into other crops, undertake intercropping and handle multiple produce types. However, in the post-production phase, they can upgrade their role in the marketing of each product by undertaking next level activities need to connect to more optimal markets. Focus and support to identify and strengthen specific value chains has the potential to enhance income and add possibility to expand market range.

Key Extracts

- India's agricultural marketing policies have undergone frequent changes but still carry the legacy of a previous closed economy.
- The administered pricing of agricultural produce can be restrictive to future growth in farmers' income and refutes true value based pricing.
- A value based system is demand linked, and therefore pricing that is market-led is optimal and allows agriculture to be more intrinsically linked to economic growth.
- The marketable surplus is a variable along the marketing chain and correlates to the capacity of a market's consumer base to absorb the supply at any instance.
- An inter-connected market system, will allow the supply to skip a market level and directly connect for transactions at the next level in the supply chain.
- A system-wide integration to meet demand with supply, involves multiple value chains interacting and the actors integrating their activities into the supply chain.
- The key factor for enterprise level optimisation and supply chain optimisation is to extract best value through a targeted production and delivery system.

Chapter 5

New Market Architecture

Market infrastructure and other direct government facilitation for the greater welfare of farmers. The market architecture must promote inter-connectivity between markets and achieve a seamless flow of produce of varying characteristics. The marketing system should ideally function in hub & spoke mode and enable skip level selling while enhancing a choice of markets within accessible range of farmers.

5.1. Background

Growth in agriculture and allied sectors positively impacts the well-being of farmers in particular and the country at large. The farmers have served the nation well by achieving increase of agricultural output, and it is time that they are supported by a robust and comprehensive market structure that will lead to greater monetisation of the varied nature and substantive quantities of their marketable surpluses. Therefore, Government's focus needs to be more on the post-production interventions including marketing. While government led market interventions like procurements of wheat & paddy by Food Corporation of India (FCI); of pulses & oil seeds under Price Support Scheme (PSS); and that of perishables under Market Intervention Scheme (MIS) are important, they cannot be a wholesome substitute for an efficient marketing system.

Agriculture in India is dominated by small and marginal farmers, who constitute about 85 per cent of the total landholdings, with around 40 per cent share in the total marketable surpluses. Similarly, in case of livestock farming and fisheries, the output volumes load are small and dispersed at individual level and have to rely on the marketing system to link with wholesalers who deal in bulk volumes.

An efficient marketing system will at first instance require an inter-connected network of market centres. The inter-connectivity of the market centres will require to be correlated with the type of produce being handled at the market networks.

The National Commission on Agriculture (established in 1970) envisaged that by the year 2000, the country would have 30,000 assembly markets. As per the Commission, markets should be created close to villages, within a radius of 5 km. For this purpose, it recommended that existing local *shandies* should to operate on a daily schedule and be brought under regulation and upgraded to full-fledged assembly markets or sub-market yards.¹³ The same recommendation was repeated by the National Commission on Farmers, 2004.

In the year 1970, the country had 19 States with 356 districts only, which by now have grown to 30 States and around 700 districts. In 1970 there were 70 million land holdings, which are now are approximately to 120 million (Census 2011). The total agricultural production including foodgrains, horticulture, spices, oilseeds, plantation crops, milk is more than one

¹³ National Commission on Agriculture, Part XII - Chapter 56 (56.1.2)

billion tonnes. However, the distance a farmer can travel in one hour is far more than 5 km, with the country having created a vast network of rural roads and highways.

Today, there are about 2,284 regulated markets with 2339 number of principal and 4276 number of sub-market yards. On average, the market yards cover about 463 sq. km of geographical area or a radius of 12 km. However, there is a large difference regionally. In Assam, a wholesale market covers about 6442 sq. km (45 km radius), whereas in Punjab market covers 116 sq. km of area (6 km radius).

The country also has about 22,932 rural periodic markets accessed by farmers. These markets operate at intervals of a week or more, though in a few cases they are in function daily. The periodic markets cover an average area of 146 sq. km or a radius of 7 km. Further, some private markets have also come up in many states.

These rural periodical markets are not typically serving the needs as envisaged originally by the Commission of 1970. They operate as points of transaction, and do not provide any facilitation for farmers to link with other wholesale agricultural markets like the APMCs. Each market type, has become a point of sale where consumers or aggregators release the farmer of the harvested value, and the earlier conceived notion of assembly and onwards linkage has not been developed.

5.2. Existing market architecture

5.2.1. APMC markets

The current market system comprises about 2,284 APMCs which operate 2339 principal markets. These principal markets have extended their footprint through sub-market yards, which total 4,276. However, these sub-market yards are expected to operate as a part of the principal market yard under the associated APMC. By and large, sub-market yards are poor in terms of infrastructure, manpower and operations relative to their principal market yards. In essence, there are only 2339 principal markets which operate out of 6,615 locations (principal market yards plus their sub-market yards). These 2339 principal markets are further categorised as primary, secondary or terminal markets, depending on their location and the volume being handled.

Each principal market, has a designated area under its coverage. Regulations required, that perforce, the notified produce in the region be transacted only in these regulated yards.

Therefore, a farmer is, by regulations, unable to freely transact an exchange with a buyer from outside the APMC control

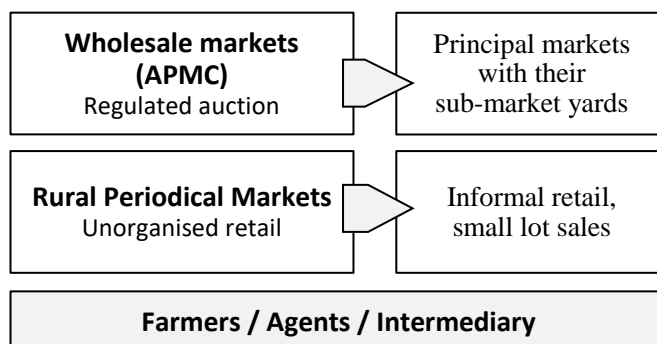


Figure 5.1 Existing market structure - which enforces an intermediary exchange at every stage

area. This has tended to enforce a monopolistic mechanism for agricultural produce trade. Furthermore, the farmers have no facilitating system to bypass the local market and connect with larger or better paying market - they have no modern organised facility or assembly centre that aggregate and transport their produce for undertaking a transaction at other market centres.

Even direct sales at APMC markets, which are principally wholesale markets, is difficult for many farmers. The small & marginal farmers, with uneconomical sized marketable lots, find it difficult to aggregate their produce to move to these APMCs to participate in the auction system for suitable price discovery. They therefore, resort to local agents and traders, who relieve the small farmer of their produce at locally determined prices, and function as first mile aggregators and transport to transact themselves at the APMC markets. This intermediation has naturally been depriving the farmer-producers from aiming for optimal or market-linked price realisation. The current market architecture, thus, does not provide farmers with a choice of markets, but imposes constraints to their selling options.

As per reports, the sub-market yards largely function as a location for the government procurement agencies and do not provide opportunity for open auction. The sub-market yards as of now, handle less than 5 per cent of the volume handled in the principal yards and are irregular in their operations.

5.2.2. Rural Periodical Markets

There are in the country large number of rural periodical markets (RPMs) located at village level. These are small *haats* / shandies that operate at intervals of a week or two and attract both sellers and consumers from the hinterland. An assortment of daily needs including farm produce (grains, fruits & vegetables are traded) at these places. These RPMs, numbering about 22,932 (as on 31.03.2017) are owned and managed by different agencies, namely, individuals, panchayats, municipalities, including State Agricultural Marketing Boards (SAMBs) / Agricultural Produce Market Committee (APMCs).

These RPMs function under traditionally existing informal procedures to provide the small farmers the opportunity to directly retail to local consumers. In addition, aggregators and agents also frequent these *haats* to informally serve the marketing interests of small farmers. However, the opportunity to connect with larger markets that offer better value is not available to the small farmers. These RPMs serve as a stop gap measure, for farmers to tap into local retail buyers for quick transactions. The key bottleneck is a lack of facilities for the small farmers to consolidate their produce into viable quantities to link with other markets. This absence of facilities to pool and move the produce, also tends to deter the farmers from any collaborative farming, as their direct marketing opportunity is limited to demand local consumers.

In parallel, many states have adopted farmer-consumer markets with varied success. These go by the names of *Rythu Bazaar* (A.P. and Telangana), *Raitar Santhe* (Karnataka), *Apni Mandi* (Haryana & Punjab), *Shetkari Bazaar* (Maharashtra), *Uzhavar Saathaigal* (Tamil Nadu) and *Krishak Bazaar* (Odisha). About 488 such markets are reported across the country, and provide

a platform mostly for transactions of produce like fruits, vegetables and flowers which are perishable in nature. The produce sold in these markets service the limited local demand.

5.3. Density of Markets

The availability and access to markets by all farmers in general, and small and marginal farmers in particular, is an important factor in designing the market architecture. Frequently, the market density targets, are in relation to the recommendations made by the National Commission on Agriculture (1976). That Commission had recommended that a market be made available within range of 5 km of farms, a distance that is negotiable by walk or cart within an hour. This assessment was subsequently reiterated by the National Commission on Farmers (2004).

In pursuing this recommendation, the optimal market coverage is interpreted to target a catchment area of 80 sq. km (5 km radius) for each agricultural market. However, the original recommendation was made at a time when road connectivity was minimal and farmers would physically bring their produce on head loads or on camel or bullock carts.

This Committee is of the opinion that the travel time - of one to two hours - from farm to market be the primary factor to ascertain market density, and not the physical distance. Creating markets in a radius of 5 km would not be relevant in this age of rural road networks, when farmers are frequently using motorised transport or tractor-trolleys. In areas of large surplus production, market catchment would also not need to factor in the wider national demand, and not related only to the local consuming population of the region.

Market density would therefore, be factored by involving multiple variables, including rural road connectivity, number of farmers in the region, type of produce, production (with cropping pattern and intensity) and access through road/rail to the unified national market. These factors are local and specific to each producing region and should be evaluated accordingly, when creating district and state level plans. The size of each market, the surrounding terrain and the clustering of farms must also be kept in mind. By and large, **a time radius of one to two hours**, for farmers to negotiate the distance from farms to markets, can be used as the guiding factor, in place of **a kilometre based radius**, to assess required market density.

Saturating the agricultural landscape, by blindly populating it with many market centres may not be a cost effective intervention. Addressing the need for aggregation and better access by farmers to state and national centres through collection centres would be a preferred option. Establishing assembly/collection centres, will initiate a hub and spoke system, these being the backward linkages of the wholesale markets or end buyer. These will open access to wholesale markets, besides serving local retail transactions. However, a broad need assessment is explained in the following section.

5.3.1. Assessment of Gap

The new Model APLM Act has provisions for establishing different models of markets in private sector, notifying warehouses and cold storages as markets in addition to government

Table 5.1 Basic data on marketing linked information from major States -

Name of major States	(WM= PMY+SMY)	No. of RPM	Area Sq.km	Area under Agri 000 ha (2012-13)	Cropping Intensity (2012-13)	Total Population	No. of Farmers	Foodgrain & oilseeds Prod ('000 tons)	Horti Prod ('000 tons)	Inhabited Villages
Andhra Pradesh	179	0	160205	8007	122.8	49471555	6491522	10446	19883	26286
Arunachal Pradesh	13	257	83743	285	131.7	1382611	302723	372	423	5258
Assam	226	1140	78438	4197	149.3	31169272	4061627	5470	6843	25372
Bihar	0	1794	94163	7778	144	103804637	7196226	15206	18624	39073
Chhattisgarh	187	1132	135191	5691	121.8	25540196	4004796	9097	9303	19567
Gujarat	400	0	196024	12600	122.3	60383628	5447500	7673	23162	17843
Haryana	281	0	44212	6376	181.5	25353081	2480801	16865	8016	6642
Himachal Pradesh	56	0	55673	947	174.2	6856509	2062062	1635	2447	17882
Jammu & Kashmir	25	8	222236	1162	156	12548926	1245316	1610	3535	6337
Jharkhand	190	602	79714	1657	117.9	32966238	3814832	5147	4764	29492
Karnataka	513	730	191791	11748	120	61130704	6580649	9228	20473	27397
Kerala	6	1100	38852	2592	126.5	33387677	670253	510	9867	1017
Madhya Pradesh	545		308252	23130	150.7	72597565	9844439	32627	24061	51929
Maharashtra	902	3500	307713	21874	126.1	112372972	12569373	15121	21668	40959
Manipur	0	119	22327	309	100	2721756	574031	503	811	2515
Meghalaya	2	124	22429	340	119	2964007	494675	285	1117	6459
Mizoram	0	220	21081	116	100	1091014	229603	65	613	704
Nagaland	19	174	16579	489	128.5	1980602	537702	602	1045	1400
Odisha	436	1548	155707	5069	115.6	41947358	4103989	9092	11765	47675
Punjab	435	1395	50362	7870	189.6	27704236	1934511	27603	6627	12168
Rajasthan	454	0	342239	23954	137	68621012	13618870	19148	3785	43264
Sikkim	0	19	7096	144	185.7	607688	117401	7069	425	425
Tamil Nadu	286	501	130060	5140	113.1	72138958	4248457	8056	17364	15049
Telangana	260	0	114840	5643	122.8	35193978	-	8250	7177	-
Tripura	21	533	10486	368	144.1	3671032	295947	731	1682	863
Uttar Pradesh	623	5107	240928	25821	155.9	199581477	19057888	49442	37135	97814
Uttarakhand	66	56	53483	1124	159.2	10116752	1580423	1777	1663	15745
West Bengal	475	2900	88752	9678	185.9	91347736	5116688	17057	30148	37469

WM (Wholesale markets) = sum of Primary Market yards and Secondary Market Yards. RPM = Rural Periodical Markets

Data provided by States to DMI

See Annexures for details

If ranking the States by geographical areas, the sq.km covered per market will be far lower than when assessing by gross area under agriculture. However, if farms are not contiguous or clustered close to markets, then markets can remain underserved or periodical.

Table 5.2 Comparative market coverage by States – across all market types.

States	Geographic area per market	Net sown area per market	Gross cropped area per market	Farmers per market	Villages per market
Andhra Pradesh	895	447	549	36265	147
Arunachal Pradesh	310	11	14	1121	19
Assam	57	31	46	2973	19
Bihar	52	43	62	4011	22
Chhattisgarh	102	43	53	3036	15
Gujarat	490	315	385	13619	45
Haryana	157	227	412	8828	24
Himachal Pradesh	994	169	294	36823	319
Jammu & Kashmir	6734	352	549	37737	192
Jharkhand	101	21	25	4817	37
Karnataka	154	95	113	5294	22
Kerala	35	23	30	606	1
Madhya Pradesh	566	424	640	18063	95
Maharashtra	70	50	63	2855	9
Manipur	188	26	26	4824	21
Meghalaya	178	27	32	3926	51
Mizoram	96	5	5	1044	3
Nagaland	86	25	33	2786	7
Odisha	78	26	30	2069	24
Punjab	28	43	82	1057	7
Rajasthan	754	528	723	29998	95
Sikkim	373	76	140	6179	22
Tamil Nadu	165	65	74	5398	19
Telangana	442	217	267	-	-
Tripura	19	7	10	534	2
Uttar Pradesh	42	45	70	3326	17
Uttarakhand	438	92	147	12954	129
West Bengal	26	29	53	1516	11

Area in sq.km, Population information as per census. Cropping intensity can indicate cultivation patterns and scope for future growth in production and market requirement.

Available markets, which include the APMC markets with sub-market yards and the Rural Periodical Markets, when evaluated against geographical area of the State will show that West Bengal and Punjab are have a similar density ratio. Odisha, Assam, Meghalaya, Arunachal Pradesh and Jharkhand are examples of low market density per geographical range. Yet when compared against gross cropped area, these states have better market coverage than Punjab and West Bengal.

Similarly, assessing market density on the basis of production alone is not sufficient as the type of crop, number of harvests in a year and scope to increase cropping intensity will have a role in market footfall. Furthermore, if Primary Rural Agri-markets as collection and dispatch hubs are established, the farmer footfall in wholesale markets can reduce as markets will handle flow of produce rather than individual transactions. Each primary aggregation centres would electronically dispense with the transactions remotely on behalf of the local farmers.

The main criteria of distance or time taken for farmer to travel to markets is not readily available for evaluation and may need primary research.

sector markets. The planning for increasing the market access by farmers is to be done by establishing markets with different ownership and management to create a competitive environment and creating multiple options for selling the produce.

The state and district level planners need to consider following key factors, in order of priority, to assess the need for a market-

- i. Road (or rail/waterway) connectivity to communicate produce to market.
- ii. Reasonable travel time to wholesale market, linked to safe travel time for produce type (eg. shorter for milk, longer for grain) and cost of travel.
- iii. Number of farmers served by a market. As per information from States, on an average, principal market yards (PMY) receive about 300 farmers daily during rabi and kharif harvest season which last around 45-55 days respectively. Thus, peak footfalls of farmers is for about 100 days in a year, farmers normally visiting twice in each season. In case of sub-market yards (SMY), the footfall in the same periods is about 30-40 farmers daily and most come to sell at MSP to procurement agencies. A normative figure of 15,000 farmers can be considered to work out the need for additional markets.
- iv. Production quantity, the size of each market and its capacity to handle volumes should be factored for prevailing crop type. On the basis of revenue generated from regulated markets, a normative quantity of 60,000 tonnes per market can be used as one of the criteria to work out requirement of additional regulated markets in the States.
- v. Consumer population in the State can also be assessed as a factor for added market requirement. However, with improved connectivity, the market channels including online marketing will actually mean that markets in the future will cater to nation-wide consumers under the unified national market.

In the opinion of the Committee, the footfall and volume of trade as explained above will determine the need for a markets. These parameters in turn are largely a function of the geographical area, gross cropped area, net sown area, quantity of output, number of farmers and number of villages. It is advised, that the gap analysis of markets for the state/district is made by assigning weights to various indicated factors.

At the national level, a broad gap analysis for the country with respect to wholesale agricultural markets has been made. The States/UTs are initially grouped into region types on the basis of relative ranking in terms of geographical area (A), total agricultural production (B) and population (C). Accordingly, was given to the individual parameters as follows:

Weightage for **type A regions** is - Geographical area – 4, Production – 2, No. of Farmers – 2 and Population – 2; while weightage for **type B regions** is - Geographical area – 2, Production – 4, No. of Farmers – 2 and population – 2 ; and for **type C regions** is - Geographical area – 2, Production – 2, No. of Farmers – 3 and population – 3.

Table 5.3 Market Density Assessment

States are advised to apply locally correlated weightage to parameters to develop a more appropriate need assessment

States/UTs	Regulated markets (PMY+SMY)	Geographic area per market	Farmers per market	Production per market	Population per market	Markets needed by geographic area	Markets required basis production	Markets required basis farmers	Market required basis population	Total Markets required	Additional regulated markets
(A) Relatively higher Geographical area											
Andhra Pradesh	248	657	15584	118	199482	519	487	322	330	435	187
Chhattisgarh	187	727	21416	81	136579	433	253	334	170	325	138
Gujarat	400	490	13619	72	150959	624	481	454	403	517	117
Karnataka	513	374	12828	65	119163	611	556	548	408	547	34
Madhya Pradesh	545	565	18063	97	133207	981	879	820	484	829	284
Odisha	436	357	9413	44	96210	496	320	342	280	387	Nil
Rajasthan	454	754	29998	48	151148	1090	365	1135	457	827	373
Telangana	260	442	9987	59	135361	366	256	216	235	288	28
Arunachal Pradesh	13	6442	23286	147	106355	267	32	25	9	120	107
Manipur	0	0	0	0	0	71	36	48	18	49	49
Meghalaya	2	11215	247338	1238	1482004	71	41	41	20	49	47
Mizoram	0	0	0	0	0	67	35	19	7	39	39
Nagaland	19	873	28300	132	104242	53	42	45	13	41	22
Sikkim	0	0	0	0	0	23	21	10	4	16	16
Tripura	21	500	14093	155	174811	33	54	25	24	34	13
Uttarakhand	58	922	27249	610	174427	170	590	132	67	226	168
Himachal Pradesh	56	994	36823	81	122438	177	76	172	46	130	74
Jammu & Kashmir	25	8889	49813	211	501957	708	88	104	84	338	313
Maharashtra	902	341	13935	32	124582	980	475	1047	749	846	Nil
(B) Relatively higher agri-production											
Haryana	281	157	8828	85	90224	141	400	207	169	263	Nil
Punjab	435	116	4447	82	63688	160	594	161	185	339	Nil
Tamil Nadu	283	460	15012	107	254908	414	505	354	481	452	169
West Bengal	475	187	10772	104	192311	283	826	426	609	594	119
(C) Relatively higher Population											
Delhi	16	93	2087	7	1049246	5	2	3	112	36	20
Goa	8	463	3919	316	182318	12	42	3	10	14	6
Kerala	0	0	0	0	0	124	176	56	223	143	143
Bihar	0	0	0	0	0	300	569	600	692	561	561
Jharkhand	190	420	20078	53	173507	254	167	318	220	246	56
Uttar Pradesh	623	387	30591	72	320356	767	752	1588	1331	1179	556
Assam	226	347	17972	60	137917	250	227	338	208	259	33
Total(A+B+C)	6,676	37,170	685,450	4078	6377,398	10,450	9,345	9,893	8,046	10,130	3,568

Regulated markets include PMY and SMY and it is assumed that all will function as wholesale markets, irrespective of current status of infrastructure.

Data in this table includes market-yard locations that may be currently inoperative

On broad assessment, there is a requirement for 10,130 wholesale markets functioning across the country.

As seen from the contents of the preceding table, the country will benefit from an additional 3568 wholesale markets; apart from strengthening all the existing 6676 number of principal markets yards (PMY) and converting the existing sub-market yards (SMY) into independent wholesale markets.

However, it is suggested that for a more credible assessment of additional markets, the States/UTs may assign differentiated weightage to each parameter as per the unique situation local to each region and work out the requirement.

The regional market requirements would preferably be developed through District and State level plans. However, for the system to be effective, the back-end aggregation to initiate such consolidated movement to wholesale markets is needed. A broad assessment indicates that assembly points as aggregation centres can be developed near villages. These can be co-located with the existing milk pooling centres or by upgrading the facilities at existing periodic retail markets. The concept is explained in following sections.

In the opinion of the Committee, the priority is to upgrade the infrastructure in the existing market system, so as to bring about an organised flow of produce from rural level to multiple market zones, on the basis of demand signals. This will make agriculture truly market linked.

In sum, the country may require a total of 30,000 markets comprising wholesale markets, and rural retail markets in the ratio of 1 : 2.

5.4. New Approach to Markets

The small and marginal farmers, as a majority, are restricted in their ability to move all their surpluses into markets. The existing market architecture does not promote such facilitation and rural market yards are merely points to assemble and transact, deficient in offering any systemic linkage with the unified national market. Therefore, the architecture is lacking a value linked system approach, and is limited to price mechanism that is locally derived, delinking the farmer from the wider demand.

So far, most of marketing legislation reforms, in relation to the wholesale markets, had been under the perception that the markets were directly accessed by farmers. This is not true in practice. Furthermore, market access is not by individuals alone, but has to be correlated to the managed flow of produce. Not much has been arranged to facilitate and provision the organised flow of produce from village level, and allow the farmer and his/her production with choice of access to markets, both across the country and international.

Both, restrictive regulatory practices and the absence of a suitable market structure that can suck up the widely dispersed small lots of produce in an organised way, have deprived the farmer from linking with markets of choice and hence his/her optimal share in the consumers' rupee.

The DFI Committee revisited the market architecture and the data available for such analysis. It is highlighted that the information is disjointed and a comprehensive redesign, specific to each region is recommended. However, on a broad-based level, some key changes are urgent to bring about sustained market linked growth for farmers. These changes are recommended keeping in mind the existing assets and resources already available in the form of various market types.

The new architecture will aim to inter-connect the farmers with multiple marketing opportunities, through the wholesale and retail market networks. The Committee recommends that the sub-market yards numbering 4276, be upgraded into full-fledged wholesale markets, which will take the network from existing 2339 principal markets to about 6615 wholesale market facilities in the country.

To feed these wholesale markets, the Rural Periodical Markets (RPMs), about 23,000 in number, be upgraded into a function that enables aggregation and transport from village level to wholesale markets of choice. It is advisable to build on the available infrastructure and experience of the RPMs to establish large number of primary rural agricultural markets (PRAMs) to provide the two following services:

- i) direct marketing between producers and consumers;
- ii) aggregation platforms for the small lots of farmers.

The PRAMs will be the foundation of the new market architecture, having facilities to aggregate and organise the flow of farm produce and thereby, bring primary post-production activities at village level. PRAM centres, having a dual function to serve as local retail markets as well as assembly and aggregation centres, will deepen the market structure and broad-base direct participation from farmers.

These decentralized primary centres, will especially benefit the small & marginal farmers who have the most need for aggregation of produce. These PRAMs will allow farmers a choice to connect with any market in the nation, provided viable transport and storage lots are developed.

This mechanism is similar to the way milk supply chain works, where small lots are pooled into viable transport lots to connect with the processing unit at a distance.

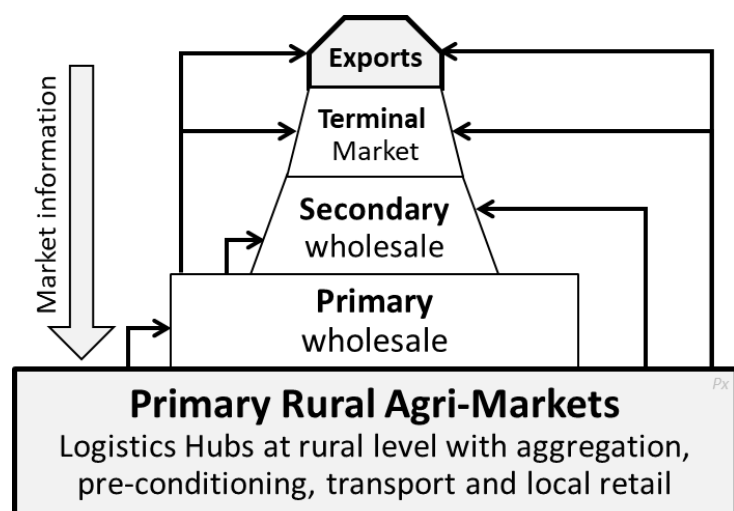


Figure 5.2 PRAMs as foundation of market structure will generate a directed flow of trade

In pursuing the establishment of PRAMs, the capability to connect the produce in suitable quantities with markets of choice will be developed. Further, with farmers enabled with a choice of markets, the element of market to market competition will follow, to the advantage of the producers.

The main functional options of the new architecture are:

Market		Function	Ownership and Management
Primary Rural Agri-Market centres (PRAM)	Assembly & collection centres	Aggregation and transportation - Aggregation - Assaying and weighment - Post-harvest handling - Short term storage - Transportation - Payment	Gram Panchayat/ Town Committee/ Municipal Committee / Entrepreneur / FPO / VPO / Cooperative / APMC
	Retail Markets	- Buying & selling small lots - Multi commodity in nature - Transportation	
Wholesale markets (primary, secondary, terminal)		- Auction of produce - Payment - Storage links	Agriculture Produce Market Committee / Private Markets / Societies
Warehouses (also designated as markets)		- Assaying - Inventory Management - Pledge Loan - Transportation	Private companies / State government / Procurement agencies / Commodity exchanges / FPO / VPO / Cooperative / Entrepreneur

The model Agricultural Produce and Livestock Marketing (Promotion & Facilitation) Act 2017, includes provisions that aid in increasing the density of different types of Wholesale Agriculture Markets, namely, primary, secondary and terminal. There is also provision to expand physical markets through licensing of existing warehouses and cold storages, as well the market network expansion through virtual online market networks.

The existing wholesale markets will get an expanded footprint with the adoption of the model APLM Act, 2017 resulting in an increase in the wholesale exchange. The inclusion of existing warehousing will also ease the physical bottlenecks at existing wholesale markets. This including online markets, will result in an immediate expansion of markets available and help the long intended and desired level of market density.

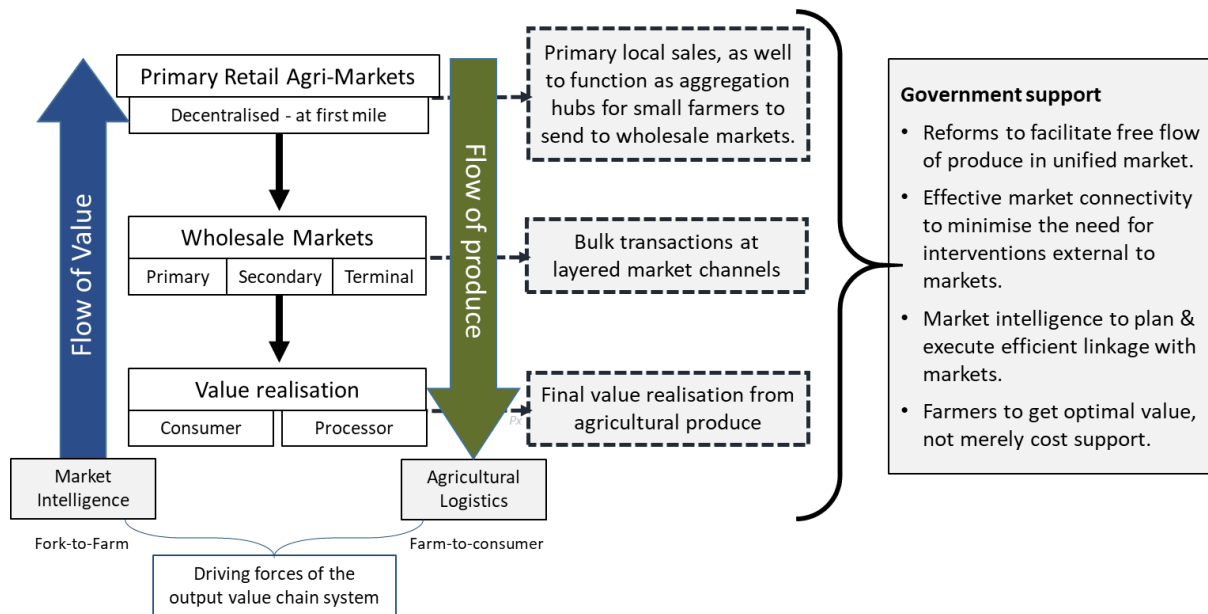
The Committee also recognises, that neither the existing APMC Acts of the states, nor the Model APLM Act, 2107 include provisions relating to these rural markets, focussed as they are on wholesale markets only. This Committee recommends framing of Primary Rural Agricultural Markets (PRAM) as a marketing infrastructure component.

5.5. Primary Rural Agri-Market (PRAM) centres

The Committee felt that the first-mile stage in the produces' movement to value realisation, needs to be strengthened. To align with the new strategy proposed, there is need to restructure how the markets facilitate the movement of farm produce to its multiple consumption points.

There is the need to create first stage (at village or *grameen* level), primary rural agri-market centres (PRAM) as the back-end spokes that feed into the forward hub-spoke network.

Figure 5.3 Primary Retail Agri-Market centres to organise village level handling



These *grameen* or primary rural agricultural market centres (PRAM) will have two roles. The first will be as local retail markets for the farmers to transact sales with consumers from near-farm locations. The second, will be as primary aggregation/pooling/assembly centres of farm produce, to facilitate the onwards movement to other market destinations. These can be located at existing rural periodical markets which are at major village/hobli/firqa/gram panchayat centres.

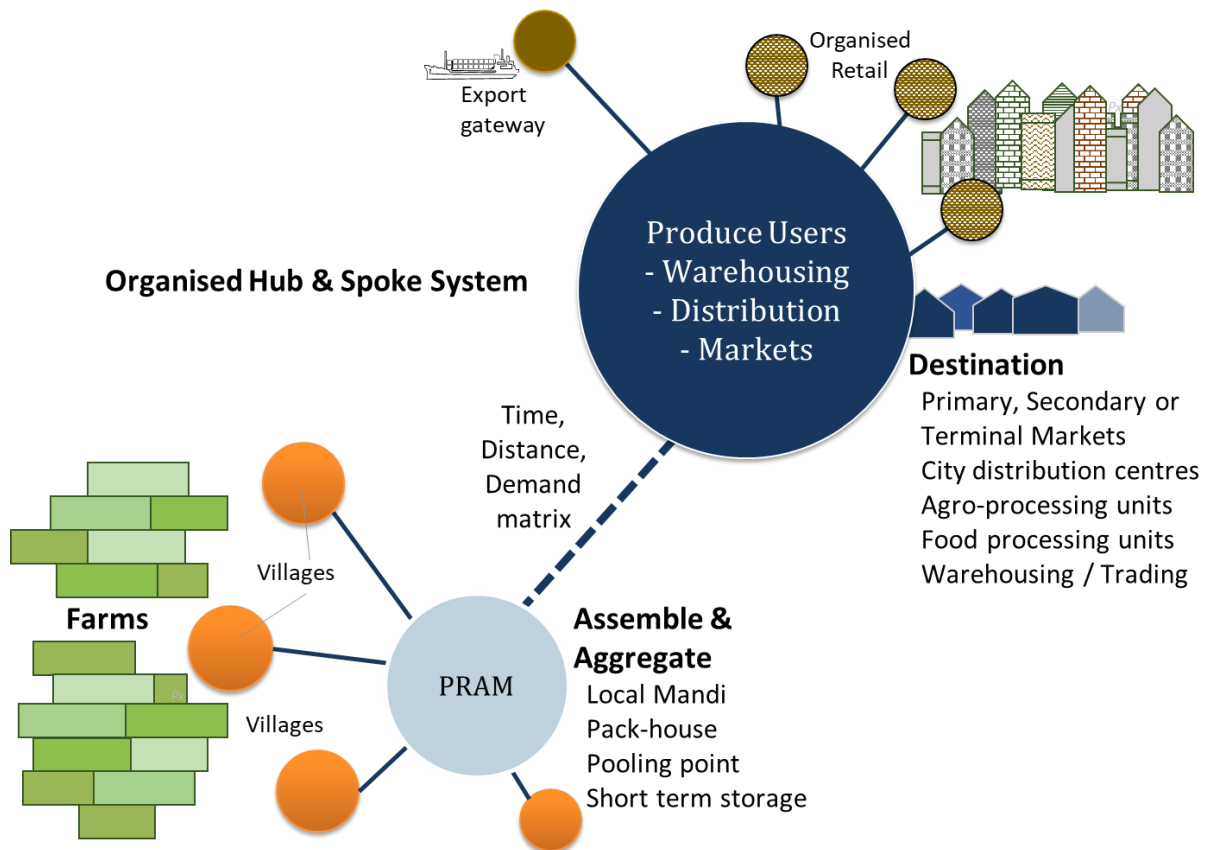
Being close to the farm-gates (at *grameen* level), the base of the pyramid will allow the farmers and rural communities to scale up their role in the overall value chain.

Each PRAM would suitably take up the services of a village level logistics hub, where milk output would be pooled, horticultural produce would undergo pre-conditioning, and other agricultural produce would be assayed and graded for onwards connectivity to next level markets. Hence, the PRAMs would necessarily have facilities that will allow first stage post-production activities at the first mile, located close to the villages and farms.

The PRAM are comparable to the thousands of assembly markets as also envisaged in the National Commission of Agriculture (1976), which were expected to function as assembly points for farmers with small scale load aggregation. These kind of organised assembly and

aggregation hubs, are a critical weak link that prevents the small farmers to organise their forward linkages and therefore are forced to dispose their small lots to intermediary aggregators at the first instance.

Figure 5.4 PRAM in the hub and spoke logistics network



The collection facility will function for bulking (gathering together produce from different farmers to send to the buyer collectively). Such collection facility should be located within one hour travel of producing areas. It should also focus on requirement of orderly marketing i.e. cleaning grading, packing, labelling, etc.

The experience so far, however, shows that it has been difficult to promote primary wholesale agricultural markets, where farmer-sellers outnumber the traders. The Primary Rural Agri-Markets (PRAMs), will allow a large number of farmers to collaborate and direct their produce to wholesale markets of choice across the country. The ability to aggregate and communicate produce to other regions, will allow market-to-market competition to the farmers benefit.

This back-end organisation will also create near-farm jobs at the small pack-houses, mini-storages and the supporting processing units that will come up in the PRAMs. The type of technology deployed will depend on the type of produce from their catchment region. Existing aggregators can be upgraded as managers of these facilities, as well involve large food retailers that would wish to secure their back-end sourcing.

Creation of such retail and collection centres at block level that allows a supply cascade could potentially generate higher returns throughout the supply chain.

5.6. Location and Facilities

5.6.1. Location

The location of PRAMs should be in rural/semi-urban/peri-urban identified based on their potential to serve as a hub for a certain producing region. The choice of such a hub should be guided by its potential to serve as a 'Farmer-Consumer Direct Market' or/and 'Aggregation Platform' that can linked the produce with any wholesale agriculture market.

5.6.2. Systems and Infrastructure

The Department is advised to develop "Guidelines for Farmers' Markets" and share with the States/UTs. The Guidelines besides operational issues should also define the standards & specifications relating to layout, sale platforms, buildings etc., so that these markets evolve along 'uniform look and feel' across the country.

i) Systems and processes

The operational guidelines may lay down norms for conduct of intended functions in a hassle-free, transparent and accountable manner. The milk collection centres, where the small dairy farmers deliver milk every morning and receive their prices based on test values offer a good example for emulation with necessary changes. It is the bulk coolers of small size that facilitate collection and onward transfer of milk without spoilage. On similar lines perishable commodities will require pre-coolers and reefer vans to store & transport perishable commodities.

ii) Infrastructure:

- boundary wall/fencing;
- connecting road and internal road;
- goods transport service (cold & dry);
- electricity;
- Internet connectivity;
- waste disposal system;
- passenger transport;
- sitting/selling platform;
- weighing devices;
- dry/cold storage;
- drying platform;
- washing facility;
- cleaning, sorting, grading & packaging;
- office space.

5.7. Nature of PRAMs and Functions

5.7.1. Producer – Consumer markets

The small producers as sellers can avail of the basic facilities at the nearby regular / periodic markets to sell their produce, particularly perishable commodities, directly to the consumers. Section 11 of the APLM Act, 2017 provides for such a direct market and shall remain outside the regulation. All such existing direct markets in some states need to be further systematised and upgraded in terms of management, transactions and public hygiene. The large number of

existing RPMs will offer an easy choice in locating these farmer-consumer markets (PRAMs). Promotion of such markets is also feasible at semi-urban / per-urban centres by identifying suitable space.

5.7.2. Aggregation platforms

In order to achieve efficiency of marketing in transacting small lots of farmers, both non-perishable (grains) and perishable (fruits & vegetables), their aggregation is essential. It would help to build aggregation platforms in close proximity to farm-gates, and facilitate a formal & transparent system of aggregation, displacing the village-trader based intermediation that happens today in rural areas. The existing rural periodical markets (RPMs) can be utilized to build aggregation platforms, by putting in place the required infrastructure and processes. The farmers will bring their small lot of marketable surpluses to these markets and the same can be processed or cleaned, sorted, graded and packaged for further transportation & sale through auction at regulated markets (APMCs, etc.). Alternately by assaying the aggregated lot at the same location, it can be traded online via electronic platforms like e-NAM.

This process can be operationalized by mobilising the farmers as well as interested retailing organisations, into 'Farm-Produce Marketing Organisations (FPMOs)' in the form of a company or a cooperative for the purpose of marketing only. FPMOs can displace village trader as the intermediary, as well create unhindered channels to networks of organised retail outlets.

5.7.3. Fund Requirement:

Fund required to develop these markets can be mobilized from existing schemes like Rashtriya Krishi Vikas Yojana (RKVY), Integrated Scheme for Agricultural Marketing (ISAM), Mission for Integrated Development of Horticulture and MGNREGA. The sharing norms as applicable between Centre and State may be adopted.

In addition, the markets can be developed under private sector, through PPP mode, creating SPVs between existing ownership of RPMs and sub-market yards and partner stakeholders. Agro-processors and food processors that wish to establish a sustained back-wards integration to secure their raw material can also participate in such organised sourcing through the rural primary agri-markets.

5.8. Other enablers in Agricultural Marketing

A situation analysis immediately brings forth the fact that marketing of produce is hampered most by the handling size of the farm produce or the marketable lot size. Unless the post-production volume is of a shared character and of sufficient quantity at the first stage of handling, the subsequent handling to connect with markets is inefficient.

The fragmented land holding dictates small volume outputs per farm. However, small holdings are managed more attentively and achieve higher productivity, if the output is aggregated for marketing.

5.8.1. Small farmers, small volumes

In the context of doubling of farmers' income, the strategy should necessarily be inclusive, as 85 per cent of the farmers of the country are small and marginal. The size of operational holdings in India is declining continuously with every successive generation. Needless to say that the small farmers do not have economies of scale and access to market or information.

The country is estimated to have more than 137 million operational farm holdings under different size groups. The number of smallholders, consisting of marginal and small farmers (less than 2.0 ha land holding), has increased from 70 per cent of total land holding during 1970-71 to 85 per cent in 2010-11. The average size of land holding has declined from 2.28 hectare in 1970-71 to 1.15 hectare in 2010-11.

Table 5.4 State-wise land holding patterns

State/UT	Marginal		Small		Semi-Medium		Medium		Large		All Holdings	
	2000-01	2010-11	2000-01	2010-11	2000-01	2010-11	2000-01	2010-11	2000-01	2010-11	2000-01	2010-11
All Major States												
Andhra Pradesh	0.4	0.4	1.4	1.4	2.7	2.6	5.7	5.6	16.3	15.5	1.3	1.1
Bihar	0.3	0.3	1.2	1.3	2.6	2.6	5.2	5.1	15.5	14.5	0.6	0.4
Chhattisgarh	0.4	0.4	1.4	1.4	2.8	2.7	5.9	5.7	12.0	16.3	1.4	1.4
Goa	0.3	0.5	1.3	1.8	2.6	2.9	5.6	6.2	23.8	24.2	0.8	1.1
Gujarat	0.5	0.5	1.5	1.5	2.8	2.8	5.8	5.7	16.9	20.9	2.3	2.0
Haryana	0.5	0.5	1.4	1.5	2.8	2.9	6.0	6.1	16.5	18	2.3	2.3
Himachal Pradesh	0.4	0.4	1.4	1.4	2.7	2.7	5.7	5.7	15.9	15.5	1.1	1.0
Jammu & Kashmir	0.4	0.4	1.4	1.4	2.7	2.7	5.4	5.4	21.1	22.3	0.7	0.6
Jharkhand		0.4		1.4		2.7		5.6		15.4		1.2
Karnataka	0.5	0.5	1.4	1.4	2.7	2.7	5.8	5.7	14.8	14.7	1.7	1.6
Kerala	0.1	0.1	1.3	1.6	2.5	2.8	5.3	5.3	40.9	64.6	0.2	0.2
Madhya Pradesh	0.5	0.5	1.5	1.4	2.8	2.7	5.9	5.8	15.5	15.8	2.2	1.8
Maharashtra	0.5	0.5	1.4	1.4	2.7	2.7	5.6	5.6	15.4	16	1.7	1.4
Odisha	0.5	0.6	1.4	1.6	2.7	3.0	5.6	6	16.5	23.7	1.3	1.0
Punjab	0.6	0.6	1.4	1.4	2.7	2.6	5.8	5.7	15.1	14.8	4.0	3.8
Rajasthan	0.5	0.5	1.4	1.4	2.9	2.8	6.2	6.1	18.2	17.5	3.7	3.1
Tamil Nadu	0.4	0.4	1.4	1.4	2.7	2.7	5.7	5.6	19.5	20.1	0.9	0.8
Uttar Pradesh	0.4	0.4	1.4	1.4	2.7	2.7	5.5	5.5	25.1	15.0	1.0	0.8
Uttarakhand	0.4	0.4	1.4	1.4	2.7	2.7	5.6	5.5	15.1	23.1	0.8	0.9
West Bengal	0.5	0.5	1.6	1.6	2.8	2.7	5.1	4.9	279	316.2	0.8	0.8
North-Eastern/Hill States												
Tripura	0.3	0.3	1.4	1.4	2.6	2.5	5.2	5.1	78.8	14.3	0.6	0.5
Arunachal Pradesh	0.5	0.6	1.3	1.3	2.7	2.8	5.8	5.5	16.1	14.9	3.7	3.5
Assam	0.4	0.4	1.3	1.4	2.7	2.7	5.2	5.2	53.0	68.1	1.2	1.1
Manipur	0.5	0.5	1.3	1.3	2.5	2.5	4.9	4.9	11.4	11	1.2	1.1

State/UT	Marginal		Small		Semi-Medium		Medium		Large		All Holdings	
	2000-01	2010-11	2000-01	2010-11	2000-01	2010-11	2000-01	2010-11	2000-01	2010-11	2000-01	2010-11
Meghalaya	0.6	0.5	1.5	1.3	2.6	2.8	5.4	5.7	13.1	16.5	1.3	1.4
Mizoram	0.6	0.6	1.3	1.3	2.3	2.4	4.8	5.1	13.1	15.1	1.2	1.1
Nagaland	0.5	0.5	1.2	1.1	2.6	2.6	6.2	6.2	15.8	17.6	7.3	6.0
Sikkim	0.4	0.4	1.4	1.2	2.7	2.5	5.8	5.4	20.7	15.8	1.6	1.4
Union Territories												
A & N Islands	0.4	0.4	1.4	1.4	2.5	2.6	4.3	4.3	46.8	36.9	2.0	1.9
Chandigarh	0.4	0.5	1.4	1.4	2.7	2.9	5.8	5.7	16.5	11.1	1.6	1.3
Dadar & Nagar Haveli	0.5	0.5	1.3	1.4	2.8	2.8	5.8	5.7	16.0	15.5	1.5	1.4
Daman & Diu	0.3	0.2	1.4	1.4	2.6	2.6	5.9	6.3	20.3	20.0	0.6	0.4
Delhi	0.4	0.4	1.4	1.3	2.9	2.7	5.8	5.6	15.3	15.1	1.5	1.5
Lakshadweep	0.2	0.2	1.3	1.4	2.6	2.5	5.5	6.1	22.3	24.0	0.3	0.3
Puducherry	0.3	0.4	1.4	1.5	2.7	2.9	5.7	5.7	19.5	16.9	0.7	0.7
Total	0.2	0.4	1.4	1.4	2.4	2.7	4.4	5.8	13.2	17.4	1.3	1.2

Source: Agricultural census, various

Higher income realisation per unit of land is vital for making small land holdings economically viable. Minimisation of transaction cost and tapping high value market are options to provide an opportunity to smallholders. This calls for increasing their effective size through various alternatives available. These include cooperatives, producer's companies, cluster formation, etc. so as to reduce the transaction costs to cultivate per hectare and ensure better and collective participation in the marketing system.

Making farmer producer organisations (FPOs), as cooperatives or companies, has assumed a critical role in context of today's land holding structure, and relevant in countering the situation of small land-holding predominantly populated by land sizes of an average of 0.65 ha.

5.8.2. Farmer producer organisations

Grouping farms together, to operate in collaboration as a large cluster is the concept behind forming farmer producer organisations. Small Farmers' Agri-business Consortium (SFAC) is the nodal agency at the national level for the creation of FPOs.

A cluster approach is necessary to bring about a critical economy of scale at farm-gate, so that farm inputs can be better managed, the cultivation gets consolidated care and the output from farms has viable scale for modern post-production handling.

However, for these benefits to accrue, the farmer group creation process, needs to focus on grouping contiguous tracts of land (as far as practicable) and not just the grouping of individuals. The end outcome aimed is collaborative farming, where the entire group farms a common set of crops in farms that adjoin one another.

Table 5.5 State-wise number of FPOs promoted by SFAC

SN	State	No. of Farmers			No. of FPOs		
		Mobilized	Under Mobilization	Total	Registered	Under process	Total
1	Andhra Pradesh	6360	640	7000	5	2	7
2	Arunachal Pradesh	1750	0	1750	2	0	2
3	Bihar	19065	3935	23000	19	5	24
4	Chhattisgarh	20670	5330	26000	10	15	25
5	Delhi	3535	0	3535	4	0	4
6	Goa	1810	0	1810	2	0	2
7	Gujarat	18959	1041	20000	20	1	21
8	Haryana	13240	0	13240	23	4	27
9	Himachal Pradesh	4887	0	4887	5	0	5
10	Jammu	3694	287	3981	1	2	3
11	Srinagar	3120	960	4080	1	3	4
12	Jharkhand	10009	0	10009	8	0	8
13	Karnataka	103904	18596	122500	102	18	120
14	Madhya Pradesh	111010	33990	145000	126	18	144
15	Maharashtra	88348	3152	91500	85	7	92
16	Manipur	2884	4066	6950	4	4	8
17	Meghalaya	2990	760	3750	3	1	4
18	Mizoram	1700	1000	2700	0	3	3
19	Nagaland	1750	0	1750	2	0	2
20	Odisha	28663	10237	38900	30	12	42
21	Punjab	6288	0	6288	7	0	7
22	Rajasthan	47079	3421	50500	38	2	40
23	Sikkim	1876	0	1876	2	0	2
24	Tamil Nadu	10945	55	11000	11	0	11
25	Telangana	24539	0	24539	20	0	20
26	Tripura	2874	0	2874	4	0	4
27	Uttarakhand	6004	0	6004	7	0	7
28	Uttar Pradesh	35746	0	35746	33	2	35
29	West Bengal	61266	8234	69500	62	6	68
Total		6,44,965	95,704	7,40,669	636	105	741

As of 10-July-2017

In addition to the 741 farmer producer organisations promoted through Small Farmers' Agri-business Consortium (SFAC), another 339 FPOs have been promoted by other state agencies, bringing the total to 1,080 in the country. FPOs exist across the country, mainly registered under statutes such as the Cooperative Laws, and lately under the Companies Act as Producer Companies. Associations, Trusts and Federations are also formats of organised collaboration among farmers.

The benefits from grouping together of farms are essentially from generating viable logistics capacity in the supply of raw inputs (fertilizers, planting material, irrigation, etc.) leading to an incremental reduction in input costs and for planned sowing and harvest cycles. Similarly, farming on contiguous land allows for collective functioning, for the viable deployment of farm mechanisation, optimising labour costs, and for post-harvest activities.

Most importantly, such back-end collaboration can shift the control of the value system into hands of the FPOs for the transactions on both inputs and supply side.

The perceived economy of scale from FPOs, needs to essentially translate into gainful value on the following principal fronts-

- a) Raw Inputs (eg. assured volume of fertilizer and planting material can lead to incremental reduction in input costs)
- b) Farm mechanisation (eg. contiguous farming can lead to viable deployment of harvesting combines or other farm mechanisation – incremental reduction to labour)
- c) Post-harvest Infrastructure (eg. capacity utilisation is justified for pack-houses, grain silos, transportation, etc – a transformational change in supply chain)
- d) Market access & connectivity (eg. control of value chain system shifts into hands of FPOs once meaningful volumes are available to transact on both supply and inputs)

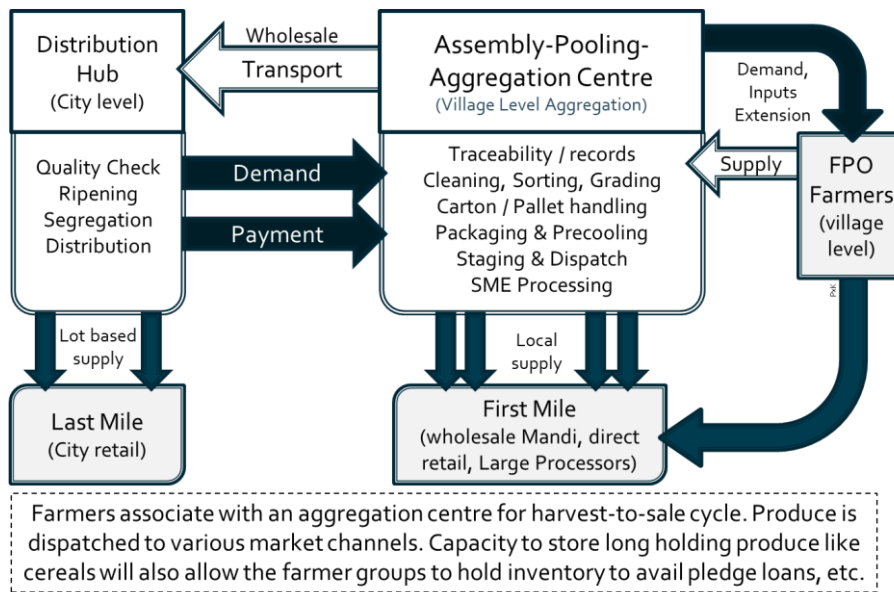
At the moment, in its first phase of development, FPO formation has primarily focused on mobilising the interested farmers together, clubbing these individuals to avail options of equity and credit support. In the second phase, it is recommended that this be matched with allied efforts to coerce members of FPOs to undertake collaborative farming by the clubbing together of farm-land and to undertake next level activities such as aggregation and transport to markets.

It is recommended that the FPO development mechanism must henceforth focus on the pooling of farm land, such that the soil health assessments, inputs (planting material, fertilizer, irrigation), farm labour and mechanisation, extension works, can be deployed at incrementally lowered and optimised costs. Similarly, the farming can be planned for a common set of crops, and the consolidated output would then be of a scale that brings improved viability and leads to a transformation of the supply chain.

Grouping together of individual farmers with non-contiguous holdings, will not lead to the desired bringing together of tracts of land nor the desired economy of scale in respect of both inputs and outputs. It must be kept in mind that negotiation power through collectives is worth its while, only when the outcome is a common produce type, in large marketable volumes, and for cross-regional markets.

Collaboration of farmers to collectively cultivate and harvest a common set of produce, is not sufficient. There is subsequent need to advance efforts to connect the produce with markets farther afield. Without suitable market connectivity, the output from such collaborative farming will be directed to near-farm markets only, which will lead to a localised glut, and associated price repercussions. Therefore, the production from collaborative farming will need to be linked to multiple demand centres to maximise on the market opportunities.

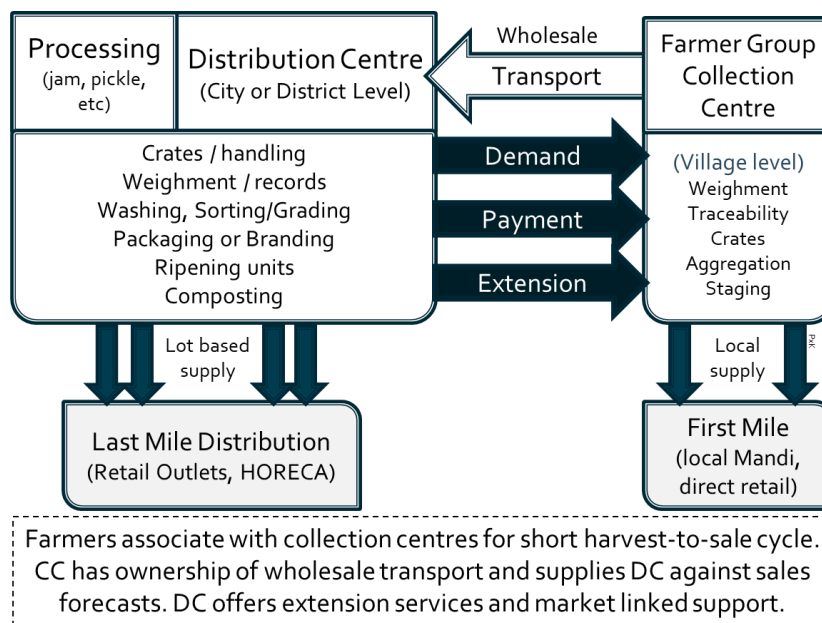
Figure 5.5 FPO model of market connectivity



Developing such an arrangement for FPOs will also lead to long term market linkages for the selected produce and will make income enhancement of farmers a sustainable program. To arrange collaborative farming, the procedure for forming FPOs can look at grouping land under a village, to create village level farm organisations. Such village level collaboration will bring greater control of the production and post-production activities, to entire village communities.

FPOs can also be created for groups of farmers in close proximity to urban centres. The close proximity of large demand centre will change the operating model. In such cases, the cluster size per crop could be smaller, with more diversification in crops. The shorter and more direct access to urban markets will however offer quick evacuation of produce and faster cash flows.

Figure 5.6 City-proximate farms and marketing operations



FPOs are currently not formed on the basis of availability of adjoining farm holdings or on prior basis of preferred crop types. In the future, development efforts can be undertaken to support collective or collaborative cultivation of specific crop types for targeted markets.

5.8.3. Need to build FPOs/VPOs

Since initiation in 2012, the country has organised as few as 1080 FPOs. After having accepted the importance of FPOs in India, it would not be appropriate to remain at the starting line, as is the case today. Among these FPOs there are several successful cases that offer learnings for replication in a large scale.

Village producer organisations (VPOs) can also be developed as a joint venture of FPOs, or JV of a private company and FPO, or with public private participation, such that an entire village region is developed for a predetermined set of agricultural produce, as well as with post-production activities. For example, a region having strength in producing fibre crops can be developed as a VPO to include small handloom, weavers or handicraft units.

Similarly, a village that has appropriate agro-climatic environment for mangoes can also intercrop tomato and other vegetables and take up post-production management such as aggregation, packaging, branding and dispatch to markets. An example in grapes around Nasik, where entire regions around villages are cooperating to expand productivity and in post-production is already evident.

A VPO would essentially be a cluster of farms in a village region that will function as a collective for predetermined outputs. Such a mechanism of natural clustering of activities can be expected to find greater buy-in and alignment with activities of the local population.

Considering the critical need to economise on the cost of production, as also realise efficient post-production transactions, the scaling up of farmer producer organisations (more particularly companies) and village producer organisations (VPOs) across the country should happen quick and fast. In the view of this Committee, a minimum of 7,000 number of FPOs & VPOs should be targeted by 2022-23 and double that target number in the six years thereafter.

At an average of 1000 hectares of cultivated land under each such organisation, and 1000 farmers per FPO / VPO, the organised number of farmers would be 7 million and pooled land would be 7 million hectares by 2022-23. This will scale up to an additional 14 million farmers and 14 million hectares by 2029-2030.

If success is demonstrated over the following years till 2022-23, the scale up thereafter may acquire greater momentum than targeted. What is, therefore, critical is to work towards creating a critical mass of successful FPOs / VPOs in the coming 5 years.

In the following section, the constraints and challenges and their negotiation as also the way forward to achieve the desired scale is discussed.

5.8.4. Scale up village level, farmer producer organisations

Ongoing support for FPOs is in mainly in the form of –

- Grant of matching equity (cash infusion of upto Rs. 10 lakhs) to enhance the credit worthiness of registered FPOs (Farmer Producer Company - FPC).
- Credit Guarantee Cover to Eligible Lending Institution (ELI) to minimise their lending risks and thereby enable provision of collateral free credit to registered FPOs (maximum guarantee cover 85% of loans not exceeding Rs. 100.00 lakhs).

FPOs can also avail financial support provided for post-harvest management and processing under general category, vide-

- Post-harvest Infrastructure support from MIDH (DAC&FW) - central sector scheme and centrally supported scheme.
- Warehousing financial support through ISAM scheme of DAC&FW.
- Processing Industry infrastructure from MoFPI – central sector scheme.
- Venture Capital Assistance through scheme of SFAC.
- Credit for cooperatives from NCDC
- Projects under RKVY, operated through state governments.

Though there is sufficient focus on financial assistance, there is limited hand-holding subsequent to formation of a farmer producer company or organisation. This means, that after mobilisation of farmers into a group, there is very little support in marketing, value added logistics or in B2B interactions. There is a need for incubation support to FPOs so that they have a greater clarity of their value chain involvement and can address their concerns better. Effective and ongoing engagement of FPOs with government, donors and markets is being done piecemeal and not in a systemic manner.

Banks tend to refuse to lend to FPOs due to disaggregated land holding or lack of other collateral. Small and marginal farmers, who account for more than half of the total land holdings, and who may not hold formal land titles, are unable to access institutionalised credit. The producer companies are not provided the same incentives/grants and are also liable to tax on their income, unlike cooperatives. Among other constraints in scaling up operations of FPOs / VPOs, is the limited access to professionals to meet the statutory compliances of a producer company. These include book keeping, registration of Board of Directors (who may be marginal farmers and illiterate).

Agriculture is not only food items and a lot of the produce in fact supports artisans, weavers, handicrafts, etc. Various online platforms already provide opportunity for such output to link with a wider market. There is opportunity to promote non-producer companies to create joint ventures with village enterprises and take their unique products global. Therefore, government can promote non-producer marketing enterprises to enter into joint venture with FPOs, or

conversely allow FPCs to add a limited number of members from non-farmers.

To make further development efforts, on FPOs, to be market linked, the following steps are recommended –

- a. Identify FPOs with contiguous land or with scope for scalable production. This may also be done at village level to promote village producer organisations (VPOs)
- b. Identify target markets - map consumption, crop wise with volumetric demand
- c. Evaluate distance from FPO location to target markets and evaluate produce selling cycle, minimum and maximum. For selling cycle of greater than 48 hours, list the added support systems needed to access the markets
- d. Support FPOs to develop relevant market infrastructure/linkage through capacity building, value chain analysis and partnerships with external value chains.
- e. Fast tracked soil health mapping and crop planning for each FPC. Provide FPC with scientific and specific crop plans for 3 years.
- f. All procurement by government agencies be made through FPOs, preferably.
- g. Special incentive to FPCs that are willing to set up infrastructure in mega food parks.
- h. Wholesale buyers that develop long term buying arrangement with FPOs be provided a freight subsidy on the throughput as declared/certified by FPO.
- i. Income tax exemption to FPOs for 5 years, similar to that provided to infrastructure projects of cold-chain and food processing.
- j. Provide regular training and business level hand-holding to FPOs for the first three years – this may include incubation support in initial phase of development, provided the FPOs take up collaborative farming on contiguous land holding.
- k. Besides SFAC, companies from the private sector can be allowed to promote FPOs to suit their specific market needs while maintaining a stake in the FPO. Non-producer entity may be allowed to invest stake in a Producer Company, upto maximum 26 per cent. This will allow to develop financial strength and attract external professional management. This will need amendment of the Companies Act which currently only allows farmers to be producer members of an FPC.

This directed approach to linking FPOs with target markets, is expected to result in an immediate thrust on productivity at farm level. Without appropriate market linkage, farmers are hesitant to adopt high productivity practices for fear of incurring losses due to low level of market access. Central government has already advised states to treat Farmer Producer Companies at par with cooperatives and this may be implemented by all states.

This committee has recommended a Value System Platform (Chapter 8), which may specifically focus on FPO development. The platform includes a District level structure, and

the activities to form and develop FPO and VPO can be conducted at District level with the respective state government to maintain a bottom up approach and involvement. If the State and District level value system platform take ownership of FPOs/VPOs, it will fill the existing structural and organisational gap that exists in their promotion, and also connect the two organically.

5.9. Stable Trade Regime

A quick look at the Agricultural Trade Policy and tariff changes over the last decade, will show that there have been frequent and short term adjustments. Long term market relations are put at risk when trade policy is varied in the short term and unstructured in nature. Such frequent changes are typically triggered by concerns of consumer unease over prices, but cause disruptions in cultivation patterns at domestic farms. Sudden reduction in import tariffs due to increase in consumer prices harm the long term interests of our farmers, since cheap imports tend to offset the commercial welfare of farmers. **As far as import policy for agriculture is concerned, it is often considered as a price support and price stabilisation tool, which is tilted more towards consumers.**

In case of exports too, trade policy is used as an internal price control mechanism, to adjust tariffs to curtail any increase in consumer prices on an ad hoc basis. The Minimum Export Price (MEP) is a frequently used tool with the intention to restrict or ban the export of a commodity in reaction to rising prices in the domestic market.

In either case, the agenda is to control the supply of a commodity to the domestic market, the oversight being temporary and inconsistent in duration, as a contrived reaction to short term changed circumstances. The policy does not promote agricultural trade but mainly used to control prices in the domestic market. The result is that marketing opportunities get disrupted. The export potential for the produce of India cannot be suitably harvested without policies that leave open gateways to expand into markets beyond the domestic frontiers. A stable trade regime will help both farmers and other stakeholders from a long term view in building market relationships. Detailed discussion is in Chapter 10.

5.9.1. Agricultural Trade Policy to support farmers

In today's context, the irony is evident in the inverse relationship between agricultural production and income, which directly indicates a failure in communicating local surplus to optimal markets. In the face of surplus output, the main cause of economic distress is the limited marketing opportunity. The marketing opportunity for the produce of India must expand beyond the domestic frontiers.

Government needs to reconsider agricultural trade policy and structure the mechanism such that the agricultural economy has more freedom to build external markets, which will benefit plans for productivity increases. Closure of export windows deprives producers from planning long term targets for international trade. Export bans result in a short term excess and long term disruption in building export markets. Exports need to be promoted aggressively and preferably

not be used as price control mechanism. Exports can add to demand for domestic produce and provide an upward lift to the market price, which is advantageous to the farmers.

It is suggested that the agricultural trade policy should be guided by balancing the interest of both the producers and the consumers, in addition to long term food and nutritional security concerns of the country. A trade perspective over 5-10 years period is suggested. A mid-term planned review of agriculture trade policy is another important recommendation, akin to the mid-term review undertaken for foreign trade policy.

Any export strategy would require to include cluster based development such that FPO or VPO are able to output sizeable volume of quality produce as desired by the importing markets. Export oriented production through development of clusters will help to make available sizeable volumes of identified produce to meet such requirements. There is also the need to designate specific sea-ports as gateways for export /import of agricultural produce, especially those that are perishable, such that the necessary phytosanitary clearances are fast-tracked and do not become a bottleneck to movement.

The subject of Agricultural Trade is discussed further in Chapter 10 of this Volume.

5.10. Futures Trading

‘Commodity Futures’ and ‘Derivatives’ have long been recognised as instruments for risk management through forward pricing. The Futures markets, not only provide an alternate marketplace for the farmer but most importantly help the farmer address price risk by helping to lock in a price.

There are two ways by which farmer association can hedge on the Futures platform.

- one, by hedging price on futures platform and delivering goods through exchange approved warehouses; and
- second, by hedging price on futures platform and later squaring off the position and selling goods in the spot markets.

However, the Futures markets and exchanges suffer from inefficiencies. Several factors attribute to the inefficient functioning and retard the growth of futures market like-

- thin volumes and low market depth,
- infrequent trading, lack of effective participation of trading members,
- not having a well-developed spot market in the vicinity of futures market,
- poor physical delivery in many commodity markets,
- absence of well-developed grading and harmonised standards, and
- other market imperfections.

Futures market needs to be developed to provide as an alternative marketing channel for

farmers. This requires to link farmers to exchanges through farmer producer organisations including farmer producer companies. The steps in this direction are:

i. Enable participation in transparent and efficient regulated exchange

Exchange-traded forwards overcome the limitations of futures (time, place, quantity and grade of produce) and offer farmers direct access to national buyers, with reduced counter-party risk. As a result, farmers can secure improved income realisation and avoid distress sale by using the Exchange warehousing and financing infrastructure.

Indian farmers are buffeted by price volatility and in such a situation, options can be the ideal instrument for insuring their margins. Farmer producer companies and cooperatives can be encouraged to use options to manage commercial risk in the production, processing and marketing of agricultural products. Forwards along with options can provide farmers with an appropriate tool to get good price for their produce and manage price risk efficiently.

ii. Remove entry barriers for farmer participation on exchanges

Farmer participation on futures is limited due to the entry barriers in the form of membership criteria, stringent KYC norms, margin requirements, etc. By making it easier and simpler for farmer producer companies to take membership of exchanges, farmers can be encouraged to formal, regulated, cash-less markets.

By lowering the threshold for membership for FPCs through a special membership category, simpler KYC and permitting margin financing for farmers, more such companies can be encouraged to connect to exchanges to lock in prices and cover their risks.

iii. Boost warehouse-based sales and commodity finance

Encouragement of crop inflow into transparent and regulated warehousing network can be commenced with exemption of the 450 exchange-approved warehouses from Stock Control Order under the Essential Commodities Act. Additionally, the new WDRA regulated repository can encourage a pan-India digital network licensed warehouses and provide the legal and regulatory environment for inventory financing and warehouse receipt lending to encourage the use of these financing mechanisms.

All e-Negotiable Warehouse Receipt (eNWR) based financing provided to farmers should be considered as priority sector lending and banks should be mandated to provide credit to the agri-sector compulsorily through eNWR. A default guarantee structure under WDRA can give further confidence to banks and boost agri-financing.

iv. Improve competitiveness of small and marginal farmers through aggregation

For small farmers, the advantage of joining a collective are the direct and indirect access to a market (local, regional, global); a transparent pricing mechanism, that is linked to demand; scope to shift away from mono-cropping low-value to high-volume crops; avoiding over-reliance on credit to purchase inputs; leveraging a competitive advantage in production, quality certifications; and, credibility of the buyer and trust among farmers via regular direct

interaction between the buyer and the farmers. There is also the need to invest resources in capacity building for financial and managerial skills as well as improved corporate governance.

v. Expand the digital Mandi network

By July 2017, as many as 455 markets across 13 States have joined the e-NAM platform initiated by the government of India. Further, 150 markets have joined the Unified Marketing Platform (UMP), under Rashtriya e-Market Services Limited (ReMS), a joint venture of Karnataka Government and NeML. By March 2018, NAM will have 585 markets integrated via the e-NAM platform, creating inter-operability between these two networks. This will take the total number of markets that can conduct online trade to almost 750. The Model APLM Act 2017, provides for multiple online platforms.

Inter-operability that will create a network of all these platforms, will be to the farmers benefit by providing competitive price discovery.

5.10.1. Integrating the physical, derivatives and input markets

There are three types of markets in the ecosystem that a farmer has to deal with. One, for selling his produce, he needs access to physical or spot markets, and lack of such an access is one of the major impediments for smallholders. Local rural markets are thin and dominated by agents whereas trading in distant markets is not remunerative owing to high transportation and transaction costs. Besides, the farmers also face problems in gaining access to credit, high quality inputs, improved technology, information and services.

Second aspect relates to the input market. Agricultural inputs and related services are the basic requirements for agricultural sector. Raising the farm productivity depends on the quality of farm inputs and services. The steady and timely availability of farm inputs and service is very much required in order to increase agricultural growth and welfare of farming community.

Third relates to the agricultural derivatives market. Farmers do participate in the futures market, both indirectly as well as directly. They take advantage of the price signals emanating from a futures market that helps them to take decision about cropping pattern and the investment intensity of cultivation. The farmers also benefit by the dissemination of the futures prices of the Exchange traded products as it improves his bargaining capacity.

The larger lot sizes of futures contracts remains a challenge for smallholders to participate directly. However, the situation is changing slowly but steadily. With the emergence of FPOs and their increasing awareness, they are now able to hedge their price risk well in advance of the start of harvest seasons. With commodity options being available soon, farmers will be getting another instrument to hedge their risk which is cheaper and more efficient. Options would give the farmers benefit of price protection in case the price falls below their cost of production, as well as the benefit of any rise in price. This would be a better instrument for farmers than futures. All these markets being very critical for smallholders, are required to be integrated so as to serve the farmers in a holistic manner.

There must be a formal institutional mechanism that integrates these three markets with a concrete intention of making farmers successful and making agriculture sustainable for them. When derivatives market gets scaled and becomes completely integrated with physical market, the benefits of derivatives market gets integrated to physical market and in turn to farmers then it results in real empowerment of farmers.¹⁴

The integration of the spot market with the exchange is expected to add value through risk hedging and capturing better prices. There will be need to develop harmonised set of standards and quality grades to make such integration fully effective for seamless trade across platforms.

A report by NICR (an NCDEX group company) reports that farmer producer companies and cooperatives have emerged as viable aggregation vehicles for small and marginal farmers to participate directly on the NCDEX platform to realize better prices and manage risk through informed judgement. In the last 18 months, NCDEX has reached out to more than 275,000 farmers belonging to 177 farmer collectives. Farmers have received 15-25% higher net price realisation. This is in addition to the 3% savings in costs from direct market access. The higher income was made become possible through a range of multifaceted developmental activities undertaken by NCDEX to upgrade post-harvest practices and other capacity building. Farmers were motivated to undertake primary post-production activities to segregate by quality grades and were able to capture added value. Around 47,000 small and marginal farmers have successfully hedged their crops on exchanges in the last year or so (2016-17) and 1.29 lakh farmers have opened account with the exchange. This is indicative of positive response of farmers to futures trading.

5.11. Annotation

The erstwhile architecture of the marketing network does not abet the element of market to market competition. Farmers within the captive catchment of a market have no choice but to undergo exchange at prices influenced by supply to the locally determined demand.

The previously understood metric of desired market density was construed to mean having a market every 5 km of distance. However, the interpretation was derived from a maximum travel time of one hour from farms to markets. With today's network of rural roads, the one hour travel time for farmers can vary from 20 km to 40 km depending on terrain.

The Royal Commission on Agriculture (1926) held view in its report of 1928, that a twelve mile radius (19 km) represented the limits within which agricultural produce can easily flow to a market centre, when referring to direct marketing by a cultivator when transporting by own cart. Emphasis was placed on urgent need to improve roads, in order to facilitate carriage by cart and, to render great extension of motor transport.

¹⁴ NICR- Role of commodity derivatives in doubling farmers' income, June 2017

The current network of markets are advised to upgrade into an architecture that allows assembly and aggregation of produce, to interconnect with the one-nation, one-market system.

For improved linkage with domestic and international markets, as well for streamlining online trading, a pre-requisite is to have harmonised standards and quality grades.

Key Extracts

- A new market architecture is recommended to inter-connect the existing locations and allow for a seamless flow of produce to various demand centres.
- The market density is governed by travel time and not merely the geographical area covered. The entire country is the market, limited only by logistics connectivity.
- FPO must factor in the grouping together of adjoining farm land and not merely bringing together of individuals. The ills of fragmented land holding can be countered by promoting clubbing of contiguous land to take up cluster farming at village level.
- While imports prevail, particularly in case of deficit items like oilseeds, a more determined focus to promote exports should be taken up to optimise on commodities that have large surplus production.
- Futures market can be developed to provide an alternative channel, especially for village/farmer producer organisations.

Chapter 6

MSP and Procurement

There are structural constraints in the way agriculture is performed and has been understood in the country. While an efficient and effective marketing system will benefit the farmers better, given the small individual quantities of marketable surpluses and less than perfect market conditions in reality, price and market support will continue to be sine-qua-non. It is critical, that these two are strengthened.

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

Price support, and procurement whenever the prices in the market become less than remunerative, serve as effective interventions. These are two sides of the same coin – remunerative price for the farmers' produce. In a way, while price support indicates the intention of the government, market support though procurement shows its intention in action.

6.1. Price Support in Agriculture

The success of green revolution launched in the second half of the 1960s was predicated upon the triangular policy of high yielding seed, robust extension service and assured market support. As well known, green revolution began its journey from the irrigated belts of Punjab, Haryana and Western Uttar Pradesh and was largely limited to wheat and paddy. Assured procurement of these two crop-commodities linked to Minimum Support Price was a powerful incentive for the farmers, who adopted new seed and the associated basket of technology that went with it.

Till the mid-1970s the Government notified two types of price support, namely, (i) **Minimum Support Price (MSP)**; and (ii) **Procurement Price**. The MSP was intended to serve as a floor price and an assurance against risks that could arise from sharp falls in market price. The procurement price was used to undertake domestic purchases of cereals by public agencies, for the purpose of the Public Distribution System. Normally, the procurement price was higher than MSP, but lower than the open market price. This provided the farmer the choice to avail of either the price in open market, or sell to the public agencies. In fact, MSP was a floor price, meant to come into play to address the farmers' risks from any further downside in market.

Subsequently and as in practice today, MSP itself is the Procurement Price and is used as a market price benchmark. Government notifies MSPs annually for 23 commodities inclusive of 14 kharif, 7 rabi and 2 calendar year season crops. In addition to these 23 crops, Government also notifies Fair and Remunerative Prices (FRP) for sugarcane and jute.

The Government notifies MSPs based on the recommendations of an independent body, called Commission for Agricultural Costs and Prices (CACP). The CACP adopts a scientific approach to calculation of the cost of cultivation and the data for this is provided by a field

survey conducted by the Directorate of Economic and Statistics (DES) in the Ministry of Agriculture & Farmers' Welfare. The recommendations of CACP currently take into account various factors like cost of production, changes in input price, trends in market prices, demand and supply situation, inter-crop price parity, effect on general price level, effect on cost of living, international market price situation, etc. In addition, the Commission also studies expected impact on nutrition and the imputed value of family labour.

The CACP finally considers all paid out costs in respect of the above variables, called A2 and the imputed value of family labour. Thus, CACP recommendation is a function of:

A2 = Actual expenses in cash and kind, including rent paid for leased-in land.

FL = Imputed value of family labour

Further, CACP adds a certain percentage of the A2 cost as a profit margin and this together is recommended as MSP to the Government.

Table 6.1 Percentage margin of profit on A2+FL for the year 2016-17

S.N.	Commodity	MSP Rs./quintal	A2+FL Rs./quintal	Current % Margin (in practice) over A2+FL
Kharif Crops				
1	Paddy	1470	1045	40.7
2	Jowar	1625	1501	8.3
3	Bajra	1330	925	43.8
4	Maize	1365	966	41.3
5	Ragi	1725	1733	-0.5
6	Arhar (Tur) ^{^^}	5050	3241	55.8
7	Moong ^{^^}	5225	4065	28.5
8	Urad ^{^^}	5000	3584	39.5
9	Cotton	3860	2889	33.6
10	Groundnut in shell*	4220	3371	25.2
11	Sunflower seed*	3950	3479	13.5
12	Soyabean*	2775	1852	49.8
13	Sesamum [^]	5000	4188	19.4
14	Nigerseed*	3825	3366	13.6
Rabi Crops				
15	Wheat	1625	797	103.9
16	Barley	1325	816	62.4
17	Gram [^]	4000	2241	78.5
18	Masur (Lentil)!	3950	2174	81.7
19	Rapeseed/Mustard*	3700	1871	97.8
20	Safflower*	3700	3049	21.4

* Including bonus of Rs. 100 per quintal.

[^] Including bonus of Rs. 200 per quintal.

^{^^} Including bonus of Rs. 425 per quintal.

! Including bonus of Rs. 150 per quintal

The Government notifies the MSP after due consideration and makes necessary changes as it deems appropriate in the interest of the farmers. In the last few years, in order to incentivise

the pulse producers and raise the total output in the country, the Government has been providing attractive bonus over and above the MSP for pulses.

There has been a debate on the pros and cons of considering a different costing method, where Cost C2 would be the basis for determination of MSP by the CACP. Cost C2 would include the rent paid for any leased-in land, the imputed rent for the owned land, the interest on owned fixed capital, and imputed value of wages to family labour, in addition to the Cost A2. There is also an ongoing debate regarding adding 50 per cent of Cost C2, as the profit component, for determining the MSP.

Based on the MSPs notified by Government for the year 2016-17, percentage margin of profit on A2+FL (as is in vogue now) in respect of 14 kharif crops and 6 rabi crops work out as in column 5 of the Table 6.1. An examination of the table 6.1 shows that profit margin,

- is $\geq 50\%$ in case of 6 crops, namely, arhar, wheat, barley, gram, masur and mustard. In fact it is much higher in case of wheat (103.9%);
- is $\geq 40\% < 50\%$ in case of 4 crops, namely, paddy, bajra, maize and soybean;
- is $\geq 30\% < 40\%$ in case of two crops, namely, urad and cotton;
- is $\geq 20\% < 30\%$ in case of 3 crops, namely, moong, groundnut in shell and sunflower;
- is $< 20\%$ in case of 4 crops, namely jowar, sunflower seed, sesamum and nigerseed; and
- is negative in case of ragi.

Crops for which Minimum Support Price (MSP) is fixed

Kharif crops	Rabi crops	Calendar year
Paddy	Wheat	Jute
Jowar	Barley	Copra
Bajra	Gram	De-husked coconut
Maize	Masur (Lentil)	
Ragi	Rapeseed/Mustard	
Arhar(Tur)	Safflower	
Moong	Toria	
Urad		
Cotton		
Groundnut in shell		
Sunflower seed		
Soyabean		
Sesamum		
Nigerseed		

The list of crops for which government recommends MSP does not include toria (rabi season) and dehusked coconut (calendar year crop). In case of these two, MSP is calculated by linking toria to rapeseed / mustard and dehusked coconut to copra.

So far, notwithstanding increase in MSP year on year, no assured procurement is observed. The government may consider at least 50 per cent margin on all paid out costs of production,

for the notified commodities, incurred by farmers in cash or kind, including imputed value of family labour. When combined with assured procurement, for the share of production government requires to procure, this would be a good income intervention in favour of farmer, while other market interventions get implemented and lead to more optimal demand linked value realisations. From perspective of equitability, a universal coverage in terms of geography and all MSP notified crops, needs to be considered.

6.1.1. Making MSP more effective

NITI Aayog, in its study covering 36 districts in 14 States, found that a low proportion of farmers (10 per cent) was aware of MSPs before the sowing season; 62 per cent of the farmers were informed of MSPs after sowing their crops. The pricing policy of MSPs would be effective only if farmers are aware of it at the time of deciding what crops to grow. Some of the observations from the study are as follows:

- (i) Awareness among the farmers on MSP needs to be increased and the information should be disseminated timely, till the lowest level, so that the knowledge would increase the bargaining power of the farmers.
- (ii) Delays in MSP payments have negative effects on the farmers and needs to be corrected to ensure timely payments.
- (iii) As intended by the policy makers, MSP should be announced well in advance of the sowing season so as to enable the farmers to plan their cropping.
- (iv) Improved facilities at procurement centres, such as drying yards, weighing bridges, toilets, etc. should be provided to the farmers. More warehouses/silos should be set up and maintained properly for better storage and reduction of wastage.
- (v) There should be meaningful consultations with the State Government, both on the methodology of computation of MSP as well as on the implementation mechanism. The principles for fixing MSP should be current year's data and based on more meaningful criteria rather than on historical costs.
- (vi) The small and marginal farmers can be provided with some exemption in Fair Average Quality (FAQ) norms to provide them with a source of income. The Procurement Centres should be in the village itself, to avoid transportation costs to farmers.
- (vii) The MSP scheme requires a complete overhaul in those States where the impact of the scheme ranges from 'nil' to 'at-best marginal' to ensure that MSP as an important instrument of the Government's agricultural price policy is not undermined. In fact, in a few selected States in Eastern India (for instance, Assam and West Bengal), the poor impact of the scheme may be judged by the fact that none of the selected farmers were even aware of the existence of such a Scheme.

6.2. Market Support in Agriculture

It is well established, that the status of procurement linked to MSP has not been secular either in terms of crops covered or geographic spread. Taking for example, in case of wheat, of the

average of 33 per cent of marketed surplus procured, 90 per cent is accounted for in Punjab, Haryana and Madhya Pradesh. However in case of paddy, due to introduction of decentralised procurement the geographic coverage has increased to more number of states, beyond Punjab and Haryana, over the recent years.

The experience so far exhibits that procurement has largely benefited wheat and paddy growers where almost 33 per cent of the marketed surplus crop is procured. It is only over the last 3 years, that pulses have come to be procured more substantively. The year 2016-17, saw a record pulse procurement of nearly 2 million tons at MSP. The procurement of other MSP notified commodities has not been very encouraging. Minimum support prices acquire value only when they are supplemented by a robust mechanism of procurement, whenever prices are breached in the market on the negative side.

MSP is clearly intended as a safety net and not be seen as the desired economic outcome for farmers. Agricultural sector requires interventions beyond MSP so that it is optimised as a market led activity and is driven by value that is demand led. In the opinion of this Committee the farmers would eventually gain better from a more robust system of procurement rather than increase in MSPs. It is recommended, that in addition to strengthening the existing procurement schemes, more such tools be developed and deployed to enhance the support and its reach across the country & across crops, besides improving speed of response and effectiveness of procurement, in cases where prices may drop below MSP.

While this Committee emphasises on the important role of markets in transferring remunerative prices (that are more than the MSP) to the farmers, by creating an efficient market system (refer to chapters 4 and 5), it also recognizes that world over, marketing in general and agriculture marketing in particular cannot be perfect or even near perfect in the classical sense. It would be impractical to expect ideal market conditions, therefore, farmers' welfare warrants that Government demonstrates a more visible commitment for procurement across all MSP notified crops, and more particularly in case of pulses, oilseeds and nutri-cereals like sorghum, bajra, etc. This would in a way be a replay of the price & market support that paddy & wheat benefitted from, for the other crops that are more suited to less endowed production environments. Because of inefficiencies in market system, a minimum margin of 50 per cent on the cost of production is recommended for MSP based procurement. At the same time, the market architecture and marketing system must be improved, to enable farmers to capture the more optimal share of the market value of their produce. Over time, MSP should be the second choice for any farmer, with markets being the preferred method of monetising their produce.

6.2.1. Procurement Bouquet

The existing procurement mechanisms by the government are implemented under:

- **Price Support Scheme (PSS)**
 - Applicable in case of MSP notified crops
 - Intervention by DAC&FW, GoI whenever market prices fall below MSP.

- Initiated at the request of State governments, conditional upon agreeing to abide by PSS guidelines (waiver of mandi fee; gunny bags; general support).
 - Procurement limited to 25 per cent of State production estimates; but can go beyond the norm with approval of the central government.
 - Procurement by central agencies – NAFED, SFAC, FCI.
 - Open to all notified crops, but operations have been limited to pulses, oilseeds and cotton; however other crops can be assigned by government.
- **Market Intervention Scheme (MIS)**
 - To support commodities, for which MSPs are not notified - fruits/vegetables/other horti-products.
 - Owned by GoI (DAC&FW), but operated jointly by Central & State governments, in the interest of farmers.
 - Market intervention made if prevailing market prices less than 10 per cent or production more than 10 per cent compared to the corresponding figures in the previous year.
 - Initiated at the request of state governments, on they agreeing to bear 50 per cent of procurement cost.
 - GoI bears 50 per cent of procurement price (fixed by it based on cultivation cost determined by technical committee), and overhead charges.
 - Disposal, a responsibility of the State government. Profit, if any allowed to be retained by the state.
- **Price Stabilisation Fund (PSF)**
 - A scheme to protect consumers from rising prices.
 - Owned & operated by the Department of Consumer Affairs (DoCA), GoI.
 - The scheme aims at building buffer stock of pulses by purchasing from the domestic market at prevailing market rate (could be more or less than MSP). Even imports allowed.
 - In the year 2016-17, domestic procurement of 16.46 mmt of pulses at MSP undertaken in the interest of farmers-producers by a special order of the government.
- **Food Corporation of India operations for Central Pool.**
 - Wheat and paddy is procured
 - Procurement is made to meet buffer norms and for meeting targets of the public distribution system.
 - Long experience of nearly 50 years in procurement and buffer stock management to meet the demands of National Food Security Act; and Open Market operations.

Some observations on the current state of procurement implementation

- FCI intervention for procurement of wheat & paddy through its direct purchases and through decentralised procurement operations results in substantive benefit to the farmers, as an average of 33 per cent of the marketed surpluses of these two staple

cereals is purchased at MSP.

- PSS operation in case of pulses is beginning to pick up momentum only recently. In 2016-17, total procurement accounted for about 8 per cent of the total production but works to about 10 per cent of the marketed surplus. However, procurement of oilseeds at 0.66 per cent of the total production remained still low.
- Procurement of perishables under MIS is still negligible.

It is however, seen that market interventions to procure the produce, do help in creating a more buoyant price situation in favour of the farmers, even if the spread is limited.

6.3. Broad-basing Price and Procurement Interventions - New Initiatives

It is important that procurement interventions are carried out with the key objectives of:

- a) ensuring that in spite of market vagaries, the farmers still get minimum remunerative prices, i.e. at par with MSP; and
- b) correcting demand-supply situation so as to impart price equilibrium.

These twin objectives will not only ensure a minimum return to the farmers, but in the long run minimise the extent of government intervention needed, and hence enable the market forces to ensure the most remunerative prices on the farmers' produce. It would thereby also create a market environment where production would be more aligned with real market demand, and not merely with government procurement.

Appropriately deployed, most of the price and procurement interventions should have a sunset clause, where they would be phased out after reaching a predetermined production stage (where higher production is an objective), on or when a constant or similar pattern in price deficiency is observed periodically over a fixed period (e.g. three to five harvest seasons). The latter would be an indicator of unplanned crop planning and production, delinked from demand, and hence should require other kinds of intervention. If price and procurement interventions are designed to continue in perpetuity, irrespective of outcomes, they camouflage real market demand, become part of the cost structure, and thereby prevent farming systems to correct and align with actual market demand.

6.3.1. Price Deficiency Payment Scheme (PDPS)

Since markets are not in a steady state of demand and supply, the farmers face a fluctuating farm-gate price for their output. This price variation is further aggravated when other market abnormalities come into play. To mitigate the farmers from such extreme vagaries, there is an option to try out a price deficiency payment system. The concept is, that farmers are compensated for the difference between the government-announced MSPs for select crops and the actual market prices, the farmer received on selling. The differential paid is not intended on individual price basis, but against a standard benchmark linked to modal price calculated for the market over a certain period. In result, the farmer can expect a near MSP return on produce, one the differential between actual market selling price and the notified MSP is

compensated for.

The PDPS is in the nature of an assured income transfer mechanism, and is hassle free in respect to the transaction including storage. Since the farmer undertakes the transaction or exchange with existing market channels, the disposal and distribution of the produce remains in the hands of market actors and the government does not have to undertake distribution responsibilities. Therefore, since the government is not directly involved in the procurement and handling of the produce, the associated costs of disposal such as for storage and distribution is not passed on to the government. This scheme is more relevant for regions and crops where the government's MSP procurement is not being reached and where the procurement system is not geared up to meet the challenges in disposal of the procured stock.

However, the downside of such a scheme is that it does not assure sucking out of all the surpluses in production, which is essential in times of bumper yields. Inability to evacuate surpluses and correct the supply-demand position will not result in a desired price equilibrium. There is also scope for collusion amongst traders, and between traders & farmers, to keep the market prices low, since the differential will be covered by the government. Such imbalances will lead to continued market depression and will require continued government support.

The price deficiency payment scheme would be more relevant when spot markets are robust and well developed, with a well synchronised production program - stepping in on only on those occasions when yields are extraordinarily higher or demand is temporarily low. However, where there is a large market deficit, as in case of oilseeds and edible vegetable oil, this mechanism can help promote production. Since there is already a situation of high demand and short supply, there may not be a challenge to evacuate large surpluses from farms. This Committee opines that the price deficiency payment scheme (PDPS) can be adopted as an intervention for oilseeds, as one of the options.

In the long run, various typed of income assurance schemes (Basic Income Transfers, that are being advocated) including PDPS may turn out to be a good option. But it is conditional upon a robust market structure, total market integration, information symmetry across all stakeholders including farmers, and resultant fair, transparent and competitive price discovery for agricultural produce in the spot markets. Such a fair system does not exist in the country as of now, and therefore, PDPS cannot be an omnibus option for all crops.

6.3.2. Market Assurance System (MAS)

Paddy and wheat constitute the dominant cereals produced in the country. Of the total cereals output of 251 million tons in the year 2016-17, paddy at 109 million tons and wheat at 97 million tons accounted for a total of 206 million tons or 82 per cent of cereals. The public distribution system that caters to the consumer welfare under National Food Security Act entails automatic procurement of these two staple cereals.

In respect of other agri-produce, there is no such auto-trigger. The market interventions under

PSS and MIS are implemented only on the request of the States/UTs, on the basis of certain conditionality in market scenario and such intervention may not be timely, since there is a time lag between the reaction time of the State to the market scenario, sending the request to the Centre for approval and waiting for the green signal to commence actual procurement. This time lag itself may create further downward pressure in the market and undue advantage to the traders, who can purchase at low prices & stock it to make a windfall gain later.

There is need for a market intervention scheme which allows quick assessment of the local market situation and preparedness to enter whenever and as soon as when the prices start dipping below the MSP. This is possible if both the deciding authority and the procurement authority is one and the same.

Towards making such farmer-friendly interventions more meaningful, there is the need to ease certain processes that impede a rapid response mechanism. Therefore, a new instrument called **Market Assurance System (MAS)** is proposed, whose main features are:

- (a) The scheme will be directly under the State Government who can take immediate decisions on basis of local conditions, to enter the market and begin procurement through their own State agencies or any other private agency authorised by State government. State governments may also request the NAFED to procure directly on their behalf if other robust arrangements at State level are not available.
- (b) Procurement can be initiated from the farmers directly, for MSP notified commodities (except wheat and paddy), if the prices dip below MSP. States can therefore assure the farmers of procurement if the prices dip below MSP.
- (c) It shall be the responsibility of the State/UT government to procure and liquidate the procured commodity. The liquidation options would be by release into the PDS, MDM, ICDS, Hostels and ration for the State police force etc; by sale in markets; or through exports (in line with extant GoI trade policies). The profits, if generated, can be retained by the State Governments and ploughed back into a specially created corpus fund.
- (d) The States would create a corpus fund for this purpose and make all logistics arrangements to handle the procurement. The support of the Central government to the States/UTs shall be to compensate the operational loss, if any, on value of MSP, upto a maximum of 30 per cent in general areas and 40 per cent in case of North East & Himalayan States. The procurement date and MSP notified for the commodities for the year of procurement will be used to evaluate the support.
- (e) Preliminary calculations show that the Central government support of 25 per cent of MSP would be an adequate incentive for the State Governments to undertake such procurement. These calculations based on 2015-16 MSP are shown below:
 - (i) The procurement cost includes the costs of gunny bags, loading and unloading charges, commission of various agencies and market fee works out to about 8

per cent of MSP.

- (ii) Assuming that the stock is held for a certain period (normally a wait of 6-9 months would be a good period to realise higher market prices), the carrying cost per month of the procured stock would be around 1 (one) per cent of MSP. If the stock is stored for nine months, the average carrying cost would be 9 (nine) per cent.
- (iii) Assuming that procured quantity of pulses (for eg.) is sold after nine months at prices which are 8 per cent below MSP, the total cost of procurement operation works out to $8+9+8 = 25$ per cent of MSP. An additional 5 per cent is suggested to meet miscellaneous & unforeseen expenses, which takes the indicative support to 30 per cent as compensation.
- (iv) In case of NER and Himalayan States, a further latitude of 10 per cent is suggested as response to relatively more difficult situations that exist.

Hence, the Central government's assurance of providing support for a maximum of 30 and 40 per cent of the value of MSP to the State/UT governments (as the case may be) based on actual procurements seems to be adequate to incentivize the intended decentralised market assured price & procurement operations. Some of the advantages of such a scheme are:

- i. It is a decentralized system operated by the State governments, wherein they have the flexibility to decide timely response to falling markets and engage different agencies to undertake quick and timely intervention.
- ii. The State Governments will have the flexibility to discharge the procured commodities in the manner they find it most suitable.
- iii. The liability of the Central Government will arise only if the States incur losses. In all probability the stock is likely to integrate into captive channels like PDS, Mid-Day Meal Scheme, ICDS programme, ration distribution scheme for Police and similar other State requirements.
- iv. This will be a more broad-based market intervention with the strength of Centre and State pooled for the needed deployment resulting in coverage of more farmers with advantage of closely monitored efficiency at implementation level.
- v. The scheme holds the potential of favouring the cropping systems that need to be encouraged in alignment with the local agro-ecological and climatic zone requirements.

Through this proposed mechanism, the respective State/UT governments will be in an improved position to take prompt and effective action to manage any market disruption in the agricultural sector. Procedural delays for approvals will be alleviated. The operational guidelines for the MAS can be finalised in consultation with State governments and revisited through a monitoring committee every few years.

6.3.3. Private Procurement & Stockist Scheme

All the existing schemes including FCI operations, PSS, MIS and PSF as also the newly proposed MAS are primarily government owned and driven schemes. The purpose of any non-market interventions should be to offer not only the price support to the farmers, but also market support which means intervention by way of procurement in case of price falls, by purchasing the farmers produce at pre-notified MSP. This should go along with the need to provide the farmer a safety net of minimum support on his produce. The table below shows the percentage of procurements against total production for important crops/crop categories:

Table 6.2 Status of production, marketed surplus and procurement for the year 2016-17

SN	Crop / Commodity	Total production (in million metric tonnes)	Marketed Surplus Ration (MSR) for the year 2014-15	Procurement Operations		Percentage of procurement against total production
				Agency	Quantity (mill MTs)	
1	Paddy/Rice	108.85	84.35	FCI	38.65	35.51
2	Wheat	92.30	73.78	FCI	22.96	24.88
3	All pulses	22.41	85.56 to 94.38 (vary across pulses)	NAFED (PSS, PSF)	17.50	7.79
4	All Oilseeds	32.52	71.00 to 100 (vary across oilseeds)	NAFED (PSS)	0.22	0.66

There are no studies that suggest the minimum percentage of the marketed surpluses that should be procured to ensure market stability. However, it has been experienced that the trends of falling prices are reversed whenever government makes procurement interventions. It is suggested that assured procurement for important crop categories should be substantive enough to influence the market prices. Table 6.2 amplifies the high threshold of procurement achieved in case of paddy & wheat and in contrast, lower levels in case of pulses & oilseeds as a group. It is suggested, that the thresholds of procurement for pulses, oilseeds and other cereals (other than wheat & paddy) should be raised to 15, 10 and 5 per cent of the marketed surpluses, and not of the production. However, it may be appropriate to conduct a study and determine the ideal threshold levels that will help stabilise market prices.

In order to achieve such higher percentage of procurement, it is necessary to bring in private sector players to supplement the government led schemes. Hence, the Committee recommends that the MSP linked procurement be opened to private sector where the designated / empanelled enterprises chosen through a transparent bid/empanelment process are allowed to enter the market for purchase of the farmers' produce at MSP. The guidelines framed should take care, that the markets are not manipulated artificially to create a lower than MSP market situation and purchase at MSP to earn undue profits subsequently. It is hoped, that an efficient marketing system and information access to the farmers will make them well informed sellers and will, therefore, exercise the discretion to sell or hold back their produce.

Such private enterprises can be selected on the basis of their track record, corporate governance, management of agricultural produce and their targeted investments in the market procurement. The criteria need to be developed in such a manner that any number of enterprises are crowded in to participate, so that no monopoly practices are adopted that can create adverse fluctuations in the market.

The private sector players will function alongside the on- going government interventions and help broad base the procurement operations. A well designed and closely monitored private sector intervention can be made to serve the cause of consumers' welfare and farmers' welfare without an additional burden on the government exchequer. The government to that extent will also be released of inventory management as it shall be the responsibility of the designated agency to dispose of the procured commodities in the manner it wishes to, within of course the agreed framework. Such an intervention may be particularly required in regions with production surpluses but there exists no effective demand. In such areas private sector led procurement operations will create a demand and possibly influence the market positively. In such areas, the private trader should promote warehouses, processing mill (pulses / oilseeds), so that it is the processed product that is transported and not just the raw produce. Such private enterprises can be selected on the basis of their track record, corporate governance, management of agricultural produce and their targeted investments in the market procurement. The parameters need to be developed in such a manner that any number of enterprises are crowded in to participate, so that no monopoly practices that can adversely create fluctuations in the market, are probable.

Since the engagement of private sector would be conditional upon procurement at MSP, a well-designed and transparent, incentive and duty framework may be developed. The suggested contours of the proposed scheme are as follows:

- i. Each private sector entity would be free to procure MSP notified commodities from farmers at prices not below MSP, through a transparent e-market platform, on notifying the designated authority.
- ii. The minimum quantity of procured commodity would be linked to the net worth of each private entity.
- iii. The procured quantity would be maintained under the direct management of the procuring agency.
- iv. To make the operations financially sustainable, the selected entities will need to operate "for-profit". In view of this, the determination of storage, time and place for disposal, and selling prices may solely be that of the private entity at its discretion.
- v. The declared quantity procured be free of any control orders, including stocking limits. There shall be no government interference in holding/disposal of their stocks, except in accordance with the conditions as laid down in the Agreement.
- vi. The quantity procured at MSP by these entities may be considered to be exempted from import/export restrictions, such as minimum export price (MEP) or import bans. This

- will enable the entities open up the markets during bumper production and import freely during shortages. If such an open permission is held not to be feasible, then an annually agreed import-export structure may be considered.
- vii. Once procured, the stocks will be held by the private entity and sold/exported at the full discretion of the entity. The stock can also be liquidated to FCI or State agencies to meet public distribution requirements.
 - viii. To incentivise the private entities, Government may like to consider some percentage of concession on the income tax. In order to regulate such concession, the private entity should be required to maintain a transparent and audited statement of gains and losses, segregated from its other business(es). Another condition that may be required is eligibility for such a concession, till such time as the profits are retained in the procurement account.
 - ix. The procurement entities will be given priority for receiving subsidy for expanding and creation of agri-infrastructure under any existing schemes of the government.
 - x. The agencies may be allowed to procure grains, pulses, oilseeds, spices, cotton, potato and onion.

Government may also consider such other incentives like concessions on freight charges, lower GST on hired warehouses, etc. The Government may develop suitable guidelines to this effect.

A similar mechanism can be also developed for the more perishable fruits and vegetables produce. However, the perishable crop segment has a faster selling cycle and shorter holding periods, and hence procurement of such crops would require farm produce marketing organisations (FPMOs) to participate, rather than stockists.

6.3.4. Notifying a reserve price

The Committee noted that while government agencies are guided by MSP for undertaking procurement operations, whenever market prices fall before the notified MSP, there is no minimum reserve price for the private trade that is conducted at the markets. In effect, there is no benchmark to set the floor price at the regulated auctions or for other transactions. Though the producer-sellers are expected to quote a reserve price before the auction, in practice the commission agents tend to indicate the uniform rate for each commodity type for all the participants.

The DFI Committee felt the need for setting a minimum reserve price, distinct from the MSP such as to protect the interests of the farmers without distorting the market forces. In laying down a benchmark, care has to be taken to protect the free trade practices since MSP based procurements cannot become universal. It is therefore suggested that the cost of production can become such a reserve price. It is emphasised that the margin of profit which is added to the cost of production as the basis of MSP is left out in notifying the MRP. The margin of profit can be expected to be discovered through fair and competitive price discovery process linked to quality of the commodity under auction.

The reserve price can be linked to the national average A2 + F1 cost of production and the States may consider to apply a factor 'H' at state level (depending on yield gaps vis a vis the national averages).

6.4. Annotation

The farmer's welfare hinges on the effectiveness of the market system, as well on the timely and effective market support by government. Government market support has been substantial, mainly in case of wheat and rice through the assured public procurement mechanism for the Central Pool stocks, but typically limited to the benefit of farmers in a few States.

The Committee felt that the procurement based support system can be spread into other regions and crop types, while not adding to the overall cost to exchequer. Increasing the coverage of market interventions will appropriately broaden the intended impact, by distributing value to more farmers and motivate productivity across regions.

Market interventions are also triggered by price linked eventualities. The extent and time of any market intervention should aim also at normalising the fluctuations in market prices and more importantly the downslide of prices due to temporal post-harvest gluts.

Accordingly, other ongoing price triggered interventions, need to be strengthened to enable decentralised and prompt decision making, so as to make their execution effective. Delayed action to a deteriorating market situation benefits intermediaries instead of farmers, by allowing initial distress buyers to sell when the intervention finally props up the market price.

The price and procurement based interventions contributed towards higher supply and a supply driven shift towards rice-wheat consumption and cropping since the launch of green revolution in the country. The unseen consequence of this calorie-dominant food security approach has been nutritional deficiency. There is need to revisit the strategy on demand and supply, including PDS system, for balancing the nutritional security of the population. Such interventions should therefore have differentiated outcomes and appropriate sunset clauses.

The price and procurement support mechanisms should be driven by twin objectives of ensuring a minimum remuneration to farmers in inclement market situations and for aiming to bring equilibrium in demand-supply positions so that the farmers' markets will offer the best remuneration on agricultural produce.

To maximise the market support and to make the MSP mechanism more accommodating, the procurement of surpluses by private participants is recommended. Such purchase by private parties, at MSP, can be incentivised by exempting the procuring party from stock controls and allowing them to undertake onwards trade of choice. This will not only augment the market intervention when prices fall below MSP, but will also provide scope to develop secondary trade channels in the long run.

Key Extracts

- The procurement mechanism functions as an assured market for farmers, and plays a role to strategically guide the cropping patterns and incentivises production.
- There is need to broad-base the procurement intervention system, to other crops than wheat and paddy, and to other States than it currently benefits.
- Procurement of MSP notified crops can be assured at 1.5 times of all paid out costs. However, restructuring market system should continue, as for most crops, in the long run the market can provide higher margins than 50 per cent on cost.
- A floor price or reserve price for auctions at regulated markets can be implemented. The national average input cost and a hardship factor (H) can be used to establish a regionally differentiated reserve price for notified commodities.
- A new Market Assurance Scheme is proposed, that empowers the States to take immediate and relevant action to buttress a falling market situation.
- Private participation in the MSP linked procurement process is proposed and can be incentivised by exempting participants from prevailing stock limits and trade limits.

Chapter 7

Warehousing

For a bulk of agricultural commodities, safe warehousing is an important tool to counter the time-spread between demand and supply. More so, warehousing as a safe custodian of produce can allow farmers to avail of immediate exchange or credit to meet their cash flow requirements.

7.1. Background

An efficient marketing system alone, is not sufficient and cannot guarantee the desired benefits to farmers. To make an efficient system effective, in terms of utilisation, particularly for small and marginal farmers, the sufficiency condition is met by providing a mechanism that will help them to transact at choice, when they want to. Warehousing provides this opportunity and is an important tool which improves time utility and enables the farmers to avoid an immediate sale in the surplus environment that occurs at each harvest period for certain commodities. The post-harvest period results in a supply glut, in advance of demand and this manifests in a fall in commodity price. Warehousing, therefore, allows farmers to balance their supply to markets and in the interim, enables them to avail pledge finance to meet their immediate financial requirements. Warehousing availability, of suitable type and quality, makes it an important component of the agricultural marketing system.

After independence, the All India Rural Credit Survey Committee was appointed by the RBI in 1951, which submitted its report in 1954 and recommended the creation of scientific storage facilities for the farmers near their door step, not only to avoid storage losses of agricultural produce, but also to facilitate institutional credit to the farmers.

In the light of the these recommendations, a legislation on warehousing, namely, 'Agricultural Produce (Development & Warehousing) Corporations Act, 1956' was enacted which provided three tier warehousing system in the country, involving a Central Warehousing Corporation, State Warehousing Corporations and Cooperatives. In 1962, the Government of India decided to break up the Warehousing Act, 1956 into two separate Acts, the 'National Cooperative Development Corporation Act, 1962' and the 'Warehousing Corporations Act, 1962', which gave genesis to the present set up Central and State warehousing corporations in the country.

Though substantive development in warehousing took place subsequently, there was not much improvement in the status of farmers. An Expert Committee appointed by the Ministry of Agriculture, Govt. of India on 19th December, 2000 looked into the situation and recommended introduction of a negotiable warehouse receipt system in the country. The negotiable warehouse receipts were expected to make it more attractive for banks to lend to the agricultural sector, reduce transaction cost and improve price-risk management. The need for a reliable regulatory body to create a harmonised and transparent environment for use warehouse receipts, to instil confidence in financial institutions was also felt. An Inter-ministerial Task Force on Agriculture Marketing of the Government of India, suggested for establishment of a Regulatory Authority for Warehousing in its report submitted in May, 2002.

This recommendation was further supplemented by the working group of RBI on Warehouse Receipts and Commodity Futures in 2005, which recommended the introduction of negotiability in warehouse receipt system, in line with similar instruments in operation in other countries. These developments led to the enactment of the 'Warehousing (Development and Regulation) Act, 2007' and the establishment of the 'Warehousing Development and Regulatory Authority' (WDRA) with effect from 26-Oct-2010, and the negotiable warehouse receipt system was introduced in the country.

Today, there are three main agencies in the public sector engaged in building large scale storage/warehousing capacity viz., Food Corporation of India (FCI), Central warehousing Corporation (CWC) and State Warehousing Corporation (SWCs). The capacity available with FCI is used mainly for storage of foodgrains for the Central Pool Stock. FCI owns storage capacity and also hires storage capacity from other sources like CWC, SWCs and private owners. The main functions of the CWC and SWC are to acquire and build warehouses at suitable places and to operate them for storage of agricultural production, fertilizers, and certain other items including industrial goods.

The government also supports the private sector and Cooperatives in creating warehousing capacity. The Directorate of Marketing and Inspection (DMI) implements the Agricultural Marketing Infrastructure sub scheme (erstwhile rural godown scheme) of the Integrated Scheme for Agricultural marketing (ISAM). The government supports the creation of warehousing, including modern silos through a mechanism of financial incentives and assured lease rental agreements by FCI. These are enumerated in Volume-II of the DFI report.

7.1.1. Current warehousing capacity

Total storage capacity available within the country with different organizations is summarised in the following table:

Table 7.1 Total Warehousing capacity available

SN	Name of the Organization /Sector	Storage in million tonnes
1	Food Corporation of India (FCI)	35.92
2	Central Warehousing Corporation (CWC)	11.72
3	State Warehousing Corporations (SWCs) and State Agencies	45.28
5	Cooperative Sector	15.07
6	Private Sector (ISAM – rural godown scheme)	57.75
	Total	165.74

Source: WDRA Annual Report 2015-16 and DMI March, 2017

Additional 19 million tonnes is estimated created independently by private sector. Since there is no centralised database on warehousing, the storage capacity depicted from different sources is often debated. The capacity ascertained could have a level of duplication and on the other hand, some warehousing capacity created without financial support from government agencies may be unaccounted and additional. A comprehensive warehousing status survey is indicated.

The following table lists the storage capacity that has been created under the Agricultural Marketing Infrastructure sub-scheme (erstwhile Rural Godown Scheme) of the Integrated Scheme for Agricultural Marketing (ISAM) of the Ministry of Agriculture & Farmers Welfare.

Table 7.2 Warehousing created under ISAM scheme

SN	State	Total (Sanctioned)		Storage capacity created in tonnes
		No. of projects	Capacity in tonnes	
1	Andhra Pradesh	1,296	51,56,248	51,02,311
2	Arunachal Pradesh	1	945	945
3	Assam	266	7,39,357	7,35,637
4	Bihar	990	4,87,187	4,52,957
5	Chhattisgarh	642	22,27,239	19,15,488
6	Goa	1	299	299
7	Gujarat	11,326	42,89,737	39,69,118
8	Haryana	2,133	57,18,591	72,16,450
9	Himachal Pradesh	78	24,798	24,797
10	Jammu & Kashmir	14	83,027	74,572
11	Jharkhand	24	1,19,316	1,19,316
12	Karnataka	4,459	48,59,174	35,43,207
13	Kerala	205	89,907	82,328
14	Madhya Pradesh	3,758	1,02,50,369	95,52,993
15	Maharashtra	3,469	63,28,513	59,76,150
16	Meghalaya	16	21,012	20,375
17	Mizoram	1	302	302
18	Nagaland	1	814	813
19	Odisha	419	7,81,575	7,70,575
20	Punjab	1,742	67,23,746	61,78,844
21	Rajasthan	1,424	25,72,908	17,36,551
22	Tamilnadu	1,105	13,32,345	10,45,469
23	Uttar Pradesh	1,108	51,93,210	27,66,733
24	Uttarakhand	278	7,52,793	7,34,192
25	West Bengal	2,548	15,70,777	15,59,742
26	Tripura	4	25,756	25,756
27	Telangana	690	41,44,820	41,44,820
28	UTs	-	-	-
	Total	37,998	6,34,94,764	5,77,50,740

Source: DMI, as on 30.04.2017

Over the years of post-independence period, the country witnessed significant growth in warehousing capacity, the emergence of private sector in creation of warehousing infrastructure in the country and various reforms were initiated by the government for achieving the objectives. Some of this capacity may have been leased to public sector agencies

while some capacity could have moved out of agricultural warehousing.

Warehouses in India were broadly classified based on the sector to which they pertain i.e. Public Sector Warehouses (CWC, SWCs, State Civil Supply Corporation), Private Sector Warehouses (Warehouse Service Providers, Collateral Management Companies, Standalone individual Warehouses), Cooperatives (PACS, LAMPS, Cooperative, Federations, etc.). Lately, the concepts of silos, cold chains, container freight stations (CFS) and inland container depots (ICD) have been gaining importance.

Public sector warehousing has been developed with the prime objective of expansion of institutional credit to farmers through the instrument of warehouse receipt, adding to the nation's wealth by reducing wastages and losses in storage, development of storage and distribution of agricultural commodities in the country for orderly marketing and price stabilization of agricultural commodities. Better price discovery through the warehousing has been expected to facilitate commodity trading in the country.

Public warehouses are the most common type of warehouses which may provide any or all of the following services viz. grading/standardization, issuance of NWR for pledge financing, scientific preservation and quality control, inventory management, safety and security of goods kept therein, insurance of stored goods, handling and transportation, door to door delivery, and C&F documentation.

The growing number of agricultural warehouses in the country has been helpful in supplementing the existing agricultural marketing infrastructure and to maintain stocks for public distribution and strategic buffer norms. However, the farmers, particularly the small and marginal farmers, have not necessarily been able to benefit from these developments due to deficiencies in the effectiveness of these initiatives.

Studies have indicated that small farm holdings contribute about 54 per cent of marketable surplus. These farmers, for want of with-holding ability, are compelled to undertake a sale immediately after harvest, such sales accounting for about 50 per cent of the marketable surplus. Their inability to hold on to harvested stocks is largely due to financial compulsions. Another factor assessed is the lack of direct access by farmers to warehouses due to low level of initial aggregation of produce at the village level, low number of accredited warehouses for issuance of NWR and low level of post-warehousing market linkages for farmers, having little capacity to divert attention for transacting sales for small lots at a later date.

Nevertheless, warehousing is an important component of the hub and spoke model and is a large aggregation point. While the initial aggregation at primary rural agricultural markets (PRAMs) or at pack-houses is done to create a viable load to transport to markets, the warehouses are the next stage in consolidating the produce. Such consolidation can enable larger capacity transport linkages, though rail or ship, to bigger markets. On the other hand, warehouses also function as a distribution hub to feed a close by market.

7.1.2. Brief assessment of warehousing capacity requirements

A proper assessment of warehousing capacity requirement requires relevant information on current and projected cropping patterns of the storable produce, seasonality in production and on the consumption demand of the area. Further, with the opening up of the country as a unified agricultural market, the warehousing network can be expected to shift towards locations and sizes to suit bulk handling logistics linkages. The storage requirement has to be assessed while also factoring the holding life of the agricultural produce, market access including export-import policy, consumption trends, etc. Demand linked information is not readily available across various consumption points and for that purpose, the Marketed Surplus is used to assess capacity needs.

Marketed surplus is the "gross quantity of produce actually sold by the farmers" and therefore may be inferred to have a link with demand and distinct from the marketable surplus in hands of farmers. The Marketed Surplus Ratio (MSR) is worked out in proportion to the production (average over last three years) and the quantity marketed. Therefore,

$$\text{MSR} = \text{Quantity of produce actually sold by farmers} \div \text{Quantity of production}$$

Table 7.3 Marketed Surplus estimated for major crops for storage requirement

SN	Description	Marketed Surplus
1	Cereal production (2015-16)	238.81
	Marketed surplus of cereals in 2015-16 (MSR 74.36%)	177.57
2	Pulses production (2015-16)	17.62
	Marketed surplus of pulses in 2015-16 (MSR 89.94%)	15.84
3	Foodgrains total marketed surplus (2015-16)	193.41
4	Oilseeds production (2015-16)	28.52
	Marketed surplus of oilseeds in 2015-16 (MSR 82.10%)	23.41
5	Sugarcane production (2015-16)	355.54
	Sugar produced (6.34% of sugarcane milled)	22.54

Source: The source of MSR for Cereals (Wheat, Maize, Coarse Cereals) have been estimated on the average basis is Agri-Statistics at a Glance 2016. Agri-Statistics Division, Directorate of Economics and Statistics

The table reveals, that only on the basis of MSR, the annual storage requirement for foodgrains, oilseeds and sugarcane would be 193.41, 23.41 and 22.54 million tons respectively (about 240 million tons). The surplus is across the year and most of the storage is a shared resource.

Currently, the marketed surplus data is available at the aggregate level and it does not factor in aspects such as produce movement from one demand centre to another, or from one market area to other market centres. It would be appropriate, if the surplus data at market level is assessed. This will help to direct the flow of produce, for balancing supply & demand and reduce the price volatility that occurs from localised price triggers at certain locations/markets.

Table 7.4 MSR of various crop types

SN	Group of Crops	2010-11	2011-12	2012-13	2013-14	2014-15
Cereals						
1	Rice	80.65	77.20	81.51	82.00	84.35
2	Wheat	73.20	70.00	77.49	73.11	73.78
3	Maize	86.00	83.32	84.32	86.98	88.06
4	Jowar	62.03	53.46	64.14	65.25	66.64
5	Bajra	67.38	67.48	76.77	71.11	68.42
6	Barley	73.81	59.78	67.39	80.63	77.67
7	Ragi	25.73	53.25	29.53	44.11	47.60
Pulses						
8	Arhar	73.82	81.45	84.33	86.99	88.21
9	Gram	86.68	85.25	83.67	89.58	91.10
10	Urad	63.61	70.04	77.76	80.71	85.56
11	Moong	81.54	87.32	85.55	92.22	90.65
12	Lentil	77.91	88.14	88.75	90.23	94.38
Oilseeds						
13	Groundnut	93.36	90.78	93.54	95.20	91.63
14	Rapeseed & Mustard	82.14	82.08	90.41	94.49	90.94
15	Soyabean	95.69	94.41	95.32	95.23	71.00
16	Sunflower	99.58	65.62	99.18	65.42	89.14
17	Sesamum	83.18	92.79	89.00	92.91	93.80
18	Safflower	55.12	-	-	-	100.00
19	Nigerseed	83.66	94.67	97.67	-	38.25
Other Commercial Crops						
20	Sugarcane	78.90	78.02	77.84	21.62	18.94
21	Cotton	99.79	98.36	99.41	97.32	98.79
22	Jute	99.43	83.50	100.00	100.00	98.59
Vegetables						
23	Onion	97.25	75.36	99.23	99.29	91.29
24	Potato	81.04	77.40	86.17	61.35	71.51

Across crops, though the harvests are not singular events, they are limited to specific time periods, while consumption is continuous throughout the year. The holding period of each crop type needs to be evaluated and stocking period need not exceed beyond the subsequent harvest season. Since the marketed surplus is generated across seasons, the estimations made for storage requirement need to factor in the seasonality of production and post-storage distribution to be realistic. A scheduled liquidation of stocks through distribution channels will generally free up storage space for other crops or the same crop, before the next harvest.

A general analysis is that the bulk of marketed surplus of foodgrains is generated either in kharif or rabi season. In case of oilseeds, the major commodities are groundnut, rapeseed and mustard and soybean (nearly 80 per cent of total oilseed production). Mustard is a major rabi

crop and harvested during February-March. The harvesting month of soybean is October-November, i.e. coinciding with the harvest of groundnut in November, and both contribute about 55 per cent of oilseeds production. The produce normally stays for 4 to 6 months and the same storage capacity would be capable to stock the rest of the oil seeds production. Therefore, for oilseeds, the storage requirement can be assessed to be 55 per cent of the total marketed surplus. Similarly, the sugar harvesting period starts in November and closes in April. This is also the sugar mills operating period. It means, sugar production is distributed from November to April, or a 5 month period. Considering that sugar stays for 6 months at the most, then storage requirement is about 60 per cent of the manufactured sugar.

The marketed surplus of food grains is spread between kharif and rabi season, and the stocks are distributed all throughout the year. About 50 per cent of the foodgrain marketed surplus, can be considered as the needed storage capacity.

Therefore, on the broad premise that storage would be properly managed and that inventory is liquidated into markets at proper times to avoid stock-overruns across next harvest period, the requirement for warehousing can be assessed to be only about 125 million tonnes.

Table 7.5 Marketed surplus, distribution, warehousing assessment

Commodity	Marketed surplus	Ratio of surplus for warehousing	Storage required (million tonnes)
Foodgrains	193.41	50%	96.7
Oil seeds	23.41	55%	12.9
Sugar milled	22.54	60%	13.5
Total capacity needed for dry warehousing			123.1

Source: DMI assessments

As per the estimates given in Table 7.1, the total available storage capacity is 165.74 million tonnes and about 42 million tonnes (165.74 – 23.74) of storage capacity could be in excess. This also points to reports of low capacity utilisation of warehousing capacity in the country.

As per the available data about capacity utilisation of available storage in public sector (under FCI, CWC and SWC, including both owned and hired) in the South, East, North East West and North regions is 58, 60, 63, 75 and 90 per cent respectively, with average capacity utilisation across all regions being about 86 per cent. The higher capacity utilisation in northern region is also attributed to the use by the central agencies to store stocks procured by them in that region. Inputs from the private sector also indicate that idle warehousing capacity exists in the country.

There are some fundamental factors responsible for low use of warehouses by the farmers. The majority of farmers are marginal and small and may not consider it worthwhile to store the produce in a warehouse, or may be finding other alternatives, easier to manage. Further, the lack of knowledge about the mechanism of negotiable warehousing receipts and associated pledge loan for the farmers, is also a reason for the very low utilisation of warehouses by farmers.

There is also a distribution asymmetry in the warehouses and these may not have always been constructed to suit the agricultural patterns or the shift in cropping patterns that can be expected in the future. Capacity created may not be suited for proper scientific storage which is necessary for the farmers to entrust their yield into the care of a third party. States are advised to develop a District level storage plan to evaluate their existing capacity, type of capacity and carry out a need assessment for upgrading the godowns and warehouses, or to create new capacity.

7.1.3. District level planning

The agricultural produce is categorised into various groups viz. cereals, pulses, oilseeds, tea, coffee, sugarcane, rubber, fruits, vegetables, cotton, milk and other produce under livestock sector, etc. These produce types are also subject to differing holding life, short term or long term. Within these categories, many can be stored in dry warehouses, while others require specialised post-harvest pre-conditioning before entering refrigerated warehouses. See Volume-III of this report for these category-wise requirements. Prior storage, all produce requires sorting or assaying by quality for full advantage in further market connectivity. These multiple variables need to be evaluated at the decentralised level, and this is recommended as part of district level planning.

The planning for storage and any associated infrastructure, by every state needs to be based on the unique agricultural practices, local to each district. Trying to develop all districts in identical manner can prove to be counter-productive. Any of such planning will depend on the production and factor in the seasonality and consumption demand of the area and the connectivity options to the larger national market.

To assess a district plan, the MSR for each produce will give the handling capacity required during harvest season. If a produce has a holding life that is shorter than the harvest period, assess capacity needed for the reduced time period. The same capacity will be freed at end of each inventory cycle. For crops of similar nature, but with a segregated harvest season, the capacity vacated by the previous crop can be brought into use. This inventory cycling and cross-storage planning avoid capacity and cost overruns. Adding up all capacity of marketable surplus, without planning for harvest period differentiation and distribution patterns will not be efficient planning method.

7.2. Warehouse Receipts System (WRS)

The warehouse receipt (WR) is a document in hard or soft form issued by the warehouse operator to the goods owner and certifies the title to the deposited commodities, its type, quantity and quality (grades) and facilitates storage, access to credit and futures trade. The basic principle of warehouse receipt (WR) is to validate the quantity and type of goods stored in a warehouse. The quantity stored can be used as collateral to avail a loan. For such a financing system to function, the warehouse receipt needs to be trustworthy and the goods fungible.

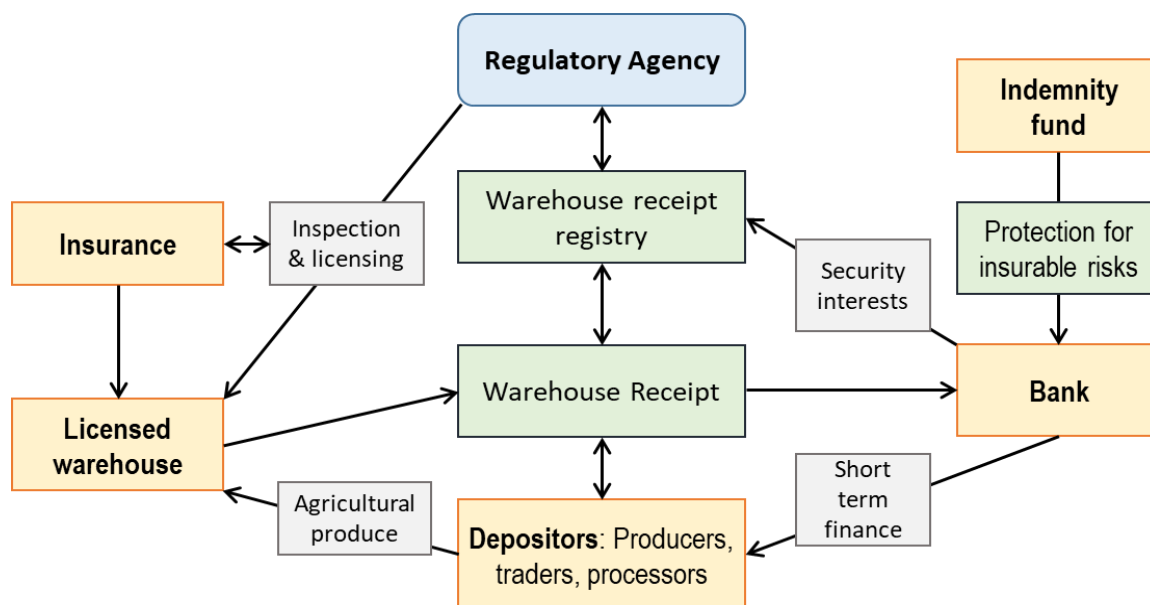
A well organised warehouse system can be helpful in improving the efficiency of agricultural

marketing through better price discovery by allowing the produce to be traded at a time of choice. With the help of an online marketing platform, the agricultural produce can also be traded at a location or with a buyer of choice. The effectiveness is however linked to the delivery of services by the warehouses, in terms of their assaying facility, the operational excellence in storing the goods and the system integration for online auction and sale of the warehoused goods.

7.2.1. Elements of a warehouse receipt system

A warehouse receipt system (WRS) enables farmers to deposit storable goods in exchange for a warehouse receipt (WR). In order to ensure that the WRS is capable of driving the desired economic advantages, an enabling legal and regulatory framework with the backup of a regulatory and supervisory agency is put in place. Warehouses would need to be licensed to safe-guard the farmers as goods owners and this is supported by insurance and financial performance guarantees. There is also need for close involvement of the banking system as stakeholders who would have to honour the warehouse receipts.

Figure 7.1 Components of a Warehouse Receipt System



A well-developed negotiable warehouse receipt finance system benefits the farmers preventing distress sale by knocking the doors of informal lending sector (that charges hefty interest rates), banks/financial institutions, insurance companies, commodity exchanges and ultimately to the rural economy.

Warehouse receipts are commonly issued when goods are stored in care of a warehouse operator. However, the loan provided against such commonly issued WR, is at normal commercial bank rates, as applicable. When the WR is in the form of a negotiable warehouse receipt (NWR), the owner of the goods can avail pledge loan at rates with interest subvention. The NWR is a fungible instrument and can itself be traded or sold to transfer ownership of goods, whilst under care of the warehouse operator. To issue an NWR, the warehouse has to

be registered with the Warehousing Development and Regulatory Authority (WDRA).

The WDRA implements the Negotiable Warehouse Receipt (NWR) System in the country. A warehouse can issue NWR once it is accredited and registered with the WDRA. As the Negotiable Warehouse Receipt (NWR) is issued in token of acceptance of goods, it therefore, carries a guarantee that the quality and quantity as described in it will be delivered to the holder of the NWR after the storage period which is also mentioned in the terms and conditions of the NWR. The NWR also provides an assurance that the goods will remain safe upto the end of the initial storage period. Obviously this can be possible only if the quality and quantity of the goods can be preserved during storage adopting scientific techniques of preservation in warehouse structures meeting the prescribed standards and having a strict supervision and security arrangements.

Registration of warehouses under the Act is optional/voluntary. Only those warehouses which intend to issue NWRs have to get registered with WDRA. Further, the registered warehouses can also issue non-negotiable warehouse receipts. As on 30th June 2017, the Authority has registered 1436 warehouses in the country.

Table 7.6 Number of warehouses registered with WDRA

SN	Agency	Warehouses registered with WDRA	Capacity (million tons)
1	CWC	185	0.68
2	SWCs	185	0.72
3	PACs	260	0.06
4	Private (including cold stores)	806	5.14
	Total	1436	6.60

The WDRA has so far notified 123 agricultural commodities including cereals, pulses, oil seeds, spices, dry fruits, tea, coffee and rubber etc. as per the standards prescribed by the Agmark, or other approved grading agencies for issuing NWRs. Besides, 26 horticultural commodities have also been notified for issuance of NWRs by cold storages.

In order to popularize the NWR system and to encourage warehouses to get registered with the WDRA, the Authority has taken the following steps:

a) Notification of New Registration Rules

The Registration Rules 2010 have been superseded by the Warehousing (Development and Regulation) Registration of Warehouses Rules, 2017. Salient features of the new Registration rules are as under:

- No accreditation required before registration. Application for registration is directly received by WDRA which get the warehouse inspected before deciding registration
- Entire capacity of a warehouse has to be registered
- One application may have more than warehouses of same applicant

- A more robust system of inspection of warehouses has been put in place.
- Registration fee ranges from Rs 20,000 to Rs 30,000 and is based on capacity of the warehouse. **For PACS and FPO the Registration fee is Rs 5,000 per application only. Similarly the total Security Deposit in case the warehouseman is a FPO or a Cooperative is kept at only Rs 50,000 (fixed) per warehouse to be furnished in the form of a bank guarantee.**
- Period of registration has been enhanced from 3 to 5 years
- Clearly defined norm specified for infrastructure, SoPs, networth and security deposit
- Security deposit norms are more realistic and dynamic in nature depending on the value of stock covered in NWRs issued by the warehouseman
- A well-defined process of surrender, suspension and cancellation of registration has been prescribed.
- Performance requirements for a warehouse during registration is now well defined.
- Authority is enabled to take over the stock of defaulting warehouses and manage/liquidate it to prevent potential loss to NWR holders
- A well-defined 'Know Your Depositor' (KYD) process
- Migration to e-NWR and linkage with a repository after a specified date is made mandatory. Rule 27 (1) of the new Registration Rules, 2017 require that with effect from such date as may be specified by the Authority, no warehouseman shall issue any negotiable warehouse receipts in physical form, and shall register with one or more repositories registered with the Authority for issuing negotiable warehouse receipts in electronic form.

b) Introduction of Electronic Warehouse Receipt System

The WDRA has taken steps to launch electronic Warehouse Receipts. The Electronic Warehouse Receipts (eNWRs) provide for **faster movement of information and automatic creation of audit trail**. eNWRs can **break barriers and promote national market** in agricultural goods to benefit farmers. Rule 27 (1) of the Warehousing (Development and Regulation) Registration of Warehouses Rules, 2017 requires that with effect from such date as may be specified by the Authority, no warehouseman shall issue any negotiable warehouse receipts in physical form, and shall register with one or more repositories registered with the Authority for issuing negotiable warehouse receipts in electronic form.

The eNWRs come with distinct advantages over the paper based receipts as under,

- help farmers / depositors to have access to a large number of buyers nationwide with better bargaining powers;
- enable multiple transfers without physical movement of goods and alternate channels of marketing to farmers and reduce the cost of intermediation for consumers;
- enable consumers (industries, processors, wholesalers, retailers etc.) to procure graded produce at competitive prices at locations of their choice;

- promote an efficient clearing, settlement and delivery system with transparency in trading of agricultural produce;
- eNWRs can be split with obligation to transfer only a part of the commodity;
- eNWRs can be traded through off-market or exchanges;
- eNWRs can be issued by Repositories and traded in commodity Exchanges. The single source of information for the eNWR will be the repository;
- eNWR has a time validity that is co-terminus with the validity of the commodity or withdrawal of the commodity fully from the warehouse, after which it expires; and
- eNWR can be auctioned under certain conditions such as loan not repaid, on expiry and delivery not taken and on damage or spoilage of the commodity in the warehouse.

c) Notification of e-NWR Regulations

The WDRA, with the prior approval of the Government, has notified the Warehousing Development and Regulatory Authority (electronic Negotiable Warehouse Receipts) Regulations, 2017 on June 29, 2017 which provides the processes for creation and further management of the eNWRs. It is also mandated that eNWR shall include all the information prescribed under Section 11(1) of the Warehousing Development and Regulation Act, 2007

d) Establishment of Repositories

The WDRA has initiated the process to establish repositories for the creation and management of electronic NWRs.

e) Enabling Environment to Implement eNWR System in the Country

In order to create an enabling environment for smooth launch of eNWRs, various measures have been taken up. These include creating online web portal, a monitoring and surveillance system and organising awareness & training programmes.

- Public content providing general information for stakeholders.
- Applications for warehouse registration, logging of warehouse inspections, quality control reporting by warehouses & regulatory reporting by repositories, logging complaints & disputes, etc.
- Online learning & certification content for various stakeholders.
- Provides functionality for analysis of regulatory reporting data to derive insights related to compliance by regulated entities.
- Training programmes for warehousemen of registered warehouses.

Following are the benefits of using negotiable warehousing receipts:

- (i) Enables farmers, as owner of the stored collateral, to access loan from financial institutions.
- (ii) Allows banks to improve the quality of their lending services and enhance their interest in financing the NWRs.

- (iii) Minimises risks and transaction costs to intermediaries and farmers in undertaking commercial operations.
- (iv) Increases the liquidity in the rural areas.
- (v) Encourages scientific warehousing of agricultural commodities.
- (vi) Lowers the cost of financing by the banks.
- (vii) Improves buffering of the supply chain.
- (viii) Assigns greater value for graded and quality produce.

In order to cover the risk factor, the goods are insured against fire, flood, cyclone, strike/riots, theft/burglary, misappropriation, fidelity guarantee, etc. if there is any danger of the same. Barring the fluctuations in price, practically all risks are covered by the warehouses. Warehousing thus ensures safe return of goods or value thereof to the depositor, thus providing a value addition to the quality of goods which makes them acceptable to the financing institutions as a credible item of exchange for pledge financing as they are sure of realising their money by disposal of underlying goods in the event of any default by the depositor.

The finance against NWR is related not only to warehousing and banking but also to the agricultural market. The agencies having integration with the market are found better equipped for disbursement of pledge finance like the collateral management service providers, APMCs and warehousing corporation. The collateral management service agencies, seem to give preference to traders over farmers, while marketing facilitating public agencies like APMC seem to focus more on small holder farmers. This is more a reflection of the business models involved. At present, majority of the APMC markets are not integrated with warehousing or cold storage facilities. Foodgrain and oilseed crops have been found to be popular from storage point of view and maximum benefits on storage have also been observed in these crops.

7.3. Strengthening Negotiable Warehouse Receipt System (NWRs)

Crop loan scheme with interest subvention extended to post-harvest on NWRs

The existing scheme provides pledge financing with emphasis on small and marginal farmer and all the farmers holding KCC against NWRs issued by all the registered warehouses including cold storages. The current limit for KCC is Rs. 3.0 lakh and automatically enhanced to 75 per cent of the price of the agricultural goods.

Publicity of the scheme

In order to help the farmers take advantage of the NWR system, sufficient publicity has to be made, in both print and electronic media, by different agencies, such as CWC, SWCs, NABARD, Cooperative Departments of the States and Banks etc. The interest subvention scheme of pledge loan against the NWRs may be advertised by the banks, highlighting the need for scientific storage, merits of NWRs and the importance for storing the produce in the WDRA-recognized warehouses/cold storages. Different extension agencies of the agriculture and allied departments should also allocate funds for such publicity.

Bank may set internal targets for lending against negotiable warehouse receipts. This may be monitored by RBI in case of commercial banks and by NABARD in case of Cooperatives / RRBs. The progress should be reported to DFS / WDRA by RBI / NABARD with action plan / action taken report, for review.

Need for full-fledged infrastructure status to storage structures

For availing benefits of concession in Income Tax, lower rate of interest on loans etc. it is recommended that agricultural warehousing should be accorded a full-fledged infrastructure status. This would include integrated pack-houses and cold stores set up at village level.

NWR as Government security under Securities Contracts (Regulation) Act, 1956

The Department of Economic Affairs, Ministry of Finance may consider and declare the negotiable warehouse receipt as Government security under the Securities Contracts (Regulation) Act, 1956 as specified in section 2 of Public Debt Act, 1944 so that the entire regulatory framework applicable to dematerialisation and transfer of “securities by NDSL would apply to NWR”.

Warehouses to be declared as Mandis

It is recommended that the Government of India may pursue the matter with all the State Governments for declaring registered warehouses to be notified as Mandis under the relevant State Marketing Act. This is provided for in the new Model ‘Agricultural Producer and Livestock Market Act, 2017. The State of Karnataka has taken initiative on this issue. In Punjab, the State Government has declared some silos as Mandis. Other States may also notify warehouses registered with the WDRA as Mandis to facilitate trade.

PPP for promoting assaying of agriculture produce

As on today, there exist number of NABL accredited laboratories are there in the private sector which are undertaking the assaying activity for export purpose. These laboratories have been approved by the APEDA. These private NABL accredited laboratories may be roped in for undertaking assaying of various agricultural commodities in the e-NAM mandis on a PPP mode or exclusively in the private sector.

7.4. Pledge Loan Scheme

The pledge loan scheme was formulated by some state governments to protect farmers against sharp fall in farm prices. The mechanism of pledge finance to the farmers is to enable them to avail credit, when the prices are low and to sell their produce, when the prices are favourable. The aim of pledge loan scheme is to protect the interests of the farmers against distress sale of agricultural produce by providing short term loan against the pledge of the produce at zero/low interest rates. The idea is to provide access to both easy credit and safe and scientific storage.

Initially, pledge loan scheme was extended by the financing banks against the State and Central Warehousing Corporations' warehouse receipts to facilitate the farmers with short term credit, when the prices of agricultural commodities are low.

However, since the godowns of State and Central Warehousing Corporations were limited and located at divisional or district level involving transportation charges, the facility was not available to all the farmers.

Subsequently, the Agricultural Marketing Departments/Boards of various States started implementing the pledge loan scheme, through their APMCs. However, due to limited storage infrastructure available with APMCs and their dependence on SWC/CWC godowns, the situation was not suitably changed by the involvement of the Agricultural Marketing Departments/Boards.

Meanwhile, the banks extending post-harvest loans under pledge finance were facing the problems of assessment of the quality of agricultural produce stored and security of the stored produce that could be pledged even at farmers' sites.

This gave rise to the emergence of Collateral Management Service providers like National Collateral Management Services Ltd. (NCMSL), National Bulk Handling Corporation Ltd. (NBHC), etc., which are being promoted by a consortium of banks and other related organisations. These Collateral Management Service Providers assay the quality of the produce, maintain and manage the produce, issue warehousing receipts and offer collateral security of the produce stored to the banks on behalf of the farmers who store the produce. They in turn charge their margin for the services provided. The banks extend pledge finance to the farmers against these warehouse receipts issued.

There is no pledge finance scheme being implemented by any agency in the States of Bihar, Jharkhand, Himachal Pradesh, Uttar Pradesh, West Bengal, Orissa, Assam, Arunachal Pradesh, Manipur, Mizoram, Meghalaya, Nagaland, Sikkim, Tripura, and Delhi.

7.4.1. Pledge loan scheme implemented by different banks

Pledge loan facility is available from commercial banks against the produce stored. The rate of interest varies across banks. The repayment period is normally up to six months, which can be extended upto one year depending upon the quality condition of the produce with the revalidation done once in three months. Some cases are discussed below.

BANK OF INDIA provides pledge loan to the extent of 70 to 60 per cent of market value of farm produce (max. Rs.50 lakh) to its non-defaulting individual farmers (owner/ tenant farmer & share cropper), group of farmers (JLGs), engaged in production of crops suitable for storage in warehouse/ godown/ cold storage/ regulated market yards, etc. at rate of interest of 1 per cent over base rate upto Rs.3 lakh, 1.5 per cent over base rate for loans over Rs.3 lakh to Rs.10 lakh and 2 per cent over base rate for loans over Rs.10 lakh to Rs.50 lakh for other than small & marginal farmers. Small/ Marginal Farmers having KCC facility get interest subvention for maximum period of 6 months up to a limit of Rs.3 lakh. The loan has to be liquidated within 12 months from the date of disbursement.

SYNDICATE BANK extends 75 per cent of the value of the produce as Pledge/Produce Marketing loan. No mortgage is required up to a loan amount of Rs.1.00 lakh. For loans above Rs.1.00 lakh, security as applicable to agricultural loans is required. However, loans up to Rs.10 lakh issued against bonds/warehouse receipts by cold storages/warehouses registered with WDRA, are extended certain relaxation in security norms and concessions in interest.

VIJAYA BANK provides loans up to Rs.10 lakh to farmers, repayable in 12 months against hypothecation/pledge of agricultural produce, including warehouse receipt.

INDIAN BANK provides loans upto 70 per cent of the wholesale market price of the produce stored in CWC/SWC or authorised or approved private godowns, with a maximum of Rs.10.00 lakh, repayable within 12 months.

IDBI BANK extends financial assistance against pledge of agricultural commodities, to farmers (min. Rs. 25,000 and max. Rs. 10 lakh), traders (min. Rs. 25,000 and max. Rs. 5 crore) and processors (min. Rs. 10 lakh and max. Rs. 100 crore) for a maximum of 12 months from the date lodging commodities or shelf life of the product.

Table 7.7 Pledge finance against produce stored in State Warehouse Corporations in different states

Year	Karnataka		Andhra Pradesh		Tamil Nadu		Kerala		Madhya Pradesh	
	Amount (Rs Lakh)	No	Amount (Rs Lakh)	No	Amount (Rs Lakh)	No	Amount (Rs Lakh)	No	Amount (Rs Lakh)	No
2009-10	55341.84	18780	Nil	Nil			2021.26	130	3395.57	1628
2010-11	51944.01	18048	Nil	Nil	19100	3599	2444.40	116	2024.87	1124
2011-12	34114.54	12072	Nil	Nil	19100	3529	2251.82	234	916.76	380
2012-13	44726.41	12986	Nil	Nil	9300	1479	3956.49	190	605.79	233
2013-14	NA	NA	291.80	145	13900	1975	4949.97	188	2469.25	509

Table 7.8 Pledge finance against produce stored in Central Warehouse Corporations in different states

Year	Andhra Pradesh		Tamil Nadu		Kerala		Gujarat		Maharashtra	
	Amount (Rs Lakh)	No	Amount (Rs Lakh)	No	Amount (Rs Lakh)	No	Amount (Rs Lakh)	No	Amount (Rs.Lakh)	No
2009-10	46911.46	7199	Nil	Nil	3554	136	288.93	57	538	139
2010-11	9764.47	7211	Nil	Nil	10639	664	126.13	17	684	171
2011-12	2082.33	1032	3212.43	346	4295	376	36.58	07	898	199
2012-13	3648.32	2409	3089.05	543	2543	102	517.63	46	1470	336
2013-14	2143.37	1439	6264.58	795	704	1328	2019.67	62	1644	390

7.4.2. Pledge loan by State Agricultural Marketing Departments/Boards

Andhra Pradesh Agricultural Marketing Department implements pledge finance scheme viz., *Rythu Bandhu Pathakam*, since 1999. The advances are limited to 75 per cent of the value of agricultural produce pledged subject to a ceiling of Rs.1,00,000/- per farmer. Interest is not charged on the loans sanctioned under *Rythu Bandhu Pathakam* for the first 90 days. Interest at 3 per cent p.a. is charged from 91st day onwards if they lift the produce within a period of 180 days. If not, a penal interest of 12 per cent is charged on loan from 91st day onwards up to

270 days; after 270 days, the APMCs have the right to dispose of the produce and recover the loan from the sale proceeds.

Wherever Agricultural Produce Market Committees do not have their own godowns or have inadequate space, pledge loan is sanctioned against the produce stored in the godowns of State/Central Warehousing Corporation. The Warehousing Corporations concerned give an undertaking to the Agricultural Market Committee that they will not allow the farmers to remove or sell the stocks without the specific and prior approval of the concerned Agricultural Market Committee.

The Karnataka Agricultural Producer Marketing (Regulation) Act provides for sanction of such short-term advances by the market committee to the producer cum seller on pledge of his produce with the market committee. This scheme is in force since 15-8-1995 in 132 regulated markets of the state. Loans up to a maximum of Rs. 2 lakhs or 60 per cent of the value of the agricultural produce, whichever is less, may be advanced to the farmers against the pledge of their commodities for a maximum of 180 days. No interest is charged for the first 90 days. Beyond 90 days, interest is charged at four per cent for amount up to Rs. 25,000; six per cent for amount between Rs. 25,000 and Rs. 50,000; eight per cent for the amount between Rs. 50,000 and Rs. 1 lakh and 10 per cent if for loans between Rs. 1 to 2 lakhs.

The Directorate of Agricultural Marketing & Agri-business in Tamil Nadu has been implementing pledge loan scheme to farmers through their regulated markets. Under the scheme, farmers can store their agricultural produce in the godowns of regulated markets for a maximum period of six months and can avail pledge loan up to a maximum of Rs. 2.00 lakhs. For the first 15 days, no interest is charged and beyond 15 days interest is charged at 5 per cent. The farmers can store their produce in the regulated market for a maximum period of 6 months.

APMCs in Rajasthan are implementing a pledge loan scheme since 1995. The pledge finance upto maximum Rs. 20,000/- per beneficiary is at interest of 6 per cent p.a. with repayment period of up to 9 months. Pledge finance up to Rs. 1.00 lakh per beneficiary is at 12.50 per cent interest p.a., for a period of 180 days. The pledge finance scheme is being implemented by Rajasthan State Warehousing Corporation. However, no pledge finance was extended for the period from 2009-10 to 2013-14. No warehouse receipts are being issued by Central Warehousing Corporation in Rajasthan for availing pledge finance from banks.

The Maharashtra State Agricultural Marketing Board is also implementing pledge finance scheme through their APMCs for the benefit of farmers. The advances range from 50 to 75 per cent of the market value of agricultural produce pledged. The rate of interest is 6 per cent for a period of 180 days. If the pledge loan is repaid within 180 days, interest subsidy at 3 per cent is extended to the farmers. Beyond six months, interest rate is 8 per cent; between 12 to 18 months, it is 12 per cent. Maximum period of pledge is 18 months.

Table 7.9 Pledge finance provided by APMCs in different states

Year	Karnataka		Andhra Pradesh		Tamil Nadu		Rajasthan		Maharashtra	
	Amount (Rs Lakh)	No.	Amount (Rs Lakh)	No.	Amount (Rs Lakh)	No.	Amount (Rs Lakh)	No.	Amount (Rs Lakh)	No.
2009-10	145.77	101	2254.04	5404	2196.01	3157	1.20	6	1727.48	NA
2010-11	207.95	150	1296.79	3024	20134.86	2817	Nil	Nil	1009.37	NA
2011-12	246.03	128	973.77	1564	1859.59	2246	Nil	Nil	895.44	NA
2012-13	503.38	193	1576.7	2815	2685.09	2381	Nil	Nil	2233.03	NA
2013-14	296.33	121	1578.63	2363	3936.56	2995	Nil	Nil	Nil	NA

7.4.3. Pledge finance by collateral security management agencies

The collateral security management agencies such as National Bulk Handling Corporation and National Collateral Management Services Limited in Andhra Pradesh, Haryana, Punjab, Rajasthan, Madhya Pradesh, Orissa and West Bengal are issuing warehouse receipts against which the banks are extending pledge loan. In some states like Karnataka, National Bulk Handling Corporation, Multi Commodity Analysts and Independent Inspection Agency etc. are providing scientific storage services at the door steps of farmers, which is being used as collateral security by the bankers for pledge loan.

Table 7.10 Pledge finance provided by collateral manager NBHC

Year	Haryana		Andhra Pradesh		Punjab		Rajasthan		Madhya Pradesh	
	Amount (Rs Lakh)	No.	Amount (Rs Lakh)	No.	Amount (Rs Lakh)	No.	Amount (Rs Lakh)	No.	Amount (Rs Lakh)	No.
2009-10	81333	151	66448	2774	89771	191	92762	571	25944	432
2010-11	56872	97	66796	2484	79088	158	74527	524	19543	233
2011-12	91593	106	51873	2708	90830	163	83052	573	16464	198
2012-13	138843	133	31954	1244	159343	192	95255	559	21737	307
2013-14	1419	157	31074	1022	176446	217	116850	612	28704	386

Pledge finance by the National Bulk Handling Corporation in different states

7.4.4. Schemes for pledge financing against electronic warehouse receipts

Electronic Warehouse Receipts represent certain quantity of a particular grade of a commodity credited in the depositor's electronic account maintained with NCDEX SPOT/approved Trading cum Clearing Member (TCM). However, for the financing bank, NSPOT is to be the single point contact agency for communication and facilitation. Each commodity deposit of a particular grade is identified with the client's ID and lot number. When a particular commodity is deposited in an accredited warehouse of NCDEX SPOT by a depositor, corresponding credit of quantity deposited is given against a particular lot number in depositor's electronic WR account. Commodities deposited in the NCDEX SPOT accredited warehouse have a validity and re-validity period. Individual account for each e-pledge shall be opened in Demand Loan segment giving full details of account like name of borrower, nature and value of security, address of warehouse where goods have been stored, insurance particulars, date of inspection etc. Separate register is maintained to depict the total outstanding against any party at any given time. Minimum amount provided is Rs.50,000 and maximum is need based. However, maximum amount will be Rs.50.00 lakh for individual farmers including SHG/JLGs and Rs.25.00 crore for sole proprietorship concerns. Rapeseed and mustard seed, soyabean, guarseed, chana, pepper, sugar and other commodities as notified by NCDEX SPOT from time to time are considered for financing. The value of the commodity as security is determined at

by taking the previous day's closing spot price on the respective exchanges, at the city/town/place where the godown is located.

7.4.5. Interest subvention scheme

Government provides interest subvention to different banks and cooperatives for short term crop loan extended to farmers at a concessional interest rate of 7 per cent per annum. An additional incentive of 3 per cent reduction in interest is provided to the farmers who repay the loan on or before the due date. Therefore, the overall interest on crop loans is available at 4 per cent per annum to farmers who make timely re-payment. The crop loan is offered to primarily address the credit requirement for the cultivation phase of activities. For further relief to farmers affected by natural calamities, an interest subvention of 2 per cent is made available to banks for the first year of restructured amount of crop loans.

While achieving high productivity and overall production in the agricultural sector has its importance, equal importance is required to prevent inopportune or distress sales. For this purpose, there is also provision for concessional post-harvest loan to small and marginal farmers against negotiable warehouse receipts (NWRs). The post-harvest loan, on the value of agricultural produce kept under pledge terms in storage, is eligible for the interest subvention of 2 per cent (same as for crop loans) for upto a period of 6 months.

This is offered only to small and marginal farmers holding Kisan Credit Card (KCC). Small and marginal farmers who have not availed crop loans through banking system, are not eligible for the concessional interest on the post-harvest loan. The Committee recommends that such farmers also be allowed a post-harvest loan on concessional rate against NWR.

It is felt that even though a small and marginal farmer may not have availed a crop loan from the banking system, either because there was no need or was earlier a loan defaulter, which situation could have changed. A change may also occur in the market circumstance after harvest, which may necessitate the need for a post-harvest loan at concessional rates.

7.4.6. Critical Assessment

The above data on pledge loans by banks and non-banking (APMC/Collateral managers) sector makes it evident that the reach of the facility is very insignificant. The factors responsible for low popularity of credit flow under post-harvest loan are:

- i. Poor awareness level of the facility among farmers
- ii. Physical availability of warehouses accessible to farmers
- iii. Small lots in hands of small farmers, having minimal facility for aggregation
- iv. Complicated procedure for getting the pledge loan
- v. Negotiability restriction under the NWR required to obtain the pledge loan.
- vi. Lack of confidence among bankers about the management at the warehouses

There is an obvious need to make farmers more aware of the pre-requisites and to extend more favourable terms for the pledge loans. As the collateral is the produce itself, suitable assaying

of quality and quantity is also necessary. For this purpose, the registration of warehouse under WDRA is a preferred option.

In the current agricultural marketing system, most of the market functionaries can access financing against negotiable warehouse receipt (NWR), issued by WDRA registered warehouses. The warehouse receipt system (WRS) has the potential to improve the access to institutional credit of farming community. Moreover, requisite number of agencies have not been identified for disbursement of pledge finance. The APMCs, State Agriculture Marketing Board can take a bigger role in addition to the banks and collateral agencies.

7.5. Strengthening Warehousing and the Pledge Loan Scheme

The pledge loan mechanism plays an important role in mitigating the ill effects of distress sale. However, though the program has been in existence for long, the effectiveness in helping the farming community has been far from satisfactory. In this context certain strategies can be prescribed as follows:

- i. The number of farmers availing pledge loan is insignificant. Efforts need to be made to enhance awareness among the farmers about the concept of pledge loan. Agro-processing industries stock produce for processing needs, and they can be involved as channels to facilitate pledge loans to farmers.
- ii. Since scientific storage of the produce is a pre-condition for the advance of the loan by regulated markets / banks, creation of scientific storage facility in rural areas, where farmers can store the produce and get warehouse receipts is essential.
- iii. There are instances of bank tie-up with private sector collateral security providers, who ensure scientific storage of the produce at farmers' door steps and provide collateral security to the bankers for the advance of loan. However, such tie-ups are seen only between the banks and collateral security agencies. Thus, it is necessary to have similar tie-ups between regulated markets and such agencies as pledge loan from market committees is more economical in terms of the rate of interest.
- iv. It is a complaint of market committee officials that they do not have adequate staff to effectively implement pledge loan scheme. It is thus required, that market committees recruit staff to exclusively deal with the scheme.
- v. The amount of pledge loan advanced by the regulated markets is generally less than the amount advanced by the banks. Thus, it is advisable that provisions are made by the respective state governments to enhance the quantum of pledge loan advanced by the regulated markets.
- vi. The regulated markets in some states like Karnataka lack scientific storage facility. As such, they depend on storage available mainly with SWC and CWC godowns. For the promotion and development of pledge loan system, it is essential that the market committees have their well-developed scientific storage infrastructure.
- vii. Small storage facilities may also be developed at village level, as proposed under the

- new market architecture, involving upgradation of sub-market yards and at proposed assembly points (PRAMs).
- viii. Develop harmonised tradable standards for use of warehousing, post-harvest pledge loans and on e-NAM.
- ix. A Credit Guarantee Fund for availing the pledge loan facility may be created by the Banks, Cooperative Departments of the States, KVKs and Marketing Boards/Market Committees. Banks may be mandated to pledge finance commodity loans upto Rs.2-3 lakhs provided it is against eNWR issued by a WDRA registered warehouse.
- i. WDRA may conduct a baseline survey of all agricultural warehousing, available for public use and categorise by technology and utility. The information on the storage capacity in various states (with FCI, CWC, SWC, cooperative sector and private sector) is not monitored or made available under one agency. In the absence of unified monitoring agency, District Level Storage Plans cannot be developed as per requirements. It is recommended to have a Single Monitoring Agency and as repository of database of warehousing capacity in the country.

7.6. Annotation

The Committee is of opinion that the government should develop comprehensive guidelines to promote and popularise warehousing as the fulcrum of the pledge loan system and electronic trading. This alone will fulfil the condition of sufficiency and make for an efficient agricultural marketing system.

It is learnt that substantive capacity of storage infrastructure built under the ISAM has been diverted for commercial use unrelated to agriculture.

In preparing the District Storage Plan, the status of existing infrastructure may be examined. Further, emphasis should be bringing adherence to the standards of WDRA, so that the storage godowns can be certified as warehouses. This necessitates, restructuring of the existing godowns to meet the desired WDRA standards and ensuring, that new constructions are in strict conformity with the standard.

Key Extracts

- Warehousing is the key to providing post-harvest pledge loans to farmers and for participating in electronic trading
- Modernisation of warehousing capacity in compliance with WDRA standards is felt necessary and new requirement is to be suitably assessed in District Storage Plan
- The seasonal nature of storage demand and commodity-specific requirements need to be delineated when preparing District Storage Plans.

Chapter 8

Value System Partnership Platform

Market linkage means correlating of various commercial activities with the aspects that define the market value of the output. The value is made accessible through a 'farm-to-fork' supply, which is made efficient only when it is guided by the 'fork-to-farm' flow of demand and the associated value.

The farm income based approach to practicing agricultural marketing demands a 'fork-to-farm' route in preference to the commonly advocated 'farm-to-fork' option. If the purpose is to transfer optimal monetary returns on his produce, the farmer would then need to grow what can sell, and reach out to the end-use point without loss of quantity and compromise on quality. Hence, the need to transit from production led agriculture to market-led agriculture.

A value system contains a permutation of organically linked value chains, integrated into a supply chain. The value system platform would be one that helps to on-board and integrate the sub-systems of multi-stakeholders from government, non-government and private sectors as working partners to meet the desired objective. The primary objective would be to strengthen market linkages of farmers, alongside the development of market yards / alternate markets, cold chains and food processing units.

For enhancing income of farmers there is a need to reduce risk, encourage investment and strengthen the supply chain. This gives opportunity to create partnership between independent value chains of the farmer's group and market players, input suppliers, financial institutions and research bodies. An important transformation is effected through integrating these value chains, with a bottom up approach from village level coordination to national level.

Given the importance of supporting the integration of value chains into holistic value systems, the Government of India had issued the framework for supporting Public Private Partnership for Integrated Agriculture Development (PPPIAD), operated under the Rashtriya Krishi Vikas Yojna (RKVY). PPPIAD is conceived as an alternative mode of implementation, which facilitates bringing in the technical and managerial capabilities of the private sector in combination with public funding, to achieve sustainable outcomes, by achieving system-wide value chain integration and attracting additional private investment in agriculture. The program is implemented under the direct supervision of State Governments. The main features and objectives at the time of conception are in the annexures.

Many state level interventions to integrate agri value chains, are supported in synergy with the PPPIAD program. World Economic Forum, under its global initiative 'New Vision for Agriculture' (NVA), is working with three states, Andhra Pradesh, Karnataka and Maharashtra, to catalyse partnerships with private professional agencies, using the PPIAD program, for such integration of disconnected value-chains into a value system that benefits the farmers.

In Maharashtra, beginning with 11 projects in 2012-13, the partnership grew to include 33 projects with more than 60 participating companies. Within three years the programme could

scale up to five lakh farmers and also brought in income improvements by 10-30 per cent. For example, in maize, farmers saved on inputs (3-5 per cent of overall cultivation costs due to direct supply of fertilizer from the private partner), saw increased yields (on average, a 35 per cent increase in yield) and received higher prices through direct sale to purchaser (minimum of 3-5 per cent higher effective sales price).

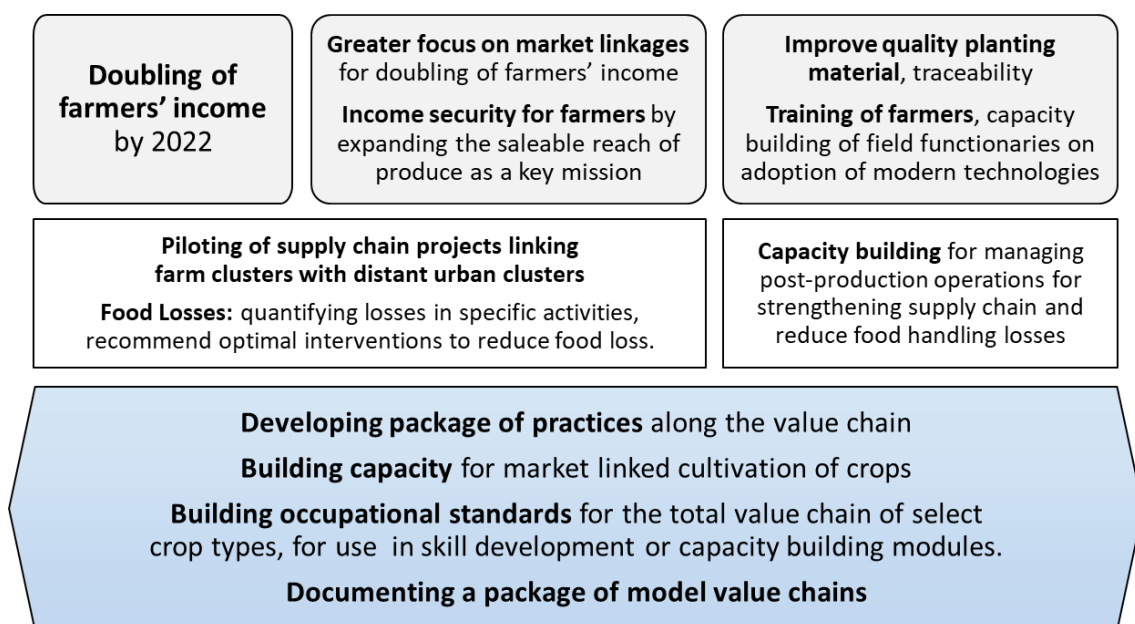
In Andhra Pradesh, the partnership platform (launched in 2016) aims to achieve double-digit inclusive agriculture growth. The state has identified 25 growth sectors – including agriculture, horticulture, animal husbandry and fishery – to support involved value-chain projects.

In Karnataka recently, the state government launched a Public-Private Partnership for Integrated Horticulture Development (PPPIHD) to improve the horticultural supply chain through technology interventions and marketing solutions. Seven projects are operational with additional five in the pipeline. The state is expanding the project beyond horticulture.

It is understood that other states including Telangana, West Bengal, Madhya Pradesh, Meghalaya and Tamil Nadu are evincing interest in this PPP model to strengthen collaboration and investment in the value chains.

Another recent example is the 'Green Innovation Centre' (GIC), an initiative in cooperation with governments of India and Germany. DAC&FW and Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) have entered into an agreement, where the GIC will intervene for two crops in select regions in Karnataka and Maharashtra. This program integrates plans to intervene in various market linked value chain segments, starting from farm management to post-production delivery. The project indicators include enhancing of farmers' income, farm productivity and employment generation in the value chains addressed.

Figure 8.1 Synergising value chain interventions with GOI priorities

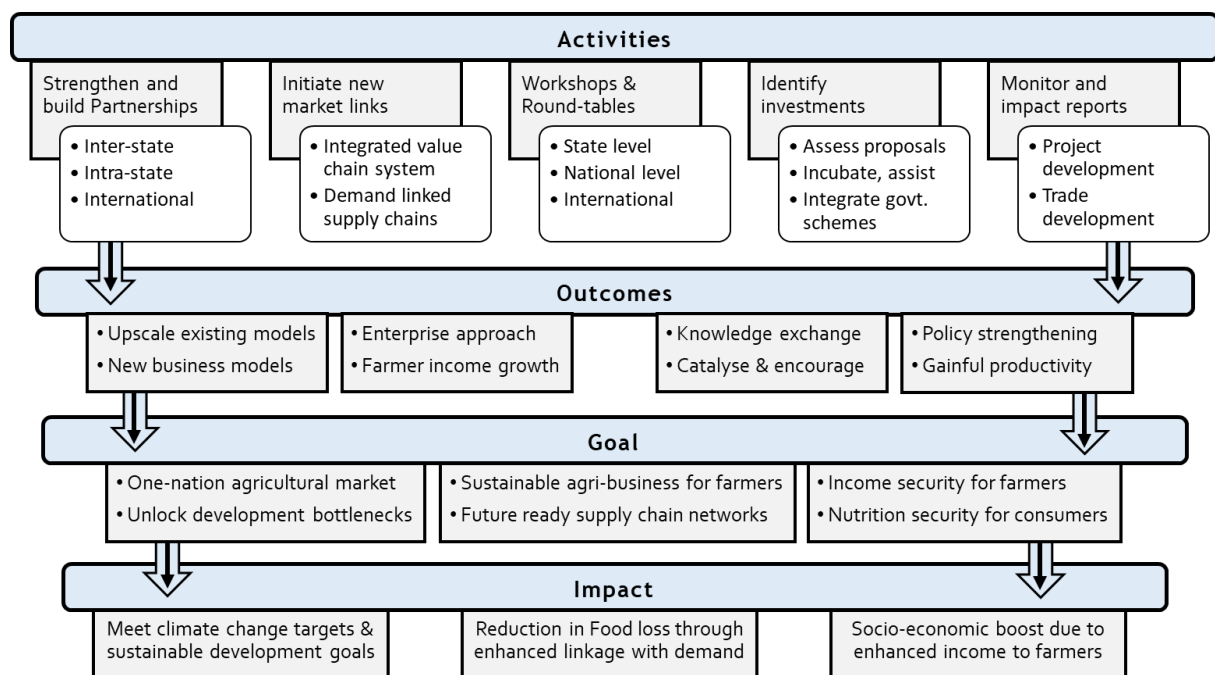


Various localised initiatives to address the inefficiencies in the value chains involved in agriculture, are in play. Interventions in the agricultural value chain system, of similar nature, are also undertaken by NGOs, foundations, international donor agencies and by commercial enterprises themselves.

A key success factor for such models has been strong leadership and co-creation, with the government setting the vision and enabling policy framework; the private sector helping to deliver on that vision through scalable and inclusive market-based activity; and key stakeholders such as farmer organisations, civil society and international organisations combining their resources and expertise. Agricultural marketing is becoming increasingly cross-geographical and needs to address the demand and supply at the unified market level. To support a transformation of the food system in India, in partnership with private sector enterprises, a national level platform will bring about concerted gains to farmers, in tandem with other recent initiatives that allow for the one-nation market to flourish.

8.1. National Agri-Value System Partnership Platform

It is recommended that at the central level, a National Agri-Value System Partnership Platform be established, to bring together the collective power of all the stakeholders in the agricultural ecosystem - the government, private companies, educational, NGOs and from research and development - to transform the sector at multiple levels.



The partnership platform will target to prioritise activities that improve farmers' income and at the same time provide food and nutritional security by enabling healthy and affordable choices across the food value chain. With the government providing and co-financing the back-end of the value chain, and the private sector and farmer contributions doing the rest, the agricultural sector can still remain as a primary engine of rural growth and poverty reduction in India.

8.2. Objectives and Scope

The objective of the Agri-Value System Partnership Platform will be to support **transformation of food system development** in India. The desired outcome of implementation of sustainable and inclusive value chain partnerships, are:

- Support the Government's vision and priorities for **doubling farmers' income** through improved productivity and market linkages.
- Provide **food and nutritional security** while enabling healthy and affordable choices across the food value chain.
- Enhance the **environmental sustainability** of agriculture and meet the challenges of a changing climate.

The scope of such a Platform will be to support both the National and State governments to catalyse investments and collaborations on projects that have multiple value chain partners, to unlock bottlenecks in implementation and scaling of such projects, and providing the enabling policy support to strengthen the agricultural marketing environment. The proposed activities at the national and state level will include:

- Brokering of new value chain partnerships at state and national levels for integration into a system-wide value chain.
- Initiation of new produce-specific cross-sectoral projects at the national level.
- Strengthening and scaling up of existing partnerships at the state level, and their collaboration across states.
- Provide an enabling policy environment through the convergence and dovetailing of various schemes and initiatives.
- Share learnings, develop capacities and promote best practice exchanges amongst states and countries.
- Develop and roll out a results based framework to monitor the overall impact on markets / trade development and take corrective action as necessary.

The platform would function under the model of public private partnership, distanced however from day-to-day functioning of the government. The PPP mode of function has potential to bring the much needed synergy in knowledge, experience and finances for triggering greater competitiveness in agribusiness. Previously mentioned, localised models through the World Economic Forum, GIZ and others, can be provided national level scale and impetus through a national level platform. The proposed platform would take up activities that will bring about:

- Greater **adoption and scaling up** of partnership model among states (“pull” factor).
- Assist in the allocation of **adequate resources** to support the state governments.
- More timely and systematic **monitoring and sharing of learnings and best practices**.
- **Convergence and alignment in relevant policies** that will enable development of larger value chain systems.

- Market linked, prioritised **identification of opportunities** for crops across states.
- **Attract new investment partners** and create more collaboration and accountability among them.

In order to guide and mentor this partnership, a steering committee comprising government, farmer organisations, NGOs, research/academic institutions, national and international development bodies, private sector and think tanks may be constituted at the level of Central Government, to be managed by a Chairman and by a Managing Director heading a secretariat. At State Level, there should be a local coordination committee again under the control of a Chairman and a CEO heading a state level executing body.

The projects taken up under this platform would aim at strategically, opening the marketing base of select crops and other produce, so as to promote the one-nation, one-market concept. Selection of projects will be done at District and Block level depending on surplus in these regions and target large cities across the country. Some examples are, marketing of fruits from North East into South India, expanding apple movement and trade from Himalayan states into other regions, opening northern Indian market for fish and marine produce from coastal regions, etc.

8.3. Governance Structure

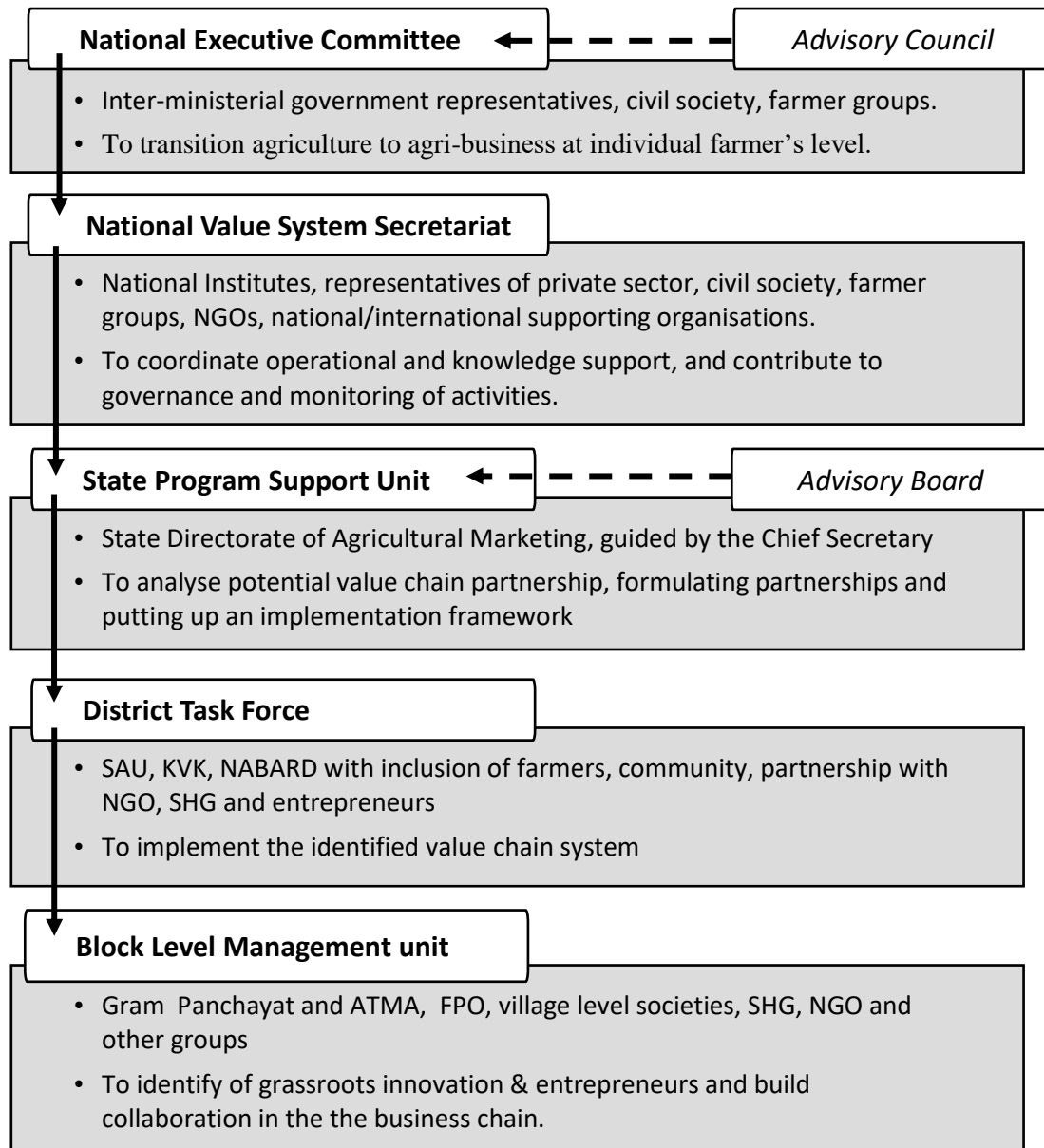
The value system partnership platform would be effected through a national level executive committee, and guided by an advisory council.

The **Advisory Council** can be a high-level body that will provide advisory support and strategic guidance on activities of the National and State Level Platforms, including input into the strategy, take decisions on matters referred to by the Steering Committee and champion and support the activities of the national platform. The Advisory Council can include:

- Government – Under Chair of Secretary, Ministry of Agriculture & Farmers Welfare, comprising Secretaries from the ministries of rural development, commerce, food processing and others, to provide direction to participating State governments.
- Private sector – Representatives from production, processing, cold-chain, retail and financial services/tech provider, industry associations like CII.
- Think tanks such as NITI Aayog and Insitutes / Centres fo Excellence from across the country.
- Multinational donor agencies and agriculture linked foundations.
- Representatives from NGOs and Farmer Producer Organisations (FPOs).

National Executive Committee: An inter-ministerial steering committee headed by an Additional Secretary of DAC&FW and senior representatives from agriculture, rural development, commerce, food processing and others and to assist in converging of government policies. The steering committee would be guided by the multi-stakeholders Advisory Council.

The Committee will provide strategic leadership, hold consultation with national and international organisations and provide guidance for new initiatives and partnerships for programmes which have potential for better returns to farmers. The Committee will also make provision for budgetary allocation for the activities and pass on to national Secretariat for execution of partnership activities.



National Agri-Value System (NAVS) Secretariat: The NAVS Secretariat will be the main executive body and support the coordination and implementation of activities undertaken. The Secretariat would provide leadership to implement the mandate passed on by Steering committee by coordination with various States of the country. It will be engaged in knowledge management activities and undertake monitoring of value chain partnerships, provide feedback to steering committee for any mid-course correction. The secretariat will act as a repository of case studies of integrated value chains, research and documents. The Secretariat will be housed with the facilitation of the Dept. of Agriculture & Farmers' Welfare. The executive head would

be a professional with private sector experience of at least 20 years in areas such as agricultural marketing/project management/logistics/market analytics. A support staff of at least 5 individuals with appropriate professional experience from private sector in knowledge management activities would be provided.

To bring about a convergence and dovetailing of Central schemes, the NAVS shall place recommendations to the Steering Committee for specific projects, so as to minimise delays and to take full advantage of extant government support mechanisms.

State level Program Support Unit (PSU): The State level coordinating executive housed under the Directorate of Agricultural Marketing to support the partnership activities in each State. A State level Advisory Board, under the chairmanship of the Chief Secretary of the State, would guide the executive. The Advisory Board would nominate a Chief Executive to the PSU. The PSU will be an independent professional agency led by the Chief Executive Officer and a team of specialists and support staff in various areas such as agricultural marketing; production technologies; capacity development; private sector development; project management etc. It will analyse potential value chain partnerships provided by district level coordinators, manage projects, broker and formalize partnerships agreements, and put in place a framework for implementation and impact study documentation. In addition to leading the project management activities and connect to National Value System Secretariat, the State coordinators will support district level coordinator for implementation. In effect the State level coordinators will implement one-nation, one-market through the partnership.

The PSU may call for the Expression of Interest (EoI) from corporates, SME and agri-startups / individuals / FPO to establish a commodity based value chain, big or small, cross regional or local with the integration of existing government interventions in the field of production, post-production, marketing and finance taken together.

The State level support to projects, through ongoing schemes, including the PPPIAD/PPPIHD program under RKVY can be coordinated through this executive body. Depending on the unique objectives and ground situation of each state, the State may opt for various interventions across produce sectors, in commercial projects. The sectors would cover animal husbandry, fisheries, horticulture, agriculture and agro-forestry.

District Task Force (DTF): The district level Task Force for project coordination can be done by experts of KVK, Agriculture Technology and Management Agency (ATMA) and NABARD (or other lead banks), to hold consultation with stakeholders, entrepreneurs, community and local governance people. The Task Force would identify and forward gaps in the value chains to the state PSU, and implement the interventions with partners. District Collector/Deputy Commissioner would be the chair of the DTF and would act as a project incubation unit. It is recommended that DTF will nominate produce specific experts as specialist coordinators and for day-to-day interface with private corporates including farmer groups as partners. DTF can do preliminary evaluation of PPP proposals and forward to the

State Level Approval Committee for further coordination by the State PSU. The DTF should also coordinate timely flow of funds from schemes to approved projects and monitor implementation timelines, deliverables and evaluation of completed projects.

Block Level Management unit (BLM): The block level coordination of activities with partnering farmers will be done by experts of KVK and ATMA and Block Development Officers. The block level coordination is required to identify potential value chains at grassroots level, identifying innovations which need to be scaled up, identifying entrepreneurs who require support. Such value chains can be earmarked to be further developed, integrated and implemented. This partnership has to be inclusive of informal groups, societies, NGO and SHG at village level. Existing interventions through various parties can also be selected for scaling up.

8.4. Begin with 100 districts

The selection of the initial 100 districts should be based on free volition. A national level interaction session may be organised with leading public & private sector corporate & trade houses, to enable consensus on their participation in the national initiative. Commodity specific value systems that encompass multiple regions can also be targeted.

The participants shall be free to choose one or more districts and adopt them as mentors. The mentors will then be responsible to work in partnership with the District Platform and shoulder comprehensive responsibility, inclusive of creating awareness, building capacities, customised training programmes, identifying products for priority integration into value and supply chain systems, delineating the total pathway, identifying the manpower & infrastructure gaps and resolving the same, advising farmers on production decisions & 'production specifications & standards' for profitable integration with the platforms, mobilisation of farmers etc.

8.5. Funding the Platforms

Funds will be required to set up, operate & manage the platforms at central, state & district levels, besides meeting the expenses on actual implementation. It would be possible to dovetail various ongoing schemes of different Ministries/Departments to meet the needed expenses. RKVY can be the primary source of funding at different levels. In addition, the Corporate/Trade bodies opting to become volunteers can be allowed to build revenue models for the activities they identify in the monitoring district as priorities for promoting them to integrate the value chains on a supply chain basis.

8.6. Operational Guidelines

The Department of Agriculture, Corporation and Farmers' Welfare (DAC&FW), as the owner department, of this initiative should adopt & share operational guidelines covering all aspects, including organisational, financial, project/platform management, etc.

8.7. Outcomes from value chain integration

It is felt that agricultural projects have inherently moved from a phase of intensive cultivation and production, towards one that requires greater integration with market demand. While the government has various supporting schemes, incentives and programs to promote holistic development in agricultural marketing system, the actual integration needs to manifest within individual projects. It is important to have a mechanism that directs such support to specific projects, in a sector agnostic manner, such that the overall value chain system has opportunity across sectors and is developed at a national level, creating cross regional connections.

The proposed National Agri-Value System (NAVS) platform is envisaged to have a systems approach and target integration of individual value chains to bring about the following benefits:

- a. Move away from disjointed sectoral schemes & programs in agriculture to well designed, commodity based integrated value chains that connect all the farmers, big or small, to their consumers - wholesalers, retailers, processors & exporters.
- b. Prepare an ecosystem of value chain systems that integrate market demand with production, post-production & finance in a seamless manner, to ensure that the planned reforms in agricultural marketing, land leasing, contract farming and farmer producer organisations, have a base in commercial enterprises.
- c. Promote greater private investment through adoption of Public Private Partnership framework across the system wide value chain for linking farmers to the market in an efficient & effective manner.
- d. For each value chain, strengthen existing extension & agricultural advisory services by promoting relevant best practices like soil management, raised bed planting, ridge and furrow method of sowing, sub-surface irrigation, precision farming, post-harvest handling, commercial negotiations, market linkages, as well as credit and insurance facilitation.
- e. Diversify the portfolio of integrated value chain systems from crops to animal husbandry, dairy, fisheries, horticulture, pisciculture, sericulture, aqua culture, mushroom cultivation to enhance the farmers' income.
- f. Develop strong institutions of farmers to get them integrated into the larger supply chains through promotion of FPOs/ VPOs / cooperatives / SHG / JLG / Trusts / NGOs and get them federated along regional or commodity based market linked enterprises.

Key Extracts

- The implementation of sustainable approach to agriculture requires a 'fork-to-farm' approach, in order to form the appropriate market linkages in agriculture.
- A national level platform to support system-wide value chain partnerships is recommended

Chapter 9

Supply, Demand and Price Forecasting

Forecasting of prices of farm commodities to augment predictability and stability of farmers' income is discussed. Pricing dynamics also stem from assessment of demand and accordingly adjusting supply.

9.1. Introduction

The instability in production due to over dependence on rainfall and climatic factors coupled with high volatility in prices have been eroding the predictability and stability of income earning capacity of farmers. Due to seasonality of production, derived nature of the supply and comparatively inelastic demand for farm products, there is a natural price variability by default in farm produce. Prices of farm produce are not only determined by local supply and demand situations but also influenced by global and exogenous socio-political factors that further exacerbate the volatility in agriculture. No country is an exception, and government intervention works alongside the free operation of market forces (i.e. supply and demand), in price discovery mechanisms of agricultural commodities.

As agricultural marketing is also characterised by policy interventions, the cost effectiveness of such interventions to minimise burden on government exchequer is crucial. What is vital is to sustain agriculture and improve the farmers' income earning capacity, including risk bearing ability in the wake of climate change on one hand volatility in the market on the other.

In this backdrop, market intelligence to strengthen the 'preparedness of farmers' to effectively face market volatility has assumed great significance.

Relevant information on future demand, price and production scenario not only assists the government but also helps the farmers, as useful **Decision Support System** to minimise risk and to augment their income. Forecasting of agricultural demand, prices and production is incorporates demand from agribusiness industries also. Such industries also establish decision support mechanisms for agri-products, which in turn translated into demand for the correlated agricultural produce. Correlating the demand with supply, also helps to optimise upon the use of ecological resources, the logistics and energy deployed, and the input costs. It thereby, also results in making agriculture greener, less wasteful and more profitable.

Hence, a framework for precise forecasting of agricultural prices, supply and demand, by developing proper mechanisms for collection, compilation, analysis of the appropriate data and the dissemination of the information has become a key objective for academicians and policy makers in India.

9.2. Theoretical Underpinnings

Forecasting is the art of predicting the likelihood of future events based on past and present information using econometric methods and models. Forecasts being quantitative estimate are frequently used as guide to public policy formulation and private decision making processes.

The crucial purpose of agricultural commodity price forecasting is to allow farmers and policy makers to make better-informed decisions and to manage various risks including price risk.

Time series analysis is usually carried out for forecasting future values. Time series data is recording on variables, like prices, rainfall, sales, etc., at regular intervals. Analysing time series data begins with an understanding of the four time series components, viz., Trend, Seasonality, Cyclical and Random variation. The trend decides the secular movements; increasing, decreasing or constant, of the series over time. The seasonal variation captures the season induced effects, the cyclical variation is the long term movement of a series similar to business cycles. The random variation in agriculture prices are due to stresses and shocks emanating from outside the system.

Auto Regressive Integrated Moving Average (ARIMA) models are class of models widely used to forecast complex data series. This model uses the past time series data of price to project the likely mean price and the volatility (range or standard deviation) for a period in future. The popularity of ARIMA model is due to its statistical properties as well as use of well-known Box-Jenkins methodology in the model building process. The technical details are in Annexure.

There are several other ways through which agriculture prices can be forecasted. Two such common methods are described briefly below:

(a) Demand and Supply Analysis: Here, by analysing demand and supply for a commodity, the end stock over the forecasting period is projected. Then changes in end-stock is related with likely changes in prices for the forecasting period. For each commodity, the end-stock is arrived at by differencing the total demand (*domestic consumption + export*) from total supply (*opening stock + production + import*). The same data is updated once in quarterly and even monthly wise. For each crop, production is estimated state-wise based on the acreage and yield. Consumption is estimated based on past trends as observed in the National Sample Survey Organisation (NSSO).

There is a strong relation between changes in end-stock and the changes in future prices. From the historic relationships between the two variables, change in price for future period is projected based on the change in end-stock. As the method is elaborate and on a continuous basis, it can capture large changes in acreage as well as in yield (due to weather or other reasons) at the state as well as the country levels. Thus, the method has potential to throw-up data which can be used to initiate remedial actions on a dynamic basis.

(b) Use of Commodity Futures: This method involves using commodities futures market to understand the forward price curve, discontinuities in price structure and interpret them with reference to the cash or ready-delivery market. This in a way deciphering futures' price and developing a view on the markets. Commodity derivatives market is in its thirteenth year in India. Several agricultural commodities – maize, soybean, soy oil, turmeric, potato, cotton, rapeseed, wheat, channa, cardamom, etc. are actively traded in

the commodity exchanges. Till now, futures contracts of above mentioned commodities are traded in these exchanges. Futures contracts indicate the most likely future spot prices on the day of expiry. Well-participated and liquid futures contracts are excellent indicators of most likely future price. Such contracts give clear trends and discontinuity in the prevailing trends.

The various methods are best suited for produce that can be safely stocked for extended durations and would not apply similarly to short life commodities, like milk, tomato, mango, etc. These commodity types will rely more on projected production instead of stock in hand, for taking up a directed supply against demand projected for optimal price discovery.

9.3. Current Status of Price Forecasting

Over the years, though the Government of India has developed an elaborate system of estimation of crop sown area, yield and production of different crops, quality and timeliness of the data poses a big challenge in precise and error free forecasting and projections. Although multiple organisations are involved in compilation, monitoring and release of prices/price indices, currently no department is involved in forecasting prices/demand officially at the national level. A few attempts under 'project mode' are being attempted. They are:

9.3.1. Agricultural outlook & situation analysis for food security

National Council of Applied Economic Research (NCAER) has been implementing this project commissioned by Ministry of Agriculture & Farmers' Welfare. The NCAER forecasts prices of key commodities for short and medium term. NCAER has been using ARIMA method to project monthly Wholesale Price Index (WPI) based on the past data series taken from the Office of Economic Advisor. Price forecast covers 17 commodities and sub-groups namely rice, wheat, jowar, bajra, maize, pulses, gram, tur, onion, potato, groundnut seeds, rapeseed & mustard, soyabean, edible oil, and food products. The NCAER also forecasts medium term prices based on Harmonic Method for major 12 agricultural commodities. Except for soybean oil, palm oil and milk for which retail prices are used in the absence of wholesale prices. Medium term forecast covers wheat, rice, tur dal, chana dal, urad dal, masoor dal, mung dal, potato, onion, sugar, soy oil and milk. The indicative Delhi wholesale price data is used for the analysis.

9.3.2. Network Project on Market Intelligence

Initiated by Indian Council of Agriculture Research (ICAR), under the National Agricultural Innovation Project, this project was for establishing & networking of Agricultural Market Intelligence Centres in India. The project was in progress for a period of five years from 2013 to 17. The aim of the project was to help farmers in taking sowing and marketing decisions based on scientific information and to get better prices for their produce ultimately. Two types of price forecasts on agriculture commodities were generated and disseminated. 'Pre-sowing forecasts' are released to help farmers on sowing and area allocation decisions and 'pre-harvest-forecast' to take decisions on whether to sell the produce immediately or store for some period for price advantage in the future.

To generate price forecast and market intelligence advisories for 34 mandatory crops, responsibilities were assigned to consortium partners in different states on the basis of share of the crops in the country's area and production. Mandatory crops of the project included paddy, wheat, maize, sorghum, cumbu, ragi, blackgram, greengram, bengalgram, redgram, soybean, groundnut, sunflower, sesamum, mustard, copra, castor, rapeseed, cotton, potato, tomato, onion, small onion, brinjal, green peas, coriander, ginger, pepper, turmeric, red chillies, cardamom, coconut and arecanut. The National Institute for Agriculture Economics and Policy (NIAP) was the lead centre along with KAU, Vellanikara; UAS, Dharwad; UAS, Bangalore; ANGRAU, Tirupati; PDKV, Akola; JAU, Junagadh; MPUAT, Udaipur; CCSHAU, Hissar; PAU, Ludhiana and GBPUAT, Pantnagar as well as a few ICAR institutes as collaborating centres.

Time series data on the commodity arrivals and prices of the mandatory crops were collected from the regulated markets identified in each state to represent the crop. The data were subjected to statistical and econometric analysis using appropriate software packages. Price forecasting tools such as Moving Averages, Seasonal Indices, Single Exponential Smoothing, Double Exponential Smoothing, Co-integration analysis and models like ARIMA, ANN, SARIMA, ARFIMA, ARCH, GARCH to the real time market data were used in the project. Among them ARIMA model was found to be the best fit for most of the mandatory crops followed by SARIMA and Exponential smoothing in occasional cases. The price forecasts generated were validated by interacting with traders, farmers, other commodity specific websites and also in futures platform. In Karnataka, the responsibility to forecast prices of rice, maize, groundnut, sunflower, onion, potato, pepper, coconut, arecanut, turmeric and ragi was assigned to UAS Bangalore, the outcome was presented briefly below:

(a) During the project period of five years UAS Bangalore has generated 101 price forecasts in the state. The predicted price was compared with actual price prevailed in the market and the validity percentage was worked out. The validity percentages ranged between 85 and 96 per cent, reflecting the robustness of the predictability. The development of information technology had positive impact on knowledge sharing. Various dissemination methods including newspaper publications, local magazines, hard copies, e-mails, websites, text SMS and voice SMS were adopted to take the information to beneficiary farmers. The impact of the forecast advisory given by the centre for selected crops was assessed. The results showed that the income of the adopters of market advisory was higher compared to the non-adopters.

(b) Besides the mandatory objectives, commodity reports on selected crops like, sunflower, arecanut, and brinjal were also prepared. Baseline survey was done to create bench mark information on key project indicators, which supported monitoring and evaluation of the project. The objectives were; (i) to understand the current knowledge on market information and market intelligence, (ii) to know their current source of market information, (iii) to establishing baseline statistics to adjust and validate the project's

planned objectives and strategies focusing on the dissemination of marketing information/market intelligence problems within the targeted domain. Four stage simple random sampling method was adopted to accomplish the above objectives. Primary data from 100 respondents were collected for the years 2008-2009 and 2009-2010.

(c) Major findings of the study were that there was not much change in the cropping pattern among the farmers in the study period. However labour shortage, institutional arrangements, deficit irrigation, anticipation of better price have enabled 35 per cent farmers to modify their cropping pattern. Better price was the single largest factor that influenced the farmer's planting/sowing decisions followed by soil and land suitability, input availability and motivation from input dealers. Regarding market and price information, newspapers and private traders were the major sources to the farmers and internet searching was not used by them. Friends and relatives, radio, TV and regulated markets were occasional sources in getting market information.

(d) All the farmers required training on market information as they lacked experience in gaining that information. Most of the farmers sold their produce at farm-gate itself to the wholesaler and near farm markets. Most were using individual mini truck or van for transportation of small lot commodities to the sale point. Farmers sell their produce through brokers and commission agents mainly in distress, due to lack of further market connectivity. Marketing cost incurred by the farmers varied among crops and the major cost involved was on their transport. Very few farmers (3 per cent) were taking on any post-production activity on the produce in the form of grading, polishing and drying. These activities allowed them to capture greater value for their produce.

Data from the respondents who were provided regular information on price forecasts of the crops assigned to UAS-B were contacted to know their opinion on market intelligence and utility of the same. Perceptions of farmers at varying degree, on the effectiveness of the price forecast in a few selected crops are summarized below:

i) Maize: Among the respondents 82 per cent agreed that price forecast positively influenced their income while 18 per cent opined that the benefit realisation was good. About 68 per cent were highly satisfied with the market intelligence, while 32 per cent were satisfied and expressed their willingness to make use of such information in future. About 82 per cent were satisfied with the quality of forecast while 14 per cent of respondents were satisfied with the type of forecast provided. Regarding their decision to follow price forecast to sell the products, it was revealed that 57 per cent would definitely follow and 43 per cent of respondents remained undecided. About 82 per cent of respondents have strongly agreed to recommend to the fellow farmers the price forecasts they obtained. Majority (57 per cent) of respondents opined that both pre-harvest and pre sowing forecast were most useful, 29 per cent opined that pre-harvest forecast alone was useful, whereas, 14 per cent of the respondents expressed that pre-sowing forecast was most useful.

ii) Ragi: Nearly 63 per cent agreed that price forecast positively influenced their income while 38 per cent agreed strongly regarding the benefit realisation. About 87 per cent were highly satisfied with the market intelligence while 13 per cent were just satisfied and expressed their willingness to make use of such information in future. About 63 per cent were satisfied with the quality of forecast while 37 per cent of respondents highly satisfied with the type of forecast provided. Regarding their decision to follow price forecast for selling decisions, it was revealed that 25 per cent would definitely follow and 75 per cent of respondents agreed to follow the advocacy. About 75 per cent and 25 per cent of respondents 'strongly agreed' and 'just agreed' respectively to recommend to the fellow farmers the price forecasts of the centre. Majority (62 per cent) of the respondents opined that pre-sowing forecast was the most useful and 38 per cent opined that both pre-sowing and pre-harvest forecasts were useful.

iii) Red gram: Almost 79 per cent agreed that price forecast positively influenced their income while 21 per cent agreed strongly that the benefit realisation was good. About 48 per cent were highly satisfied with the market intelligence while 52 per cent were 'just satisfied' and expressed their willingness to make use of such information in future. About 69 per cent were satisfied with the quality of forecast while 31 per cent of respondents highly satisfied with the type of forecast provided. Regarding their decision to follow price forecast for selling decisions it was revealed that 69 per cent would definitely follow and 31 per cent of respondents agreed to follow the advocacy. About 79 per cent and 21 per cent of respondents 'strongly agreed' and 'just agreed' respectively to recommend to the fellow farmers the price forecasts of the centre. About 40 per cent of respondents opined that both pre-harvest and pre-sowing forecasts were most useful, 35 per cent opined that pre-harvest forecast was useful, whereas, 25 per cent of the respondents expressed that pre-sowing forecast was the most useful.

iv) Banana: Similarly, 82 per cent agreed that price forecast positively influenced their income while 18 per cent agreed strongly that the benefit realisation was good. About 75 per cent were 'highly satisfied' with the market intelligence while 25 per cent were 'just satisfied' and expressed their willingness to make use of such information in future. About 90 per cent were satisfied with the quality of forecast while 10 per cent of respondents highly satisfied with the type of forecast provided. Regarding their decision to follow price forecast for selling the produce, it was revealed that 85 per cent would 'definitely follow' and 15 per cent of respondents agreed to 'just follow' the advocacy. About 82 per cent and 18 per cent of respondents strongly agreed and agreed respectively to recommend the price forecasts of the centre to the fellow farmers. Since the centre is giving weekly forecast, majority of farmers (75 per cent) were highly satisfied with the price forecasts received and the remaining 25 per cent opined that they would follow after ascertaining the quality and reliability of the forecasts.

v) Potato: Around 75 per cent of the beneficiary farmers agreed that the price forecast has marginally helped in getting better prices in the markets. Almost 89 per cent of the farmers were highly satisfied with the market intelligence while 11 per cent were satisfied and expressed that due to delayed rain they have shifted the area from potato to ginger. Nearly 82 per cent were 'just satisfied' with the quality of forecast while 18 per cent of respondents were

'highly satisfied' with the type of forecast provided. Regarding their decision to follow the price forecast for selling of commodities, it was revealed that 57 per cent would definitely follow and 43 per cent agreed to follow. About 82 per cent and 18 per cent of respondents 'strongly agreed' and 'just agreed' respectively to recommend to the fellow farmers the price forecasts of the centre. Majority (75 per cent) of respondents opined that both pre harvest and pre sowing forecasts were most useful, 20 per cent agreed that pre harvest forecast was useful, whereas very few (5 per cent) found that pre-sowing were also useful.

Indian Institute of Horticulture Research (IIHR), Bangalore was also a partner in the Network Project to generate and disseminate Market Intelligence for few horticultural commodities. Through the project, arrivals and prices of tomato were analysed using econometric methods such as ARIMA. The predicted prices were provided every season to farmers of Kolar, in Karnataka prior to sowing and harvest. These predicted prices were found to be accurate to the extent of 90 per cent in comparison with the actual market prices discovered later on and thereby benefitted both farmers and traders in taking informed marketing decisions in the region. In addition to tomato other horticultural crops such as onion, grapes and pomegranate were also covered under the program. The researchers have opined that simple ARIMA methods may not give accurate forecasts. In spite of difficulties in getting the data in required form it is advocated to include **exogenous variables** like weather parameters to enhance the adequacy of the model. Similar results were found in other network centres where ever the forecasts were done appropriately. The NIAP project ended in March, 2015.

9.3.3. Project to forecast prices of major 19 agricultural commodities

This network project was initiated during 2015-16 in Karnataka with financial assistance from Karnataka State Agriculture Marketing Board, Bangalore. The responsibility was assigned to 3 Agriculture Universities located at Bangalore, Dharwad and Raichur. The commodities selected were paddy, sorghum, maize and ragi under cereals; bengal gram, red gram, green gram and black gram under pulses; groundnut, sunflower and soybean under oilseeds; dry chillies, cotton, coconut, arecanut and turmeric under commercial crops; and tomato, potato and onion under vegetable crops.

Rigorous time series econometric models like, Moving Averages, Single exponential Smoothing function, Double exponential Smoothing function, Holt-Winters Model, Auto Regressive Integrated Moving Averages (ARIMA) and Artificial Neural Network (ANN) models were used. Depending of the lowest **Mean Absolute Per Cent Error (MAPE)** values, the best suited models were selected for determining the price forecasts. The results of the models were taken as the base for further post-analysis diagnosis.

Apart from forecasting, traders' survey, consideration of future market prices, changes in the government policies, weather changes, import and export situation, prices of competitive commodities and a shift in the crop area at district, state and country levels were considered in the Post-analysis diagnosis. In this way study further fine-tuned the methodology to encompass several markets for individual crops.

The price forecasts were released during the 1st week of every month for the next eight weeks. After the release of the price forecasts, dissemination of market intelligence were also carried out through television and FM Radio. Publications through print media in two periodicals related to agriculture; *Krishi Munnade* and *Vyavahaara Jagattu* was also made regularly. The validity of the forecasts were done through comparing the price differentials between the predicted and actual price range in the course of time. The validity of the forecasts were worked out which indicate a near prediction in crops like paddy (75-100 per cent), redgram (73-96 per cent), groundnut (83-100 per cent) cotton (92-100 per cent) and bengal gram (94-100 per cent) while the forecasts were weak in the case of black gram for Mysuru market. The market intelligence in the form of price forecast was preferred by a number of farmers and used while deciding cultivation of commercial crops such as oilseeds, pulses and vegetables. A number of enquiries were received soon after the telecast of the price forecasts over Doordarshan TV. Besides prices, the farmers also were eager to know the area under the crop and the expected production. Farmers had expressed their willingness to receive the messages even on their phones in case it was provided as they were already receiving the SMS on current prices in selected markets.

9.4. Case Study - initiatives by KAPC

The Government of Karnataka constituted the Karnataka Agriculture Prices Commission (KAPC) as an advisory body to deal with aspects of scientific costing and pricing of farm produces, competitive market structure and all other issues related to farmers', income and welfare in the state. In order to accomplish the major mandate of timely dissemination of market intelligence and information to policy makers as well as to farmers a project was assigned to School of Food Business, Dairy Sciences College Hebbal Campus, Bengaluru coming under Veterinary University (KVAFSU) Bider, to construct an Interactive Dashboard for real-time prices forecast for principle agriculture and horticultural commodities of Karnataka. Accordingly the dashboard was designed & developed as 'Decision Support System (DSS)' with the active support a Bengaluru based software company.

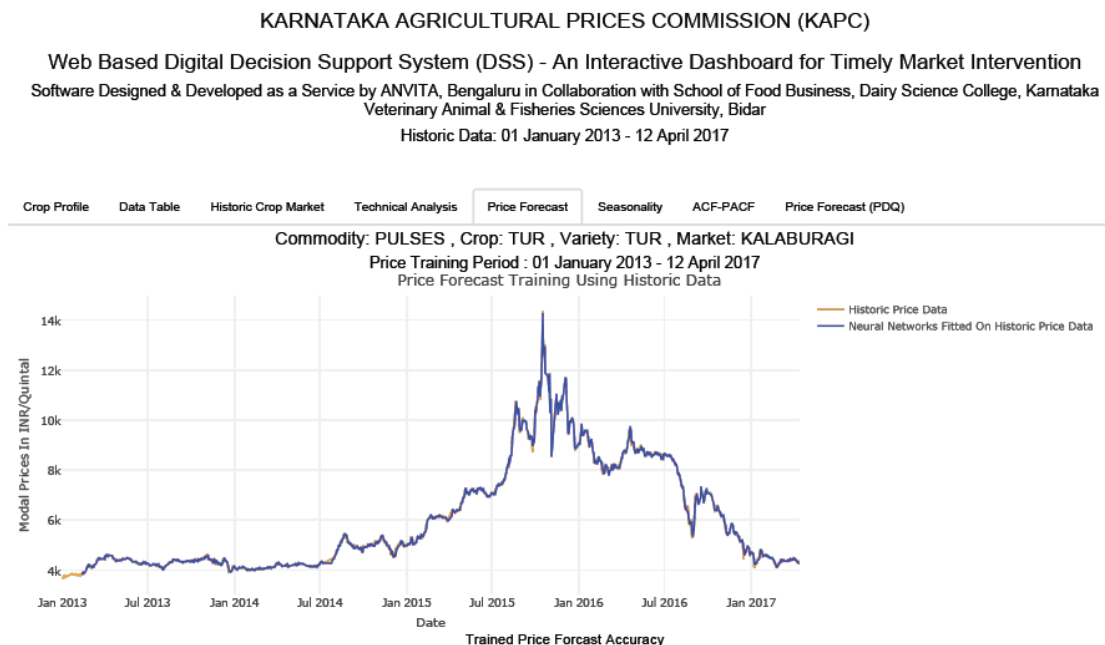
Other objectives were to design statistical learning models for analysis of available agriculture & horticulture prices & arrivals data and to facilitate comparison of the crop forecast prices with cost of production, market prices as well as minimum support price (MSP) for selected 25 crops, to begin with.

Monthly price data was obtained from government of Karnataka website: Krishimaratavahini and AgMarkNet of government of India for twenty-five selected crops from the 1st January 2002 to 12th April 2017. As the quality of the data was a concern, manual data cleaning and pre-processing to required format were performed. Designing of univariate statistical methods through ARIMA, artificial neural networks, and technical analysis for crop prices and seasonality index for arrivals were undertaken. The mean absolute per cent error (MAPE) was kept minimum thereby leading to accurate crop prices forecast trends. And finally, automation of the methods for selected crops and the interactive dashboard for better and ease of

visualization of the results were developed.

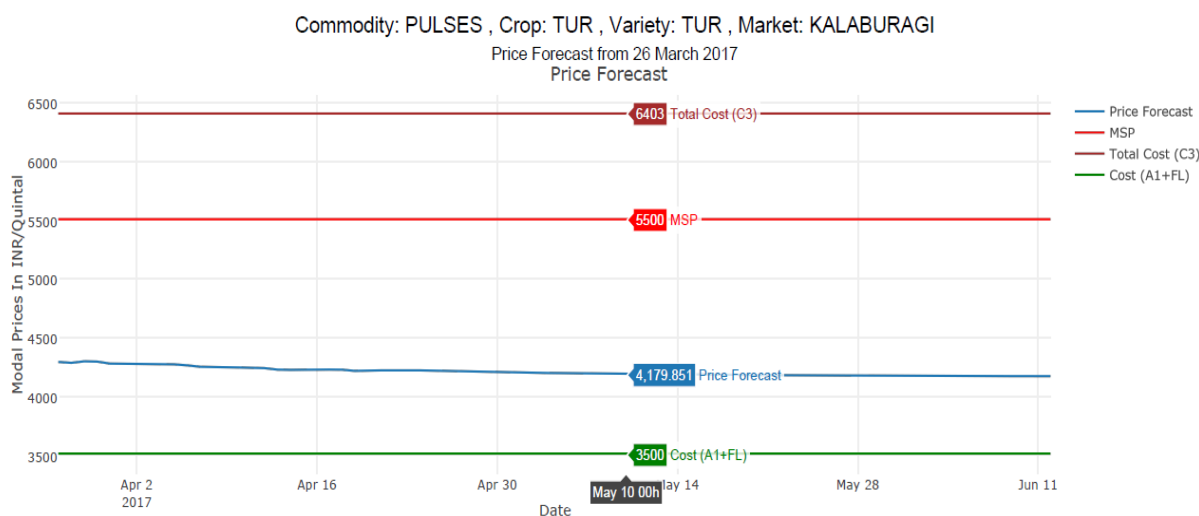
The model provided accurate forecast of price trends compared with current market data. Figures below obtained from the dashboard depict the price trends of actual and predicted data.

Figure 9.1 Price Forecast Training Using Historic Data



Dash board so envisaged serves twin purposes of predicting the future prices as well understanding behaviour of the market for any government intervention programs. As a first step, as shown in Fig 17 forecasted values are superimposed on actual data which are almost moving in unison depicting the accuracy of the model.

Figure 9.2 Price Forecast, MSP, and Cost



In Fig 18 forecasted price of Tur in Kalabuargi market is compared with the prevailing MSP and cost of cultivation of that crop. The forecasted price was much higher than the cost of production actually borne by the farmers plus imputed value of family labour (called Cost A₁

+ FL under CACP parlance) during forecasting period.

There was no likelihood of prices catching up with MSP notified by Government, let alone covering the total cost of production (C₃) that includes rental value of own land and managerial cost. This indicated a shortfall in the market intervention.

Such forecasts are not only a precautionary to farmers but also a pointer to government to undertake procurement operations till market price picks up. Accordingly, the government of Karnataka procured record 32 lakhs quintal Tur from farmers in the current year. Despite the intervention, the prices are yet to be stabilised owing to other exogenous factors.

Figures 20 & 21 indicate seasonality of arrivals along with price trends which help in understanding critical time periods for close watch on market behaviour for necessary action..

Figure 9.3 Arrival Seasonality Index

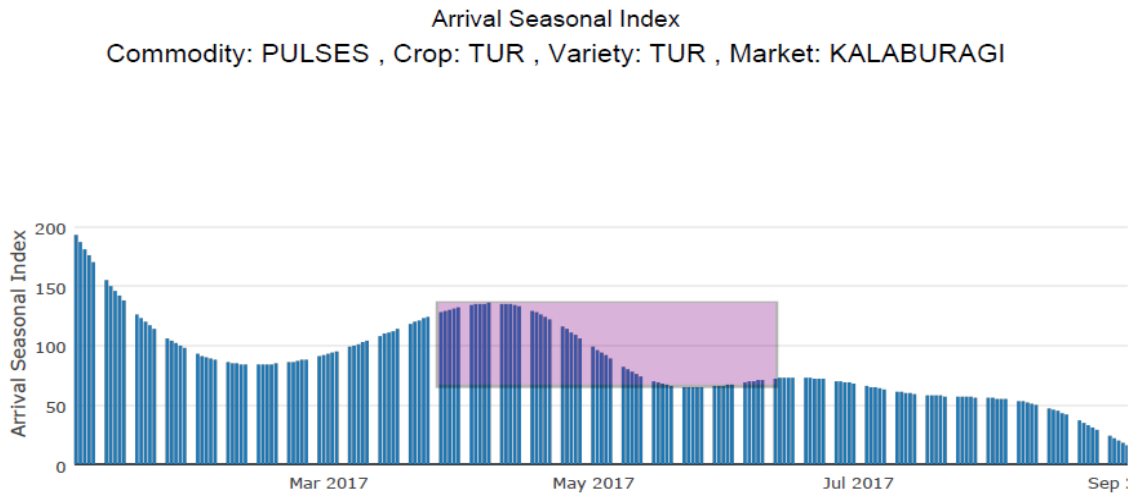
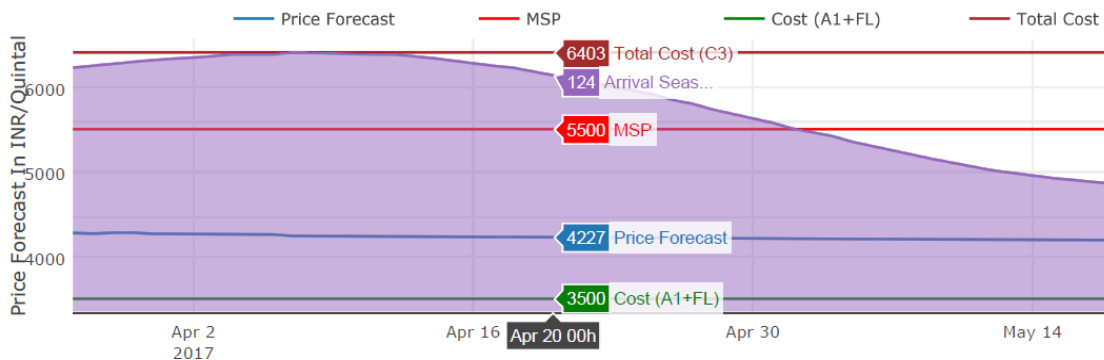


Figure 9.4 Price, Costs, MSP and Arrival Seasonal Index Superimposed

Commodity: PULSES , Crop: TUR , Variety: TUR , Market: KALABURAGI
2017-03-26 to 2017-06-12



In this way, the dash board becomes an effective **Decision Support System** (DSS) tool for policy makers to keep a watch on the market situations to take necessary interventions and policy measures to stabilize the price as well as income earning capacity of farmers.

9.4.1. Collaboration with Experts

At present, forecasting prices of a commodity is based mostly on the historical price data of the same commodity. However, need of the day is to project likely production along with forecast the price of an agriculture commodity using a dynamic models that incorporate all possible explanatory factors. In addition to historical prices, array of factors such as yield, rainfall, temperature, stocks, trade (imports and exports), unforeseen factors like political uncertainty, strikes, etc. influence future price and production of a commodity which need to be considered while designing Multivariate Models.

Indian Institute of Management- Bengaluru (IIM-B), has envisioned to lay the foundation for a long-term collaboration with Karnataka Agriculture Price Commission (KAPC) in this regard. The key objectives envisaged are:

- **Development of Supply Projection Model** using all relevant variables as a critical tool for governmental agencies to plan interventions to ensure proper pricing and adequate supply and execute futures contracts for crop prices, crop import and export at a state-level.
- **Price Forecasting Model** to help farmers in determining the right choice of crops and to take corrective measures mid-season if the choice of crops cultivated doesn't work out.
- **Area Estimation Model** both for the supply projections and price forecasting models. Currently, the techniques used to estimate area under cultivation are manual and inaccurate.
- **Demand Projection** by making use of Advance estimates that the Directorate of Economics & Statistics publishes periodically relating to production of agricultural commodities along with the historical data on production and prices of different agricultural commodities.

The KAPC has initiated a project in association with Microsoft India limited in this regard. It is proposed to involve all relevant institutions including SAUs and IIM-B to develop multivariate models that will cumulatively form a tool that can be integrated into the existing KAPC dashboard. The models are thematically presented in the diagram below:

An initiative by establishing network of premier institutes like IIMs, IITs, ICAR centres, SAUs and other public sector bodies is needed in all states as well as in the Centre that would go a long way in further systematizing farm commodity price forecasting and supply projection endeavours in India.

9.4.2. Collaboration with private sector

Karnataka State Department of Agriculture entered into an MoU with Microsoft India Ltd to undertake an ambitious project, under the overall supervision of KAPC, for projection of supply and forecasting of prices of important farm commodities by developing Multivariate Models. The model proposes to incorporate apart from prices, other exogenous variable like weather, rainfall, trade and so on mentioned above. The output that emerge from the above collaboration will be displayed through KAPC dashboard.

Major challenge in this endeavour effort is to collate realistic information on above mentioned multiple variables on both spatial and temporal spread, defining the likely impact of these factors to adopt them for machine learning so that synthesised likely scenario or outlook for a given commodity is arrived at.

This effort calls for use of Information and Communications Technology (ICT) and more specifically Cloud-Based Technologies that are relevant to build robust platform services leveraging Machine Learning based Models.

9.4.3. Web and Android based software

The KAPC is also attempting to develop web and android based software for online as well as offline collection and analysis of field data pertaining to cost of cultivation and marketing of major agricultural and horticultural crops of Karnataka. This initiative involves five Agriculture and Horticulture universities in Karnataka along with a Bengaluru based private software company. The structured data that is collected can be utilised to compute accurate costs, production and return estimates for agricultural and horticultural crops automatically without any manual intervention.

The results will be used online for supply projection and price forecasting under envisioned multivariate models. This way, over the course of time, it is intended to have the software customised to capture relevant data that can generate reports for farm planning and budgeting analysis, inventory analysis, cost and return analysis with traceability metrics while identifying and spreading best farming practices with price forecasting so as to address the issue of enhancement of farmers income in a most precise way.

9.5. Limitations and Remedies

There are limitations to such analysis and assessments depending on quality, type and harmonisation of data

9.5.1. Quality of Time Series data

The Committee for Forecasting Prices, headed by Chief Economic Adviser that submitted its report in November 2016, pointed out several lacunae pertaining to the quality of the data related to arrivals and prices of farm commodities generated by the Directorate of Economics and Statistics, and other agencies in India. The key issues raised are:

- a) At present multiple agencies are collecting arrivals and prices data at the centre and state levels resulting in duplication of efforts.
- b) Data from different sources can't be compared for want of uniformity in concepts, commodity description and grading.
- c) Absence of uniform FAQ and grading standards, as substantial number of transactions are reported under 'others' variety category.
- d) Arrivals and prices data have inherent gaps and the flow of data also suffer from issues like irregular reporting, non-response, reporting of unreliable data.
- e) Lack of proper monitoring mechanism for recording accurate data and errors at data entry level due to lack of proper training as data entry operators, in many cases, are not regular employees.
- f) Lack of transparency in price discovery, especially in wholesale prices due to urgent need for computerized auction system.
- g) No uniform reporting system to AGMARKET portal and non-reporting from many markets.
- h) Lack of uniformity in wholesale prices collected by the Department of Consumer Affairs and there is no clarity on variety and specifications.

Considering the above limitations in current agriculture data generation system, the Committee made several important recommendations that need to be implemented immediately.

Adequacy of the Data: The magnitude of unaccounted sale and illegal transactions of farm commodities outside the preview of the regulated market (APMC) and other formal systems that is rampant across the country, hence a real cause for concern. This lacuna limits adequacy in the volume of the data generated and hence greatly affects precise prediction of prices of farm commodities.

For instance, in Karnataka, as per the report by KAPC, out of total production from fifteen major agriculture and horticulture crops only 41 per cent was bought and sold in various Regulated Markets (APMC yards) of State during crop year 2014-15. Formal transaction with in the APMCs is abysmally low in the cases of jowar (just 5 per cent), ragi (7 per cent), soybean (21 per cent), tomato (24 per cent), bengal gram (26 per cent) and cotton (28 per cent). Time involved in transportation, pre-harvest contract with the local money lenders and traders, quality constraints are the main reasons for selling produce outside the APMC purview.

A comprehensive strategy encompassing legal enforcement coupled with incentives to sell with in the regulated and formal market preview, extending the scope of formal transaction to village level etc. should be a top priority.

Multiple Agencies: At present four agencies are involved in generating data on market arrivals and prices of farm products at Centre and State levels. This not only results in duplicity of

efforts, but also create divergence in the data provided.

A strong and unified institutional arrangement at the centre, and its arms at the state to generate and timely dissemination of quality data on crop area, production, prices, marketing etc. at the disaggregate level should be thought of immediately.

Univariate Models: The ARIMA model, currently used universally for price forecasting employs single variable i.e. past price thus leaving other important exogenous variables such as weather, rainfall, and so on that affect the predictability significantly. There is ample scope to employ multivariate models such as **Transfer function, Intervention analysis, and Vector Autoregressive (VAR)** models discussed earlier.

These models have to be built after isolating the independent variables that have a significant bearing on the variable being studied. The main problem with the exogenous variable is that their effect could be stochastic and not deterministic in which case its effect cannot be captured in the model appropriately. Since the data is high velocity in nature, the independent variables should have the same frequency or else a proxy variable or a dummy variable should be included to capture its effect.

Most of the multivariate models in the ARIMA framework use errors of the ARIMA model as the dependent variable and add exogenous variables to explain the variation in it. And this forms the basis for a multivariate model. However problems in employing multivariate models while forecasting the prices are:

- i. They have a greater requirement of data than univariate models. Every additional variable has to be estimated that brings in an additional source of error due to sampling variation.
- ii. Model selection is therefore more complex and lengthier and more susceptible to errors, which can affect predictions later on.
- iii. It is difficult to generalize nonlinear procedures to the multivariate case. Generally, multivariate models must have a simpler structure than univariate ones so as to overcome the additional complexity that is imposed by being multivariate. Then, multivariate models will miss the nonlinearities that are handled properly by the univariate models
- iv. Outliers can have a more serious effect on multivariate than one univariate forecasts. Moreover, it is easier to spot and control outliers in the univariate context.
- v. Identifying the lag structure of leading variables may be challenging at times.
- vi. The quality of the data has to be very good and data on causal variables have to have the same velocity as the prices.

Notwithstanding various constraints, concerted efforts should be made to develop and use

Multivariate Models to project **Crop Supply, Price Forecast** and **Crop Area** estimation for strategically important crops by generating data through modern predictive analytics developed with satellite data, ancillary data, ground truth and machine learning algorithms.

9.6. Measures to implement Market Intelligence

Market Intelligence will also require strengthening the data collection and collation mechanism for crop forecasting. The modern scientific tools and techniques, of the Mahalanobis Centre and other related central and state level agencies need to be developed at the production level. At the same time, complete mapping and updating of soil health analysis and water resource management will be needed.

On the output marketing front, a dedicated agency for analysing demand, supply and related price discovery requires to be established. Necessary analytical tools and will be needed to evaluate the following, across various agriculture sectors:

- a) Trends correlated across seasons for harvested quantity – crops, fish, livestock produce
- b) Trends on demand for each sector – food, non-food – crops, fish, livestock produce
- c) Projections of demand for all major markets.
- d) Analyse demand versus market price on the basis of supply variations.
- e) Forecasting prices and analysing international price trends vis-à-vis trends in India.
- f) Switch to online auctions in all markets including APMCs across India in a phased way.
- g) Set up a Harmonized Market Information System covering all the wholesale markets.
- h) Target a monthly, semi-annual and annual demand and price forecast bulletins in initial 5 years. Progress to issue decadal forecasts and projections.

The existing web, mobile and mass media modes of communication can be used to disseminate the information to farmers and the agri-logistics sector.

Tap into existing experience of state level organisations like the Karnataka Agriculture Prices Commission to undertake pilots to develop a national network of price analysis. Active involvement of private IT sector and civil society in “Generation and Dissemination of Forecasts and Projections” can be planned. A national Value System Platform can be simultaneously launched to take advantage of the market intelligence and develop operations that use such information as exemplifiers.

9.7. Restructuring DMI

There exists a **Directorate of Marketing & Inspection** (DMI) that is functioning since pre-independence under Ministry of Agriculture. A large number of its mandated roles are now anachronistic. This Directorate has a number of field units across the country.

The Committee is of the view, that the DMI can be restructured with respect to its roles and responsibilities, manpower, and field unit reorganisation to meet the current demand of price supply and demand forecast.

Since there already exists a large number of resources with particular qualifications recruited to meet the past mandate, they can be retrained and reoriented and positioned appropriately to undertake market intelligence functions. Into a fully equipped and empowered **Directorate of Marketing & Intelligence**.

The Directorate of Marketing and Inspection (DMI), an attached Office of the Department of Agriculture, Cooperation and Farmers Welfare under Ministry of Agriculture & Farmers Welfare, was set up in the year 1935 to implement the agricultural marketing policies and programmes for the integrated development of marketing of agricultural and other allied produce in the country with a view to safeguard the interests of farmers as well as the consumers.

The mandate of the DMI has undergone several changes over a period of time depending on the policies and programmes of the Government.

A restructured DMI can take on some of these following functions:

- i. Strengthen Agmarknet portal and collect and collate real time data on market arrivals and prices for all commodities from across the markets in both private and public sector
- ii. Collect and collate data on production of all produce (agricultural, horticultural, plantation, livestock, etc.) and maintain time series data in this regards.
- iii. Monitor global commodity prices and production estimates for major commodities from price leading countries and maintain time series data.
- iv. Promote standardisation and grading of agricultural and allied produce under the Agricultural Produce (Grading and Marketing) Act, 1937.
- v. Promote harmonisation of standards for all produce by working closely with other standardisation authorities, like BIS, FSSAI, etc.
- vi. Identify various sources of data on prices, demand and production, such as Directorate of Economics Statistics (DES), Agrimarknet, Dept. of Consumer Affairs (DoCA), NSSO, National Accounting system, etc.
- vii. Develop and adopt a suitable model for forecasting prices for select produce and develop potential to forecast supply and demand subsequently.

Deployment of forecast data: The primary objective of a forecast well ahead of the production season, is to enable the farmers themselves to undertake an informed decision on their production with a view to earning optimal returns. Such a forecast would also help other stakeholders in the supply system (like traders, processors, exporters, importers, etc.), as also

the government concerned with consumer interests to plan for their activities and initiatives.

However, the accuracy of the forecast particularly when univariate model is adopted, will depend upon the credibility and robustness of the data collated.

In the opinion of this committee it will be appropriate to commission a forecast system but limit its use to government initially. Price forecast by trend analysis is not sufficient and requires demand and supply analytics to arrive at the apropos price forecast. The government over a period of three to five years can watch the correlation between the forecast and actual price, and make necessary corrections to the model before opening for public use.

Key Extracts

- The government of India has developed an elaborate system of estimation of crop sown area, yield and production of different crops, but quality and timeliness of the data poses a big challenge in precise and error free forecasting and projections.
- Although multiple organisations are involved in compilation, monitoring and release of prices/price indices, currently no department is involved in forecasting prices/demand officially at the national level.
- Restructuring of Directorate of Marketing *Inspection* into the Directorate of Marketing *Intelligence* will provide a solution at national level for reliable and timely price forecasting in a sustainable way. Focus should be on monitoring demand and supply situations to arrive at associated price forecast.

Chapter 10

Agricultural Trade Policy

In the strategy for doubling farmers' income, monetisation of their produce assumes a critical role with an efficient marketing structure as its core.. A new market architecture, that recognises exports as a market expansion initiative is the need of the hour. A concerted effort is required in delineating the multiple stakeholders, who are key to the success of this initiative. Their roles need to be clearly defined and facilitated by a comprehensive policy for converting high production potential of Indian agriculture into exports. Parallely, the emphasis has to be on creating an efficient agri-value system (AVS) so as to let the benefits of enhanced export earnings trickle down to the ultimate producer.

10.1. Introduction

Thanks to science, facilitative policy support and adoption of new practices by the farmers, higher productivity and production across the agricultural sector have created a happy situation of surpluses. Government's response is seen in the form of market reforms. Efforts being made to create a unified national agricultural market is a classical approach, to help farmers evacuate local surpluses to distant consumption centres. It is, however, getting clearer by the day, that even a large market size that India offers may not be able to absorb the marketable surpluses in a number of crop/commodities. By necessity, the horizon of market has to transcend the national boundaries and tap export markets.

This would help maintain demand supply balance in the domestic market (necessary to avoid price falls adversely impacting the farmers' income) and also enable the farmers to be extract greater value as a part of the interconnected Global Value Chain (GVC). Thanks to globalisation, a strong trend is witnessed towards the international dispersion of various linked activities such as production, marketing, distribution, etc. The term global value chain (GVC) includes all of the people and activities involved in the production of a good or service and its global level supply, distribution and post sales activities (also known as the supply chain). In a globalised world, companies can restructure their operations internationally through outsourcing and offshoring of activities. The production, trade and investments are increasingly organised within the so-called global value chains (GVCs) where the different stages of the production process are located across different countries¹⁵. The farmers as producers, when exercising the export option will achieve higher selling volumes, possibly realising more remunerative prices, particularly when domestic market is full.

In India, agricultural export has not been a strong point both at macro-economic (state and nation) and micro-economic (farmers) levels. It has at best been seen as an 'add-on' opportunity, notwithstanding the initiatives in the past. In the opinion of the DFI Committee, the Export Market deserves to be treated as the final evacuation window building on retail agricultural markets (PRAM/GrAM) and domestic wholesale markets (APMCs/APLMCs). These are the three corner stones of the new market architecture propounded in chapter 5. The new market architecture provides a platform that facilitates the integration of farmers in the

¹⁵ OECD – Industry & globalisation: Global Value Chain

regional value chain (RVC) and the global value chain (GVC).

To fully harvest the export potential, specific focus areas need to be worked upon. An export focused policy should aim at:

- Adding to demand for produce of India – enhance marketed quantity.
- Providing an upward lift to the value captured – optimal market price.
- Enabling farmers to be a part of RVC/GVC – integrate with cross-border supply chains.
- Improved remuneration to all stakeholders in the supply chain including farmers – transparent and equitable sharing of the wealth created.

Such an agenda will automatically increase opportunity for the nation to earn foreign exchange, while also adding to the country's economic wellbeing.

Hence, at a time when India is in the process of integrating its agriculture with the global market in the WTO regime, an enhanced focus on working upon the rules of trade in favour of Indian farmers by means of export promotion in case of agro-commodities that have comparatively higher advantage and import prohibition in sectors witnessing high production advantages becomes critical. Enhanced exports clubbed with effective Supply Chain Management (SCM) would pass on two immediate benefits to the farmers; namely, improvement in marketed volumes and the price differential (if any). The latter, will be possible when market architecture minimises the intermediary actors between farm-gate and markets.

10.2. Production versus Exports: a Status Check

It needs to be recognised, that Indian agro-commodities are goods that are in demand globally, but the failure to reach out is due to absence of professional management.

Despite ranking first or within the top bracket as producer of many fruits and vegetables, milk, major spices, select fresh meats, select fibrous crops such as jute, several staples such as wheat, rice, millets and castor oil seed, the output does not find way into export markets. This is not always due to a large domestic consumption base and quality concerns, but also because the production is not necessarily planned for international consumption. The lack of export market intelligence does not facilitate relevant market linkages, and therefore, the crop planning and production are neither informed in their decisions, nor market-led.

India is also the world's second or third largest producer of several dry fruits, agriculture-based textile raw materials, roots and tuber crops, pulses, farmed fish, eggs, coconut, sugarcane and numerous vegetables. India ranked within the world's five largest producers of over 80 per cent of agricultural produce items, including many cash crops such as coffee and cotton. India is also one of the world's five largest producers of livestock and poultry meat, registering one of the fastest growth rates.

Table 10.1 India global status in production

Production figures in million tons

Product	World Production 2014	India production 2014-15	India share in production global (%)	Major producing countries in order of ranking
Cereals:				
Rice	711.99	157.20	22.1	China, India , Indonesia, Bangladesh, Vietnam, Thailand
Wheat	653.99	95.85	14.7	China, India , Russia, France, Canada
Maize	657.29	23.67	3.6	China, Brazil, Argentina, Ukraine, India
Sorghum	56.90	5.39	9.0	Mexico, Nigeria, Sudan India , Ethiopia
Millets	27.68	11.42	41.3%	India , Niger, China, Mali, Nigeria
Animal Products:				
Hen Eggs	1191.00	79.94	7.0	China, India , Mexico, Brazil, Japan
Buffalo meat	3.70	1.62	43.8	India , Pakistan, Egypt, China, Nepal
Goat meat	5.28	2.10	39.8	China, India , Pakistan, Nigeria, Bangladesh
Processed fruits and vegetables:				
Cucumber & Gherkins	7.17	0.17	0.24	China, Russia, Turkey, Ukraine, Spain (India-25th)
Groundnut	39.40	6.55	17	China, India , Nigeria, Sudan, Argentina
Fresh fruits & vegetables:				
Banana	108.35	29.72	27	India , China, Philippines, Brazil, Indonesia
Papaya	11.56	5.63	49	India , Brazil, Nigeria, Indonesia, Mexico
Mango, Guava, Mangosteen,	44.27	18.43	42	India , China, Thailand, Indonesia, Mexico
Apple	75.60	2.49	3	China, Poland, India , Turkey, Italy
Grapes	63.92	2.59	4	China, Italy, Spain, France, Turkey, Argentina, India
Oranges	61.28	7.31	12	Brazil, China, India , Mexico, Spain
Pineapple	23.72	1.37	6	Costa Rica, Brazil, Philippines, Thailand, China, Indonesia, India
Citrus	12.08	0.74	6	China, Nigeria, India , Columbia, Angola
Tomatoes	147.90	18.74	13	China, India , Turkey, Egypt, Italy
Potatoes	349.93	46.39	13	China, India , Russia, Ukraine, Germany
Peas Green	17.03	3.86	23	China, India , France, Egypt, UK
Eggplant	49.06	13.58	28	China, India , Egypt, Turkey, Indonesia

Source: UNCTAD, 2017

Recent trends already point to higher productivity achievements, ending up in a consequent bulge in production and more robust supply at farm-gate. High production, when saturating the domestic market, results in depressed prices and as a backlash deters further growth in production and even productivity. For further productivity led growth in production, the marketable surpluses should be optimally converting into enhanced presence of these products in the global markets.

The paradox between production and exports is substantiated by a comparative rank analysis presented in the following table.

Table 10.2 Production versus Exports: India's status versus World

Agri Products	India's Share In World Exports (%)	Rank in World	
		Production	Exports
Coffee & Spices	4.4	5	5
Tea	4.1	2	5
Sugars	1.9	2	10
Fish	2.6	2	12
Oil seed	1.5	1	12
Cereals	1.4	3	14
Tobacco	1.7	3	15
Edible vegetables	1.5	2	17
Edible fruit	1	1	25
Dairy product	0.2	1	47

Source: DFI's compilation from various sources

10.2.1. Current export status

Though among the top producers globally, India also has a large population base and hence domestic demand is also equally large. However, as productivity levels and post-production activities and connectivity improve, there is scope for Indian agricultural produce to benefit from increased exports. On the whole, India is a net exporter of agricultural products as of now. The table below breaks this out.

Table 10.3 Trade balance in APEDA monitored products during 2016-17

Figures in \$ million

Product Group	Export Value	Import Value	Trade Surplus
Cereals	6074	1343	4731
Animal Products	4416	69	4347
Processed Fruits & Vegetables	1070	3741	-2671
Other Processed Foods	3005	1241	1764
Fruits & Vegetables	1552	881	671
Floriculture & Seeds	161	118	43
Total	16,278	7,392	8886

The Agricultural & Processed Food Products Export Development Authority (APEDA) reported exports at US\$ 16.28 billion in 2016-17 for the products it monitors, which account for roughly 50 per cent of the total agri-exports of the country.

Further, of these exports, cereals and animal products have a major share; and within these, basmati rice and meat are the main items. It connotes, that India's agri-exports are not yet

broad-based, viewed particularly in the context of wide array of domestic produce. It simultaneously implies that there exists large scope to pare up the quantum of exports and enhance the horizon of market opportunities for the farmer-producer.

India's share in global export of agricultural commodities is about 2.2 per cent and the country is ranked 9th globally. The export of APEDA monitored products in last three years is as under:

Table 10.4 Export of APEDA products

Qty: '000 tons, Val: Rs crore

Product	2013-14		2014-15		2015-16		2016-17		CAGR (%)Value
	Qty	Val	Qty	Val	Qty	Val	Qty	Val	
Cereals	21,065	63,452	18,414	58,280	11,945	40,433	11,825	40,624	(5.02)
Animal Products	2,112	32,289	2,163	33,128	2,075	30,137	1,895	29,533	7.29
Processed Fruits and Vegetables	1,082	6,484	1,007	6,670	970	7,213	880	7,152	6.91
Other Processed Foods	2,784	25,068	3,013	24,893	2,513	18,855	2,586	20,112	(9.45)
Fresh Fruits & Vegetables	2,917	8,761	2,500	7,474	2,405	8,391	4,116	10,370	11.61
Floriculture & Seeds	40	866	35	888	33	973	33	1,076	6.89
Total	30,001	136,920	27,133	131,333	19,942	106,002	21,337	108,867	(1.64)
\$ billion value	22.70		21.49		16.20		16.27		

Source: APEDA

The recent trends indicate a plateauing out of exports in cereals and processed food products in terms of both volume and value, and demand for fresh fruits and vegetable growing in both quantity and value. For exports, the pre-requisites are surplus production, quality compliance with market parameters of residues of pesticides, matching large viable quantity with uniform maturity index and quality for the purpose of aggregation, sturdy and appealing packaging, good multi-modal logistics connectivity to exit ports, etc.

Today Indian agriculture faces various new challenges such as stringent and ever changing global sanitary and phyto-sanitary standards, lack of adequate post-harvest infrastructure and logistics connectivity, etc. Due to small land holdings, the produce from even a single village has significant variation in terms of varieties cultivated, size and other physical parameters and stage of maturity at the time of harvest. In view of this, it is difficult for the exporters to source requisite volume of a particular fruit or vegetables.

In order to meet all these requirements, there is need for farmer awareness about pre-harvest intervals (PHI) of various crops, judicious use of permitted and registered pesticides, harvesting at right maturity, appropriate post-harvest infrastructure facilities such as modern pack-houses, reefer transportation, processing facilities where needed, certified packaging, etc.

10.2.2. India's share in global markets

An assessment of the market demand at global level, indicates that India has little presence in many of the top importing countries. The situation for some select products is represented in

the following table to substantiate this.

Table 10.5 India's share in global Imports

Product	Global import - \$ bn	India's share - \$ bn	Top importing countries	Top exporting countries
Cereals:				
Sorghum	0.03	0	Mozambique (66.66%); Barbados (33.33%)	Zimbabwe, USA, South Africa
Maize	31.90	0.18	Korea Republic (13.87%); Japan (10.10%); Mexico (7.57%); Czech Republic (7.12%); Egypt (5.60%)	USA, France, Brazil, Argentina, Poland, Ukraine
Animal Products:				
Poultry meat	2.5	0.013	Saudi Arabia (9.55%); UK (7.78%); Japan (7.19%); Hong Kong (6.55%); France (5.11%)	Brazil, Netherlands, Germany, USA, Belgium
Milk Powder	5.00	0.030	China (12.11%); Hong Kong SAR (10.85%); Algeria (8.04%); Mexico (5.12%)	Netherlands, France, New Zealand, Germany, Denmark; Sweden, USA
Cheese	16.18	0.003	Germany (17.39%); USA (7.04%); UK (6.33%); Italy (5.73%); France (5.25%)	France, Germany, Italy, New Zealand, Netherlands, Belgium, UK
Processed Fruits & Vegetables				
Cucumbers & Gherkins	0.43	0.18	Canada (9.2%); USA (9.2%); Germany (8.52%); France (8.30%)	USAQ, India, UK, Germany, Turkey, Vietnam
Other Processed Foods				
Sweet Biscuits	7.19	0.103	USA (13.15%); France (7.39%); UK (6.26%); Germany (6.01%); China (4.24%)	Canada, Mexico, Germany, UK, Belgium, Netherlands, Poland
Wine	2.57	0.003	USA (16.82%); UK (13.57%); Germany (8.23%); China (6.10%); Canada (5.98%)	Italy, France, New Zealand, Spain, USA, Chile
Infant food	8.99	0.010	China (28%); Saudi Arabia (7.25%); UK (6.03%); China Macao SAR (3.54%); Germany (3.52%)	Germany, Netherlands, Ireland, Thailand, Singapore, USA
Cassava	0.08	0.002	USA (21.95%); Korea Republic (8.54%); China (8.45%); France (6%); Czech Republic (4.88%)	Thailand, China, Indonesia, Other Asia, USA
Starch	3.65	0.07	China (22.95%); Indonesia (9.70%); USA (6.08%); Other Asia (5.09%); Korea Republic (4.88%)	Vietnam, China, Germany, France, Thailand, Denmark, Netherlands
Fruits & Vegetables				
Tomatoes	6.4	0.07	USA (24%); Germany (15.27%); Russia (8.01%); UK (7.60%); France (7.30%)	Mexico, Netherlands, Japan, Italy, Spain
Potatoes	2.75	0.069	Netherlands (9.28%); Belgium (8.40%); Russia (8.39%); Germany (5.44%); Spain (5.26%)	France, Netherland, Egypt, Germany, Spain, China,
Bananas	11.60	0.020	USA (17.28%); Belgium (8.08%); Germany (6.95%); Russia (6.52%); Japan (6.04%)	Ecuador, Philippines, Costa Rice, Guatemala, Columbia

Product	Global import - \$ bn	India's share - \$ bn	Top importing countries	Top exporting countries
Grapes	8.36	0.17	USA (18.26%); UK (8.05%); Germany (7.89%); Netherlands (7.55%); China (7.01%)	Chile, USA, Italy, Netherlands, Spain, South Africa, India
Mandarins	4.21	0	Russia (14.54%); France (9.85%); Germany (9.84%); USA (9.53%); UK (9.08%)	Spain, Turkey, Morocco, Chile, South Africa
Mango, mangosteen and guava	2.41	0.48	USA (22.50%); China (10.76%); Netherlands (9.64%); Germany (7.03%); UK (6.74%)	Thailand, Brazil, India, Pakistan, Peru, Philippines, Indonesia
Pineapple	2.41	0.004	USA (27.95%); Netherlands (6.35%); Germany (5.77%); UK (5.73%); Belgium (5.15%)	Costa Rica, Netherlands, Mexico, Other Asia

Source: UNCOMTRADE (Update as on 15.01.2017)

Table 10.6 Global position of India's agro exports

Produce	Major Exporting Countries (competing suppliers)	India's share in world Exports (%)
Tea	Sri Lanka (23.3), Kenya (18.6), China (15.3), United Kingdom (4.1)	8.7
Rice	Thailand (35.2), Vietnam (12.5), USA (11.3), Pakistan (11.1)	4.1
Sugarcane	Brazil (43.6), Thailand (10.6), France (5.2), Mexico (3.5), Germany (2.4)	2.3
Coffee	Brazil (22.3), Vietnam (7.8), Germany (7.7), Colombia (7.4), Switzerland (4.8)	2
Tobacco	Germany (14.3), Netherlands (14.2), Brazil (7.5), Poland (4.6), USA (4.3)	1.7
Mangoes	Mexico (15.9), Netherlands (12.8), Brazil (10.9), Peru (8.9), Thailand (7.4)	1.1
Potatoes	Netherlands (22.3), France (15.5), Germany (8.8), Egypt (5.8), Canada (5.2)	1
Tomatoes	Mexico (25.2), Netherlands (18.4), Spain (14.1), Morocco (5.4), Turkey (5.2)	0.9
Grapes	Chile (19.4), USA (15.2), Italy (9.3), Netherlands (7.9), Turkey (7.9)	0.8
Wheat	USA (23.7), France (14.4), Australia (13.4), Canada (12.2)	0.1
Rapeseed	Canada (43.2), Australia (10.2), France (10.1), Ukraine (5.9), UK (3.9)	0
Cocoa	Côte d'Ivoire (29.2), Ghana (25.5), Nigeria (8.7), Netherlands (6.6)	0
Apples	Italy (14.2), USA (13.6), China (13.1), France (10.6), Chile (9.7)	0
Bananas	Ecuador (24.2), Belgium (14.3), Colombia (8.8), Costa Rica (7.8)	0
Cucumbers	Spain (28.3), Netherlands (20.5), Mexico (13.1), Canada (6.9), Jordan (6.3)	0
Poultry	Brazil (28.4), USA (17.7), Netherlands (8.9), France (5.8), Poland (4.7)	0
Fish	China (11.5), Norway (9.4), USA (5.3), Viet Nam (4.4), Canada (3.9)	2.6
Eggs	Netherlands (21.6), USA (9.1), Turkey (8.9), Germany (7.4), Poland (6.3)	0.2

Note: Figure in brackets is percent share in total world export of respective countries i.e India's major competing suppliers.

An aggressive export strategy would require to include cluster based development, such that Farmer Producer Organisations (FPOs) or Village Producer Organisations (VPOs) are able to output sizeable volume of quality produce as desired by the importing markets in an efficient manner. Availability of a particular fruit or vegetable in significant quantity with similar physical parameters and stage of maturity at the time of harvest is critical, especially when the produce is required to undergo some post-harvest pre-conditioning, like vapour heat treatment or hot water treatment in compliance of the importing country's requirements. Export oriented production through development of clusters will help to make available sizeable volumes of identified produce to meet such requirements.

Agricultural and Processed Food Products Export Development Authority (APEDA) in the Ministry of Commerce has in association with the Department of Agriculture, Cooperation & Farmers' Welfare, initiated a cluster approach, by identifying contiguous geographical farmlands and developing the farmers to address the issues raised in cultivation (quality planting material, integrated pest and nutrient management, etc.), pre-harvest (maturity indices, permissible residue levels, etc.) through agencies of the state governments. The concerns in the post-harvest handling and export linkage can be addressed through support of Central government agencies.

There is also the need to designate specific sea-ports as gateways for export/import of agricultural produce, especially those that are perishable, such that the necessary phytosanitary clearances are fast-tracked and do not become a bottleneck to movement.

10.2.3. State level data on exports

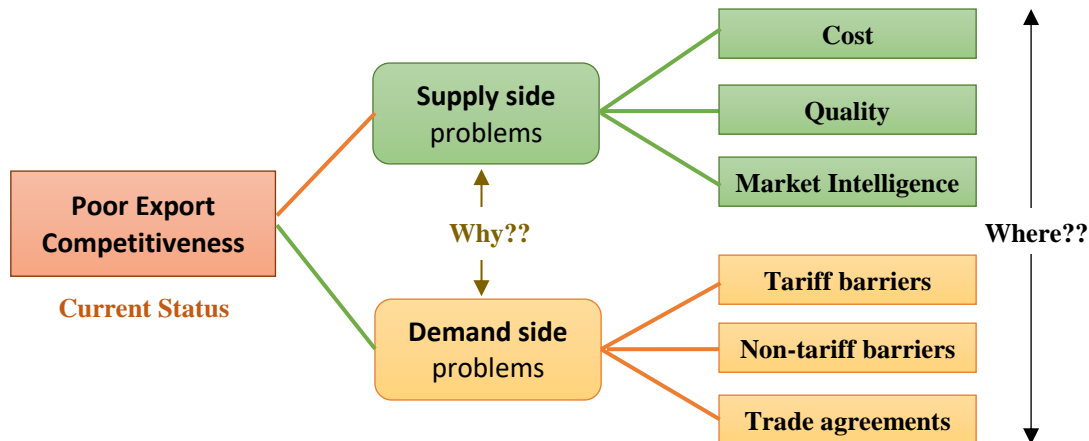
Currently, the export data compiled by DGCIS (Directorate General of Commercial Intelligence & Statistics) is at an aggregate country level which does not indicate the exact origin of the export consignments. In order to identify state level export promising clusters, it is essential to have state level data on exports. Compilation of data at state level will also be instrumental in making state export promotion policies, future cluster identification and priority intervention for quality upgradation, testing laboratories, investments for export infrastructure and subsequent focused interventions in terms of QC (Quality Control), SPS (Sanitary and Phyto Sanitary) / TBT (Technical Barriers to Trade) training and traceability, etc. based on rejections or response of market. The *modus operandi* could be similar to the state level export data maintained by the USA, and can be maintained at GrAM/PRAM levels, from where purchases for exports are initiated. All *grameen* rural markets should be inter-connected to prepare a national network of the business generated to introduce and prioritise government interventions. Online trade using platforms like eNAM (electronic National Agriculture Market) or any other can also be promoted at GrAMs/PRAMs.

10.3. Agri-exports not Commensurate with Production: Cause and Effect

The dissonance between India's global ranking between production and exports may be categorised into supply side as well as demand side constraints. On the supply side, the concerns arise from inefficiencies in terms of regulatory restrictions, production related issues

and post-harvest losses. Poor reach of agri-logistics disallows appropriate connectivity and leaves the supply conduit narrow. Resolution of these primary these issues is only a necessary condition. The sufficiency condition for achieving a robust export status warrants that all demand side issues are also addressed.

Figure 10.1 Supply and demand side issues



10.3.1. Supply side constraints

As indicated in the Figure 10.1, Indian agro-exports are primarily hit at three levels,

- (i) higher landed cost as compared to other competing players;
- (ii) poor quality not in sync with the standards of the importing countries; and
- (iii) absence of market information and global market linkages.

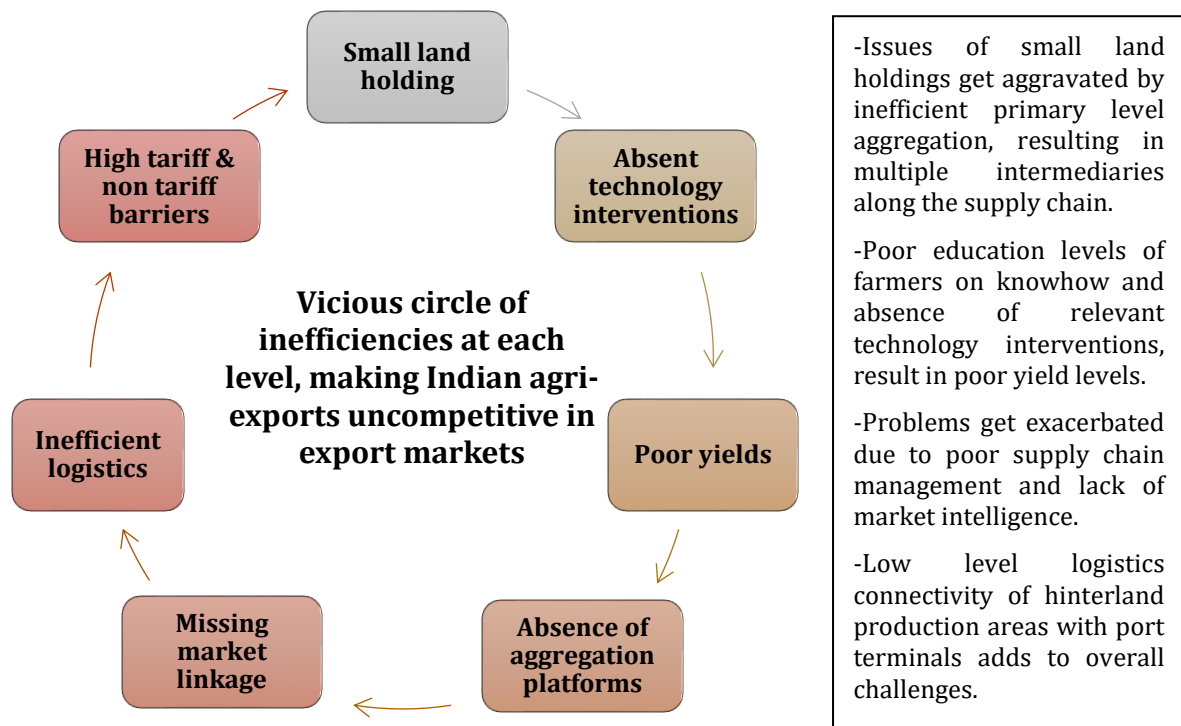
Instances of very high final landing price as compared to other competing suppliers can be witnessed in case of mangoes in the USA, which is one of the biggest importers of mangoes and tea. All other competing suppliers of mangoes in USA market including Thailand (5798 USD/ton), Brazil (1277 USD/ton), Peru (1255 USD/ton) & Mexico (840 USD/ton) are able to reach US port at much cheaper price than India (alphonso mango reaches at 6462 USD/ton). Similar situation prevails in case of tea in US; rice in UK, refined sugar in Australia and in most other cases. While in some instances the difference is due to mode of transport used, distance and travel time, on occasions the cause is also due higher inputs costs or lower productivity and factors such as added cost of losses arising from poor post-harvest management at source. In result, India is losing out on export opportunity in foreign markets.

The reason for poor price competitiveness of Indian agri-exports is an outcome of inefficient economies of scale arising from lack of initial aggregation at farm-gate or village level. Since the average size of a land holding in India is small, the consequent marketable surpluses from individual farmers are small. As such, the first mile aggregation of produce is an important requirement, so that output from individual farms can be pooled into exportable container loads. The collaboration among farmers to produce the same (uniform) quality and variety of produce is also important, requiring a cluster approach by FPOs or VPOs.

This Indian yield levels are lower than even some smaller ASEAN (Association of South East Asian Nations) and African countries. Apart from large farming communities of USA and EU (European Union), even smaller countries surprisingly are surpassing India in the productivity levels. Some of these countries include Cape Verde (mango), Cyprus (Okra), Turkey (soybean), Jordan (eggs) and Nicaragua (groundnuts). According to the World Bank, India's rice yields are one-third of China's and about half of those in Vietnam and Indonesia. With the exception of sugarcane, potato and tea, the same is true for most other agricultural commodities. China, with higher land fragmentation than India also surpasses in productivity levels, due to a cluster approach in production, and by using appropriate supply chain management systems, starting at farm gate.

The link roads from farms to the main road are underdeveloped in most of the states, though positive change is occurring as an outcome of investments by the Department of Rural Development under two of its flagship schemes – MGNREGA and Prime Minister's Gram Sadak Yojana (PMKSY). Rural electrification which is an important focus of the government is yet to focus on supplying uninterrupted power to village level post-harvest management uses. Congestion at the ports is due to high waiting periods of shipment and is another major issue. The issue of delayed connectivity becomes critical in case of perishable exports. In such cases, availability of reefer containers at the optimum time becomes crucial. Exporters face volatile freight rates in the peak season. Inadequate number of trolleys at the airport hubs adds on to the issue.

Figure 10.2 Circle of inefficiencies hurting agri-export potential



Poor economies of scale, stem from a very limited presence of village level primary

aggregation of the production, that aid evacuation. This shortfall in the produce collection and evacuation mechanism, leaves farmers to their own devices to market the surplus produce, and does not promote them to undertake collective or cluster farming. The lack of aggregation facilities result in small export consignments and without viable scale it leaves Indian exporters with little negotiating power to obtain suitable Incoterms (International Commercial Terms) and international freight rates.

All these inefficiencies add up to a much higher landed cost of Indian exports at the destination port. Related requirements dealing with logistics and agri-marketing have been examined in Volume III and chapter 5 in this Volume. Poor market intelligence, in terms of consumer preference, dynamic monitoring of market share, qualitative feedback, developing opportunities, etc. in the target export market are also a constraint.

10.3.2. Demand side constraints (Trade Barriers)

The destination markets, including the European Union (EU), Japan, and the United States (US) use protection tools, to varying degrees, such as low but highly dispersed ad valorem tariffs, specific duties, seasonal tariffs, tariff escalation, and preferential access along with tariff-rate quotas. These add to existing supply side constraints, building costs and making Indian exports less competitive. There are also instruments such as non-tariff measures (NTMs) - these are policy measures, other than ordinary customs tariffs, that can potentially have an economic effect on international trade in goods, changing quantities traded, or prices or both". (UNCTAD, 2010).

10.3.2.1. Tariff barriers

Tariffs for a specific range of products depend on numerous factors, including the date of entry (seasonality factor), the degree of processing (escalation phenomenon), and the relationships with exporting countries (preferential agreements and regional and bilateral free trade agreements - FTAs). The EU's highly complex import tariff regime aims to protect domestic production of fruit and vegetables during the growing season. For this reason, the regime's key features are as follows: **(i)** relatively low tariffs on imports of tropical fruit, for example 5.8 per cent on pineapples and zero per cent on papayas and mangoes; **(ii)** differentiated tariffs for temperate and semi-tropical fruits, so that tariffs are higher during the season for European producers and lower out-of-season; and **(iii)** generally higher overall tariffs for vegetables, with no seasonal differentiation.

High tariff peaks and dispersions

Indian agro-products bearing high export potential have been facing high import duties in some premier importing countries.

Table 10.7 Examples of Indian exports facing high tariff peaks

Country	Major items with import duty higher than 50 per cent
EU	Prepared F&V (20), Fish & Fish products (11), Fruits and vegetables (10), Dairy products (10)

Japan	Food industry products (24), prepared F&V (20), Dairy products (18) and Cereal and Cereal products (12)
USA	Dairy products (42), Food industry products (16) and Sugar and cocoa preparations (12)
Canada	Dairy products (23), F&V (16), Cereals & Cereals preparation (13) & Food industry products (13)

Figures denote number of product lines on which the import duty has been more than 50%

Source: IIFT

In other examples, Sri Lanka and Philippines imposed as high as 35 per cent and 40 per cent tariff respectively on Indian wheat. There is no duty on India's cotton exports to major destinations except China, which imposes a high duty of 54 per cent. Bangladesh, imposes a tariff of 37.5 per cent on milk imports. Similarly, India's rice export attracted 50 per cent duty rate in Philippines and a Rupiah 430 per kg is specified in Indonesia.

Tariff rate quotas

A tariff-rate quota system allows to fix a two tier structure of import duty. A Tariff Rate Quota (TRQ) fixes the volume of imports at a lower tariff. After the quota is reached, a higher tariff is applied on additional volume - in principle, TRQ provides continued market access. However, in practice, over-quota tariffs can be prohibitive when in excess of the quota.

Import quota limitation in markets like China (for wheat, corn, soybean oil, rapeseed oil, sugar etc., and Thailand (instant coffee, rice, pepper, maize, green tea, copra, etc.) are examples of restrictions on Indian exports.

Tariff escalation: a challenge for value added exports

Certain niche sectors in India's processed food industry, including milled products, cereal preparation, jaggery and confectionery, guar gum, etc. have had opportunity to grow. However, due to existence of tariff escalation, import duty in the importing countries like EU, Japan and the USA increases with the level of processing.

Table 10.8 Tariff escalation in major importing regions

Product	Tariff (%)	Product	Tariff (%)
European Union			
Milk	113	Cheese	120
Grapes	18	Grape Juice	215
Apples	11	Apple Juice	63
Japan			
Milk	280	Yoghurt	370
Pineapple	17	Pineapple Juice	30
Grapes	12	Grape Juice	30
Apples	17	Apple Juice	34
USA			
Milk	66	Milk Powder	179
Oranges	4	Orange Juice	31
Pineapple	3	Pineapple Juice	12

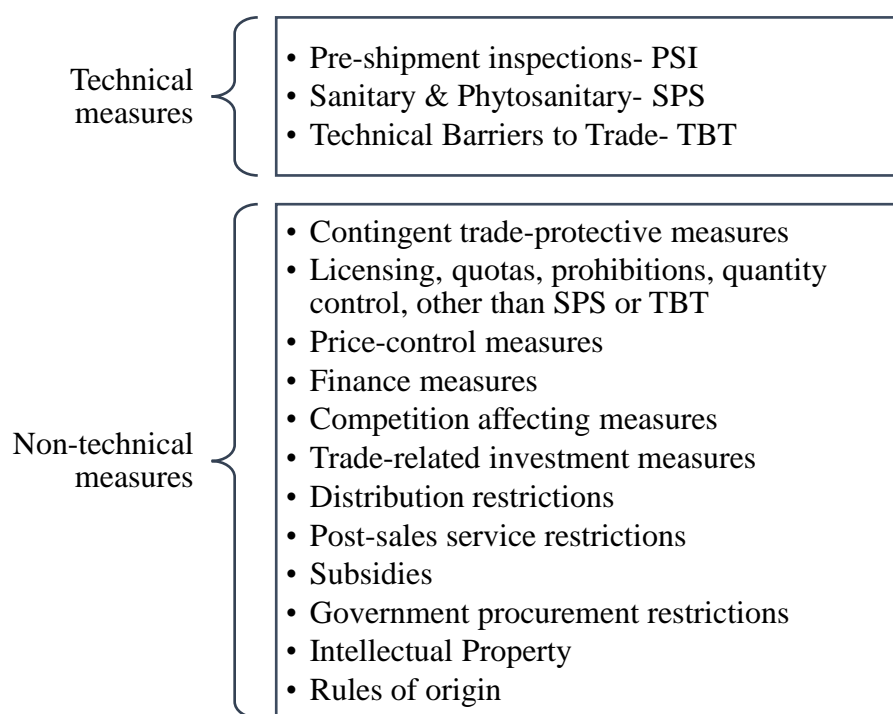
Source: IIFT

Seen in table 10.8, import duty on milk in EU, Japan and USA, already high at 113, 280 and 66 per cent respectively shoots up 120 per cent (cheese-EU), 370 per cent (yoghurt-Japan) and 179 per cent (milk powder-USA). Tariff escalation as above ensures that most imports to the EU are raw produce or products like coffee, cocoa or pineapple which cannot be cultivated in Europe. It also ensures that value added products are made less cost competitive. For example, while import duties for unprocessed cocoa beans is low, the EU charges 30 per cent for processed cocoa products like chocolate bars or cocoa powder, and 60 per cent for some other refined products containing cocoa.

10.3.2.2. Non-tariff measures

Looking beyond global push for tariff liberalisation, it is observed that policy orientations have progressively been turning towards non-tariff measures. There exist instruments, other than custom tariffs, that are effective in restricting access into importing markets. Such policy measures include quality control (QC) measures; para-tariff measures such as anti-dumping and safeguards measures; technical barriers to trade (TBTs) for manufactured goods; and sanitary and phytosanitary (SPS) measures for food products, plants and animals.

The non-tariff measures to control imports are typically categorised into technical and non-technical measures as picturised below.



UNCTAD

Compliance to non-tariff measures such as TBT and SPS requires meeting stated process benchmarks and certifications, which add to costs, thus wearing out the competitive advantage due to low labour costs or enhanced market access acquired through tariff cuts during

negotiations. India's agri-produce and agro-products are also subject to a series of non-tariff measures in top consuming markets. Examples of market denials are ban on rice imports by Iran and green pepper by Saudi Arabia. Vietnam refuses to allow Indian peanuts, and China does not buy non-basmati rice from India but sources the same from Pakistan as well as Cambodia, Myanmar, Vietnam and Thailand. US legislation requiring agriculture imports to be mandatorily inspected and audited by USFDA (US Food & Drug Administration) will increase the cost of compliance and hurt India's farm exports.

Prevalence of non-tariff measures are important in view of WTO commitments. There is widespread use of NTMs by both developed and developing countries. In major importing countries, NTM coverage is 100 per cent across commodity groups. It is estimated that over 50 per cent of Indian exports to EU, less than 33 percent of exports to US, and 45 per cent of exports to Japan are subject to NTMs. In Argentina, Brazil, Chile and Romania non-tariff measures are applied widely in case of food drink and tobacco products. The non-tariff measures applied in these countries are predominantly for the protection of human, animal and plant health; while in China measures most frequently applied is import inspection.

It is generally believed that sanitary and phyto-sanitary measures when seemingly applied in an indiscriminate manner lacking transparency, are done in order to keep a check on exports. There are several rejections of basmati and non-basmati rice shipments to the US on the grounds of low hygiene standards. The US regulations require the manual sorting of rice and the treatment for weevils. The issue of pesticides residues is frequently raised by the EU and Japan. Pesticide residues are also a concern in the case of tea exports to the EU. These concerns need to be rightfully addressed through suitable interventions in production and post-production phases, especially where focus clusters are being developed.

In developed countries frequent revisions of TBTs and SPS standards occur, demonstrating a 'goalpost change syndrome', making compliance more difficult for the exporting partner, which is generally a developing country. India has participated in non-tariff measure regimen through specifying the labelling requirements, registration procedures, certifications and test, quarantined requirements, and measures for food products. About 14 per cent of Indian agricultural exports are subjected to only NTMs (Non-Tariff Measures) and 79 per cent are subjected to both NTMs and tariff measures.

Negotiating for tariff cuts with other countries is not sufficient, unless non-tariff measures are also attended to in trade agreements.

10.3.2.3. International trade agreements

International trade agreements allow partnering nations to arrive at mutually agreed terms to promote trade in a free and fair manner. These are designed to promote the increased flow of goods, and when applied holistically, provide many opportunities for the participating countries to achieve higher gross domestic product, encouraging specialisation based on comparative advantage. However, if loosely applied, it can lead to one-sided market capture.

International trade agreements can be bilateral or plurilateral, regional or cross regional. The term Regional Trade Agreement (RTA), is a broad term that refers to a reciprocal arrangement between two or more countries to apply lower trade policy barriers to goods and services imported from the members, than to those imported from third countries. Modern RTAs go beyond tariff-cuts and traditional trade policy administration, but include mechanisms on investment, environment, labour and competition.

Other international trade arrangements take the shape of preferential grants (PTA), either unilateral concessions (Preferential Trade Arrangement) or on reciprocal basis (Preferential Trade Area). A free trade area (FTA) is a PTA in which barriers on trade between members are reduced or eliminated, usually including common tariffs and other policy measures such as eased custom controls.

Countries or regions can go beyond FTAs and collaborate for a greater degree of economic integration resulting in comprehensive economic partnerships or cooperation agreements. These include Comprehensive Economic Cooperation Agreement (CECA), Comprehensive Economic Partnership Agreement (CEPA and Regional Comprehensive Economic Partnership (RECP). A common market is a trade bloc where there is free flow of goods, services, capital and human resources.

India has signed on to various RTAs, both on bilateral basis like in case of Afghanistan and Sri Lanka (FTA); Chile (PTA); Singapore and Malaysia (CECA), Korea and Japan (CEPA), etc., and also with regional grouping for instance ASEAN-FTA, MERCOSUR-PTA and under negotiation are EU-BITA and the RCEP (Regional CEP).

From the perspective of farmers' income enhancement, the RTA strategy bears an important role, keeping in view the following:

- a. It should offer the potential to widen the farmers market, thereby allowing to develop targeted economies of scale to achieve improved resource use efficiency.
- b. Farmers may take advantage of complementarities that exist among countries in the RTA. Processing units in these countries can source raw material produced in large scale in India.
- c. Farmers can achieve sustainable productivity gains as they capture and create larger markets for their outputs. This also improvise capital use efficiency for the investments in logistics and other infrastructure.

Various RTAs need to be designed and applied appropriately to the overall advantage of farmers. The advantageous outcomes are many, and include changes in production processes and in the produce basket of exports, thus promoting market led innovation and diversification in all agricultural sub-sectors.

Trade agreements offer possibilities to enter into new markets or expand existing market presence, and at the same time, however, it also opens up the possibility of surge in imports for those agro- products for which India commits to reduce its tariff rates. This surge in imports due to import duty reductions clubbed with high domestic production of the concerned crop leads to drastic fall in the prices of agro-commodities in local markets. The ugly side is a hit on the expected income of the farmers.

One of the protective measures preventing import duty reductions of crops of livelihood concerns of the country as trading partner in RTAs, is to announce a special, negative and sensitive list during its trade negotiation. For instance, India has managed to safeguard the interests of both its farmers and industry through a large 'Negative and Exclusion'¹⁶ list of 489 items, which includes 303 items of agriculture sector. This would mean on one hand protection of Indian farmers against import surge from ASEAN, but at the same time similar list from ASEAN would mean no business opportunity for Indian agro-exports.

On account of AIFTA (ASEAN-India Free Trade Area) under the Framework Agreement on Comprehensive Economic Cooperation with the Association of Southeast Asian Nations (ASEAN), India is to reduce tariffs on special products comprising crude & refined palm oil, pepper, black tea and coffee by December 2019. Such arrangements are typically negotiated so that India also finds reciprocal access to ASEAN markets. For example, to promote oilseed production, future negotiations could include that a share of imports would use oilseeds produced in India as feedstock for the extraction plants, especially where an associated capacity in oil extraction plants is pending.

Better information and market intelligence on these aspects will build ability to take full advantage of the trade agreements, which should normally lead to growth through repeat orders. The global market should not be viewed solely from the perspective of exporting value added products, but is also as destination for the raw agricultural produce of India.

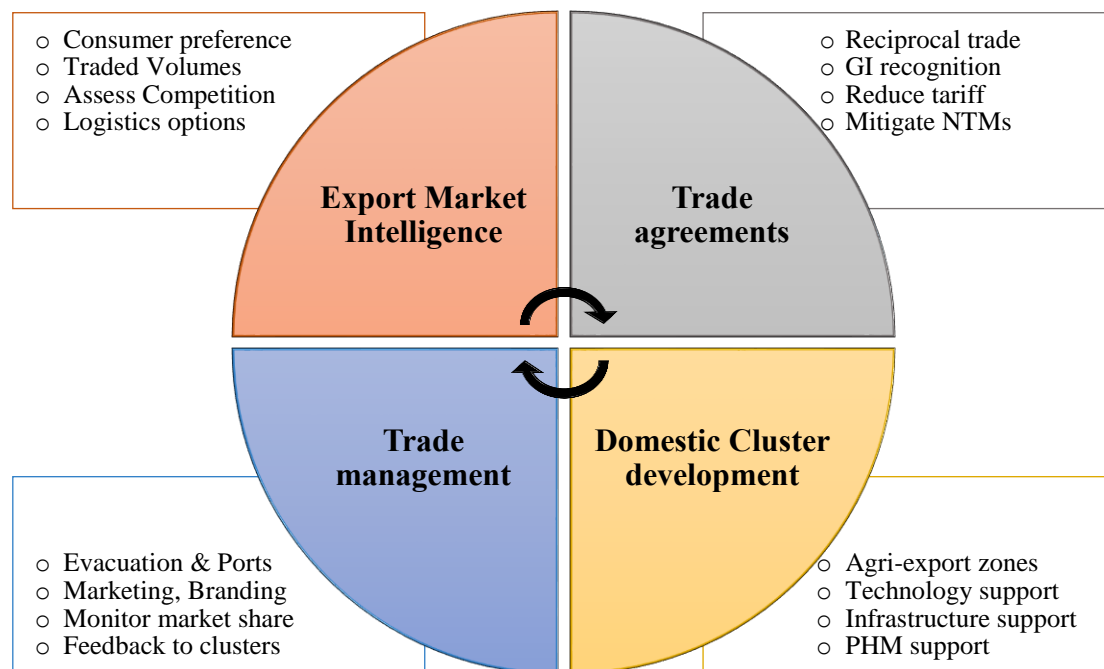
10.4. Framework to Promote Exports

A comprehensive and dynamic agricultural export promotion mechanism is recommended. While shift and growth in consumer demand in a particular period may necessitate supply through imports, where ecologically feasible, Indian agriculture steps up to meet the growth in demand. This increase in production is made more relevant, when the farmers also find associated demand through exports. Active management of the export supply chain is needed.

Any connect with foreign markets is made more pertinent, if those markets are studied and consumer preferences are better mapped. Currently, most of the export promotion activities are seen to pursue a push into foreign markets. The government supports participation in exhibitions, but basically these are an exploratory display of goods from India.

¹⁶ Negative list in a trade agreement means that the commodities listed under this category will not face any import duty exemption as a result of signing the RTA. The exports however would be allowed at MFN rate itself.

Figure 10.3 Managing the export supply chain



To make export promotion activities focused and outcome oriented, there is need to provision support through market intelligence which will include monitoring variations in market dynamics at each importing partner nation. **Transitioning export promotion from a push mode into one that is responsive to market pull is recommended by the DFI Committee.**

10.4.1. Market intelligence

The poor presence of Indian agri-produce and agro-products in global retail shelves, can be attributed to lack of appreciation of the variation in consumer preference (taste and quality) from the domestic consumer. What sells in India, may not be suitable to foreign buyers. For example, though the AIFTA was instrumental for reducing tariff on Indian rice, there was no commensurate growth in exports, since the ASEAN population prefers sticky small grained rice and not the long grained type produced for Indian consumers. Similarly, the higher level of sweetness in mangoes promoted from India, is not necessarily the demand in many countries where the consumer prefers green unripe mango.

Export growth ambitions cannot be fulfilled merely by pushing what is produced in India, but by producing what is asked for by the world.

Exports growth must be driven with the agenda to scale up the market share in existing import markets and by capturing new markets. In existing trade partners, India's market share can be increased by meeting price and quality standards of a particular produce or product, or by diversifying into supplying new produce or product types. In new markets, hitherto untapped by India, the trade can be captured by spearheading initial supply. In both cases, the chance of success is increased by situational analysis of the cross-border market demand and preferences.

The trade intelligence exercise would also require monitoring of other trade agreements, changes in buying patterns, regulations and certification requirements (pesticides, MRLs, labelling, additives, etc.)

The analysis should include regular assessment of competition from other exporters, ease of doing trade, market acceptability and lead to a cost benefit analysis for export promotion in the target country.

10.4.2. Trade management

Trade, once commenced, will need to be monitored for efficient management. Domestic bottlenecks for easing evacuation from ports will be important. Dedicating certain capacity or entire port zones for agri-export and import will also build an enabling atmosphere for agricultural trade. As part of trade management, regular monitoring of status of India's market share in a target country will be important. Any dip in trade volume will need to be evaluated. If it is because of a competing variety or product, the information should serve as feedback to producers. Where another exporting country bites into trade already executed by India, the same will need to be flagged and investigated. Marketing and branding in foreign shores would normally be by individual exporting enterprises, but an India brand image mechanism can be guided by the government.

The responsiveness of producers and exporters to changed dynamics in the importing country would also be monitored and guided. State departments, agricultural universities and other support agencies would also be able to sharpen their interventions with an outcome as target.

10.4.3. Production cluster

The Ministry of Agriculture, Cooperation and Farmers' Welfare and APEDA have already identified 10 clusters for export based production. Another ten can be identified and developed. However, these clusters or producing zones will require prioritised technology support to supply varieties and qualities as per aforementioned demand assessment. A cluster approach brings various advantages to farmers. As producers of common quality and variety, they have economy of scale, better support in post-harvest logistics and more assured market acceptance. The support would naturally be market-linked SPS compliance, bringing in suitable traceability, quality, variety, packaging and labelling, etc. to the production clusters.

The consumers of the output from such clusters will be of two types. The domestic processor of export products and the international consumer for primary produce. Therefore, such clusters will generate raw material for processors and preconditioned produce for export markets. The export promotion policy would therefore need to promote, equally, finished products as well as fresh whole produce. The finished products are such as silk products, cotton textiles, leather goods, milled food items, potato chips, mango pulp, jams, pickles and processed meats and more. The whole food produce from India would include items such as potato, mango, litchi, various vegetables, fresh meats, flowers, raw spices, etc. There is a tendency to ignore exports of farmers' agri-produce, in favour of manufactured agro-products, whereas both outputs have

demand and the first actually brings more immediate benefits in form of market capture and creates scale at farm-gate. The exported produce would require appropriate post-harvest management support, to prepare and package the produce for travel to foreign shores.

10.4.4. Trade agreements

International trade agreements have an important role to play in guiding agricultural trade. On the other hand, they need to be guided by market analytics and in convergence with ongoing development activities in agriculture. It is obvious that trade cannot be a one-sided affair. One way traffic only results in costs the entire chain of activities. Therefore, the need to plan for reciprocal traffic, buy-back or cross-product arrangements. An agreement, originally made to secure a supply of specific goods would benefit from re-assessment in light of new developments in agricultural production. Geographical Indication (GI) recognition and removing of trade barriers (price and non-price) will also help make Indian agriculture more competitive.

10.4.5. Impact of WTO

The World Trade Organisation (WTO) provides a common institutional framework for conduct of trade relations among its members. The agreement allows governments to support their rural economies, but preferably through policies that cause minimal distortion in trade. Among other obligations, member countries commit to cut and 'bind' their custom duty rates on imports of goods. The tariff rates on a number of goods are "bound" (committed and difficult to increase) and this rate is effectively a ceiling rate.

The WTO Agreement on Agriculture (AoA) has been adopted with the objective of reforming trade in the sector and to make policies more market-oriented. The rules and commitments under AoA apply to:

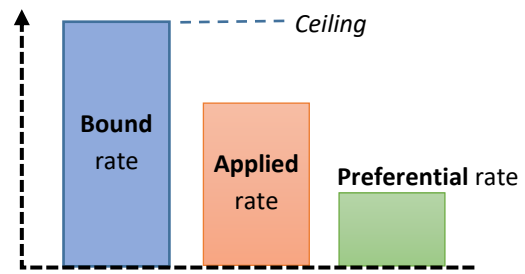
- Market access - various trade restrictions confronting imports
- Domestic support - subsidies and other programmes, including those that raise or guarantee farmgate prices and farmers' incomes
- Export subsidies – limits on spending and quantities, and other methods used to make exports artificially competitive.

The rule for market access in agricultural products is "tariffs only" and the tariffs on all agricultural products are now "bound"¹⁷. Almost all import restrictions that did not take the form of tariffs, such as quotas, have been converted to tariffs - a process known as "tariffication". This has made markets substantially more predictable for agriculture. Previously more than 30 per cent of agricultural produce had faced quotas or import restrictions (cotton is a typical case, for example). The first step in "tariffication" was to replace such restrictions with tariffs that represented about the same level of protection. Then, over six years from 1995-2000, these tariffs were gradually reduced (the reduction period for developing

¹⁷ www.WTO.org "Tariffs: more binding and closing to zero"

countries ended in 2005).

The applied tariff rate, and those negotiated with other countries as most favoured nation (MFN rate) or preferential rate, is capped as defined by the bound rate. The rates vary from country to country and commodity to commodity.



The ability of a country to use tariff to restrict imports is also effectively “bound”. Like other countries, the applied tariff rate is less than the maximum bound rate. Annexure A11 lists the difference between India’s bound rate and applied rate. On the surface, the gap gives opportunity for India to increase applied tariffs rates. However, there are other considerations in international trade, besides an immediate transactional advantage, and in the long term it is better to build equitable trading relations, based on competitive advantage. In the short term, where a gap exists and the situation so demands, the gap in bound rate and applied rate can be narrowed.

The AoA classifies government support to farmers into two basic types – those measures with no, or minimal, trade distortion effect (called “**Green Box**” measures); and those that distort trade (called “**Amber Box**” measures). For example, government provided agricultural research or training is considered to be of the former type, while government buying-in at a guaranteed price (“market price support”) falls into the latter category. **Support under Amber Box requires reduction commitments from member countries.**

Green Box measures are exempt from such commitments. These cover many government service programs, including research, pest & disease control, agricultural training - extension and advisory, marketing and promotion service, infrastructural services (including market, port and water facilities), etc. **Various recent initiatives taken by Government of India, especially the investment ‘in’ and ‘for’ agriculture, come under this exempt category of measures.** Also allowed under Green Box are direct payments that are decoupled from influencing the type and volume of agricultural production. Others include income insurance, structural adjustment assistance programs, disaster relief, etc. **In the case of developing countries, special treatment is provided in respect of governmental stockholding programmes for food security purposes and subsidised food prices for urban and rural poor.**

In addition to measures exempted in Green Box, certain other domestic support (called “**Blue Box**”) measures are exempt and only allowed to developing countries. They refer to certain developmental measures and certain direct payments under production limiting programs. These include input subsidies to resource poor or low-income producers, investment subsidies generally available to agriculture in developing countries and support to encourage diversification from growing illicit narcotic crops.

All domestic support measures in favour of agricultural producers that do not fit in other exempt categories (Green or Blue boxes) come in the Amber Box and are subject to reduction commitments. However, there is provision, that, if in any year the aggregate value of the product-specific support does not exceed a specified (*de minimus* ceiling) share of the total value of production of the agricultural product in question, then there is no requirement to reduce such trade-distorting measure. **The *de minimus* ceiling for developed countries is specified at 5 per cent and this threshold in case of developing countries is 10 per cent.**

India is in compliance with its WTO commitments and the input subsidies (seed, fertilizer, power, credit, etc.) generally amount to around 7 per cent of the total value of agricultural output. This actually indicates that the bulk of agricultural value created, relies on market linkage for economic growth. **India is also moving fast towards developed nation status, and *de minimus* ceiling will one day come down to 5 per cent.** Therefore, it is imperative that developmental efforts should focus, on priority, on market reforms, access to new markets and optimal value capture. The current exemption under Blue Box measures should also be applied strategically apply and aim to slowly shift from input support towards investment support. This should form the long term goal.

In relation to Green Box, India is already implementing various comprehensive measures. Examples of some similar measures by other countries are in the following table.

Table 10.9 Examples of green box measures

Green box measures in China	
Research programs	Allocations for research programs and activities at agricultural institutes.
Pest and disease control	Expenditures on early-warning, quarantine, prevention and cure of plant and animal pest and disease
Training	Expenditures on the training of technical and administrative personnel in the field of agriculture
Extension and advisory services	Expenditures on the extension of new technologies and breeds and related advisory services
Inspection services	Outlays on inspection and quarantine of agricultural products, animal feed, veterinary medicines and farm machinery, etc.
Marketing & promotion Services	Expenditures on market information, advice and promotion relating to particular products
agricultural Infrastructural services	Outlays on infrastructure services, including the Agricultural Comprehensive Development Programmes, flood control engineering, drainage and irrigation facilities, rural roads, rural electricity reticulation, small scale watering facilities on farmland, as well as soil and water conservation
Green box measures in Thailand	
Infrastructural services	Services include: construction of dam and drainage systems, maintenance of the facilities throughout country in order to have sufficient water resources for the cultivated areas, river-bank wall to prevent floods, consolidation of land-use in irrigation area, construction of roads and bridges and other means of transportation in rural areas.
Inspection Services	Inspection services are undertaken to ensure safety and quality of agricultural products as well as the quality of feedstuffs.

Promotion of Farmers' Organisation	Assistance in terms of advice on market information and management of farmers' organisation to help marketing of their products efficiently.
National Extension and Advisory Services	Knowledge transfer from research to producers, advice on viable options to increase income, know-how concerning seeds, plants and livestock, provision of knowledge on new technology to increase agricultural productivity.
Green box measures in Vietnam	
Pest and disease inspection services	Budgetary expenditures in activities related to plant and animal health protection; sanitary and phytosanitary defence and alertness; pest and disease surveillance, prevention and control; provision of vaccines, etc.
Regional assistance programmes	Priority investments to develop 1,500 communes under harsh and especially disadvantaged conditions in remote and distant areas etc.
Subsidy to low income resource poor farmers	Short-term soft loans; Budget allocations for freight subsidies to offset the cost of transportation and production inputs to mountainous, remote regions, etc.

10.5. Restructuring of Agricultural Trade Development

Agri-trade development efforts by the government, need to include a strong **Trade Analytics Cell**. On the basis of regular studies of export markets, trade facilitation arrangements and responsiveness of production clusters, this analytics cell would guide the promotion and development activities. Without such intelligence and inputs, promotion activities will remain a shot-in-the-dark. The practice of government supporting products on display stalls in exhibitions, should take a back-seat and it should focus on organising and facilitating regular business meetings, partnerships, negotiations and securing of delivery systems.

The analysis will also form an important input for policy makers and during trade negotiations. A harmonised set of criteria and assessment tools should be brought into use, so that nodal users are not subject to interpretations of random and independently conceived metrics.

The export promotion bodies should prioritise efforts on production clusters, and preferably to educate on regulatory compliance, traceability, packaging and labelling, and as a focus feedback mechanism to producers. The technical requirements can be guided through the local SAUs/KVKs and infrastructure support through the state government. Taking advantage of Geographical Indication, and super food focused production are important attention areas (see Annexure A10).

Pro-active involvement of Indian embassies/high commissions to promote agri-trade is needed. Embassies can be strengthened with a dedicated agricultural trade officer, with specific mandate to develop agri-trade. The officer would also closely monitor and mentor any new entrant from India into that market. Facilitation with host authorities would also be required to address issues. Any bottleneck(s) faced, should be communicated back to India for suitable remedial action, wherever possible.

The Ministry of Agriculture and Farmers' Welfare should engage actively with the Ministry of External Affairs and seek their partnership and support in promoting exports. An aggressive trade strategy is recommended, keeping the perspective of Doubling Farmers' Income.

10.6. Strategy for Aggressive Trade

Government of India is in the process of unveiling its first Agriculture Export Policy (AEP) with the objective of increasing the nation's agricultural exports and integrating Indian farmers and agricultural products into global value chains. It is to be borne in mind that there is increased focus on productivity gains across sub-sectors, that will result in a higher output, and this will need to be connected with new markets, within and outside the country. Hence, an aggressive strategy on agricultural exports is important. The objective by 2022-23, should be to raise agricultural exports to at least double the total volume of agricultural exports and in value terms, to reach a target of US\$ 100 billion. Further the basket of commodities exported should be broad-based and reach beyond cereals and meat, which today account for the bulk of the exports.

As explained earlier, export promotion, apart from market intelligence on the potentials that exist in foreign markets, should encompass inputs on the regulatory changes in potential markets abroad and resolving market access issues by taking them up with relevant bodies in host countries, as a part of an aggressive Agriculture Trade strategy.

For this purpose:

- **The India Embassy system needs to be strengthened and oriented towards enabling increased agriculture exports from India. Countries such as United States have dedicated Foreign Agriculture Service (FAS) and thus have presence in all the important countries wherein their agriculture exports are strong (93 offices covering 171 countries).** FAS of US Department of Agriculture looks after areas such as Trade Policy (resolving market access in host countries), Market Development (conducting market development programs with US agri exporters), Export Assistance (helping US exporters understand export potentials abroad and various export promotion programs), Market Intelligence (Data and Analysis on foreign market conditions, production forecasts, track changes in policies affecting US exporters of agricultural produce). **Similarly, all other major agricultural exporting countries have their representatives/offices in important destination markets. Though India has emerged as a net exporter of agriculture and allied produce, similar systems are not in place.**
- As of now, India has only one post of Agriculture Advisor in Brussels who coordinates with the Ministry of Commerce and Ministry of Agriculture on matters of agriculture & allied exports to entire Europe; a post of Resident Director, MPEDA at New York who has now been asked to look after all agriculture & allied sector exports to USA. Apart from these two, one post of Minister (Agriculture) in Indian embassy at Rome exists, but is largely related to interactions with FAO and not mandated to promote Indian exports.

- Hence, there is a need for strengthening this system by expanding the presence in all the top 15 export destinations of India such as USA, Saudi Arabia, UAE, China, Vietnam, Bangladesh, Malaysia, Sri Lanka and covering important destinations like Africa. The posts could be at different seniority levels depending upon the importance of these markets. These specific posts may be filled by domain experts/experienced development administrators/policy makers in agriculture and allied areas. These trade experts would be tasked to monitor the market conditions in their host countries, interact with traders & exporters in India and resolve their market access issues by interacting with the relevant bodies in the host countries, explore market opportunities for new products, inform the relevant Ministry based home about standards and regulatory requirements including periodic changes in those countries.
- There have to be periodic meetings with these officials in Indian embassies and Ministry of Agriculture and Ministry of Commerce. Creating this eco system would greatly help sort out issues faced by India's exporters, understand the policy changes that are happening in those markets, thereby improving the domestic policy making as well as programs, export incentives, imposing tariffs etc. **It may be noted, that the total Agriculture Trade of India is around Rupees four lakh crore and the cost of creating this infrastructure in Indian embassies would be a miniscule fraction of the benefits that would accrue.**
- To start with, the central government may create the posts of Advisor (Agri-trade) in ten select export markets in South America, Africa, Australia, China and ASEAN (at Vietnam), leaving out the two places where already such experts are placed (i.e., EU and USA).
- The trade strategy should focus on all kinds of agricultural goods, i.e. manufactured value added products, semi-processed goods, unprocessed commodities and fresh whole produce of farmers. Short supply chains having direct linkage with farmer groups should be the preferred option.

An aggressive export strategy is important for developing agriculture in a future ready manner, with growth that is market-linked and market-led.

10.7. Need for a Stable Trade Regime

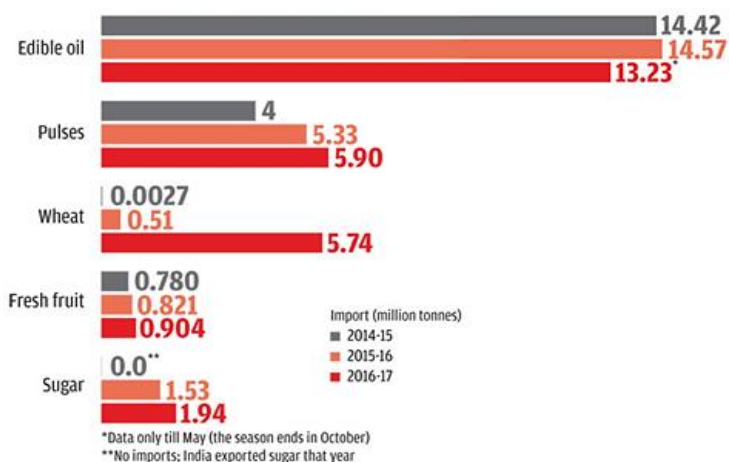
Trade typically encompasses imports, exports and compliance with associated rules of trade. All three components need to work in a complementary manner. In case of farmers, these need to also enable and empower them to capture better value and over sustainable periods.

10.7.1. Import restrictions

A cursory look at the tariff changes by India, over the last decade, will show that there have been frequent and short term adjustments, frequently in reaction to temporary domestic supply imbalance. Long term trade relations are put at risk when policy is varied in the short term and unstructured in nature.

Taking the case of wheat as an example, in the last eight years (between 2007-08 and 2014-15), the import tariff was largely zero. In August 2015, import duty was raised from zero to 10

per cent and subsequently within a month in October, 2015 it was raised further to 25 per cent. A year later, the import duty was reduced to 10 per cent in September 2016 and was brought down to zero in December 2016. In March 2016, the duty was again raised to 10 per cent.



Wheat saw a surge in imports, in 2016-17, though in 2017-18 the quantity is expected to be half. However, imports happened for various reasons, including due to inefficiency of the domestic market, making imports cheaper for traders. Wheat imports also happened when FCI restricted sales to bulk purchasers.

In case of pulses, during the last 10 years, the imports were allowed at zero tariff. Only during March, 2017, the import duty on *Tur dal* was raised from zero to 10 per cent. Though having raised the duty, *Tur Dal* imports continued at zero duty from Myanmar and a few African LDC countries. These countries enjoy tariff concessions due to the Indo-ASEAN FTA (in case of Myanmar) and DFTP scheme (in case of LDC countries). In such situation, high import duty alone cannot be the answer. It will entail closer monitoring to ensure that the imports are happening from the concessionaire country by obliging it to furnish a certificate of origin.

Similarly, import tariffs on edible oils show frequent changes. The import duty on crude palm oil was at 60 per cent during January, 2007. It was reduced over the next one year to 50 per cent, then 45 per cent to 20 per cent and set at zero during April 2008. It remained so for the next 5 years and again was raised to 2.5 per cent in January 2013, then raised to 7.5 per cent in December 2014 and again increased to 12.5 per cent during September, 2015. It was reduced to 7.5 per cent after one year, in September, 2016.

In parallel, the import tariff on refined palm oil also shows wide variations during the last 10 years. It was at 67.5 per cent during January 2007 and in the next one year was gradually reduced to 57.5 per cent, then 52.5 to 27.5 per cent and finally to 7.5 per cent during April 2008. It again was changed to 10, 15, 20 and 15 per cent over the next eight years.

In July 2017, having taken a more comprehensive view from the perspective of oilseeds producing farmers and the need to acquire greater self-sufficiency in this sector, the import duty have been notified at 30 per cent on refined oil and 15 per cent on crude oil.

Similar import tariff changes were seen in respect of other edible oils such as crude sunflower oil, soyabean oil (crude), mustard/rapeseed/colza/canola (crude) and all other edible oils (crude). They were all brought down to zero per cent during 2008 and then raised subsequently.

In case of refined oils too, tariffs were brought down during 2008 and then increased subsequently.

As far as import policy for agriculture is concerned, it is often considered as a price support and price stabilisation tool, which is tilted more towards consumers. Such frequent changes, triggered by concerns of consumer unease over prices, cause disruptions in cultivation patterns at domestic farms. Sudden reduction in import tariffs due to increase in consumer prices harm the long term interests of our farmers, and cheap imports tend to offset the commercial welfare of farmers.

What is now needed is to reorient trade policy to serve the interests of the farmers, who as agri-entrepreneurs are seeking opportunities for monetisation of their produce with comparative advantages. The trade policy then will come to acquire the characteristics of an agri-export facilitator, in contrast to consumer-centric from a larger perspective, the interests of both the farmers and consumers will need to be balanced.

10.7.2. Export limits

In case of exports too, policy is used as an internal price control mechanism, to adjust tariffs to curtail any increase in consumer prices on an ad hoc basis. The Minimum Export Price (MEP) is a frequently used tool with the intention to restrict or ban the export of a commodity in reaction to rising prices in the domestic market.

In either case, the agenda is to control the supply of a commodity to the domestic market, the oversight being temporary and inconsistent in duration, as a contrived reaction to short term changed circumstances. **The policy does not actively promote agricultural trade but is mainly used to control prices in the domestic market.**

Both import and export controls when imposed in seemingly ad hoc manners, disturb the global trading relationship. The effect of limits on imports trade also impacts in reciprocal lowering of exports and even to the extent that export relations are not promoted.

10.8. Long Term Agricultural Trade Policy

The Foreign Trade Policy announced by the Department of Commerce usually takes a long term view (3 years at present). However, there is no corresponding long term Agricultural Trade Policy in the country.

Agricultural trade policy operates under a framework where it is readily used as a supply control mechanism. The resulting short term adjustments in tariff and export windows tend to disrupt planning, or relationship building in international trade. Agriculture is already unpredictable, subject to vagaries of nature on the domestic front and market uncertainty. A short term view of trade policy can only add further to the risks and uncertainties.

It is recommended that India's agricultural trade policy should be guided by balancing the

interest of both the producers and the consumers, in addition to long term food and nutritional security concerns of the country. **A trade perspective over 5-10 years period is suggested.** A mid-term planned review of agriculture trade policy is another important recommendation, akin to the mid-term review undertaken for foreign trade policy.

The import restriction requirements can be structured on pre-determined supply signals, specific to crops and for periods of the year, so that the trade can be accordingly planned for the long term. For example, it can be declared that if the production of a particular commodity, at the time of first production estimates, is expected to be 5-10 per cent less than the moving average of the preceding three years, import tariff reduction of 5 per cent will be considered. Similarly in reverse, if the production expected is higher than 5-10 per cent of average, the import will be curtailed. The status would remain for a minimum of 6 months, unless the supply situation changes by another 5 per cent to the contrary. Different combinations of parameters, specific to commodities, can be determined. Such pre-set triggers will bring transparency and allow the trade to make planned adjustments to supply dynamics and accordingly strengthen their links with trading partners abroad. The price and demand forecasting mechanism in Chapter 9 will also help with relevant demand-supply intelligence to serve this purpose.

Government needs to reconsider agricultural trade policy and structure the mechanism such that the agricultural economy has more freedom to build external markets, which will benefit plans for productivity increases. Closure of export windows deprives producers from planning long term targets for international trade. Export bans result in a short term excess and long term disruption in building export markets. Exports need to be promoted aggressively and preferably not be used as price control mechanism. Exports can add to demand for domestic produce and provide an upward lift to the market price, which is advantageous to the farmers.

10.9. Annotation

India is considered a developing nation and accordingly relies on special leeway provided to non-developed countries in various international frameworks, such as the WTO. However, the situation will change and to be future-ready, the various policies should incrementally shift their approach from input subsidy to investment support.

To hasten achieving the status of developed nation, agricultural output needs to connect with global markets, in a more meaningful manner. Isolating practices such as random opening and closing of export and import windows should be limited. A more transparent trade policy, framed to support and promote exports and reciprocal imports needs to be developed. An institutional mechanism to converge the agenda of departments looking after agricultural sectors, consumers, commerce and external affairs may be established to coordinate policy formulation.

The large and growing production base of India's agriculture, will stagnate unless external markets are aggressively developed. Specific attention is needed to be reform the agricultural market architecture, promote clusters to produce export quality varieties, ease evacuation from

ports to international destinations, and build agri-trade relations with complementary requirements in partnering countries. Singular focus on promoting finished products of India needs to be tempered with equal focus on fulfilling international demand with produce of India. There is large production base of raw material from agriculture and allied, that is constrained from further growth, unless it is linked with extra-national demand.

Indian embassies or high commissions are well positioned to play an important role in pursuing an aggressive agricultural trade policy. However, they will require the support of officers /resources with domain knowledge posted in the embassies/high commissions at appropriate levels of seniority.

Key Extracts

- The growing production and focus on higher productivity will require associated growth in market access, across borders.
- An aggressive agricultural trade policy is recommended, with a short term target of USD 100 billion in agricultural exports by 2022-23 and at least double the volume of commodities exported. Aggressive trade policy will also include building reciprocal trade relations with trading partners.
- Ad hoc opening and closing of trading windows should be structured through an institutional mechanism that factors in the impact on international trade, domestic consumers and farmers, alike.
- A long term trade regime, with a minimum 5 to 10 years perspective is necessary to allow developing of long term relationships in international markets.
- Though all international market access of agricultural products is tariff based under WTO, with committed reduction in the long run, non-tariff measures are expected will govern trade relations. A focused trade analytics cell needs to be set up to assess and stay ahead of such challenges.
- Export promotion agencies of the govt. require to restructure and develop pull-based exports, and not merely to push products and brands into unknown market situations. A feedback mechanism to make producers responsive and remain competitive is required.
- There appears scope to take advantage of additional input subsidies under the Amber Box, however, it will be more relevant to scale up investments in modernising marketing system, logistics and irrigation facilitates, all coming under Green Box.

Chapter 11

Livestock and Fisheries Marketing

Livestock and fishery are an important source of farmers' income and form the backbone of agricultural exports of the country and the growing demand for animal food products signifies added opportunity for farmers. In direct contrast, the domestic marketing in these sub-sectors leaves much to be desired.

11.1. Background

Livestock production and crop based agriculture are intrinsically linked, each being dependent on the other, and both are crucial for overall food and nutritional security. The ownership of the livestock is more evenly distributed, with landless labourers and marginal farmers owning bulk of livestock. Rural women play a significant role in Animal Husbandry and are directly involved in most of the operations relating to feeding, breeding, management and health-care of the livestock.

The dictionaries broadly define livestock as 'farm animals regarded as an asset, who are raised on a farm to generate a profit, such as cows, sheep, chicken and pigs'. The FAO/WHO Food Standards Programme defines livestock "as any domestic or domesticated animal including bovine (including buffalo and bison), ovine, porcine, caprine, equine, poultry and bees raised for food or in the production of food. The products of hunting or fishing of wild animals shall not be considered part of this definition." The animals referred to are large and small quadrupeds, birds (including poultry like partridge, pheasant, ostrich), insects (bees) and larvae of insects (silkworms). However, in today's age even snake and scorpions are being farmed for venom. With the growth in inland fisheries, fish farms can also be considered as farmer's livestock as it is an animal asset and is cultivated for commercial production.

From the perspective of the DFI Committee, livestock broadly implies living stock or assets, of animals that are reared in agricultural setting, to produce goods (such as meat, milk, eggs, wool, hide, feather, honey, etc.) and/or to produce labour to service agricultural activities. Livestock marketing involves the facilitation of trade of the goods and services that arise from livestock. The produce from livestock can undergo agro-processing and the resultant products are marketed by attached industries and therefore different from livestock marketing.

11.2. Livestock produce and products

Livestock production can be broadly categorised into production of animals themselves and the secondary produce such milk, eggs, wool, hide, meat, etc. Besides trade in live animals, the other livestock produce that is traded can be categorised into produce from live animals, products from slaughtered animals and by-products from livestock production.

Produce from live animals are whole milk (from cow, buffalo, camel, sheep, goat), eggs (from hens, duck, partridge, ostrich, etc.), wool, honey, bees wax, *ahimsa* silk, germplasm, etc. Products from slaughtered animals include meat, offal, fat, skin (sheepskin, buffalo hide, pig skin, rabbit skin, etc.), fur, etc. The by-products of livestock production are both dairy based

and non-dairy based requiring added activity besides initial harvesting. The dairy based products include butter, ghee, curds, cheese, whey, casein, rennet, ice-cream, powdered milk, dried eggs, egg albumin, etc. and are closely integrated with the primary produce (milk) from livestock farming. The other by-products are linked to products of slaughtered animals such as meat preparations (dried, salted, canned, homogenised, cured, etc.), animal fat (lard, tallow, etc.), animal oils, gelatin (food and non-food), bio-extracts (cosmetics, life sciences, medicine, etc.), clothing (goods using leather, fur, feather), composites (bone, feather, etc.), and much more.

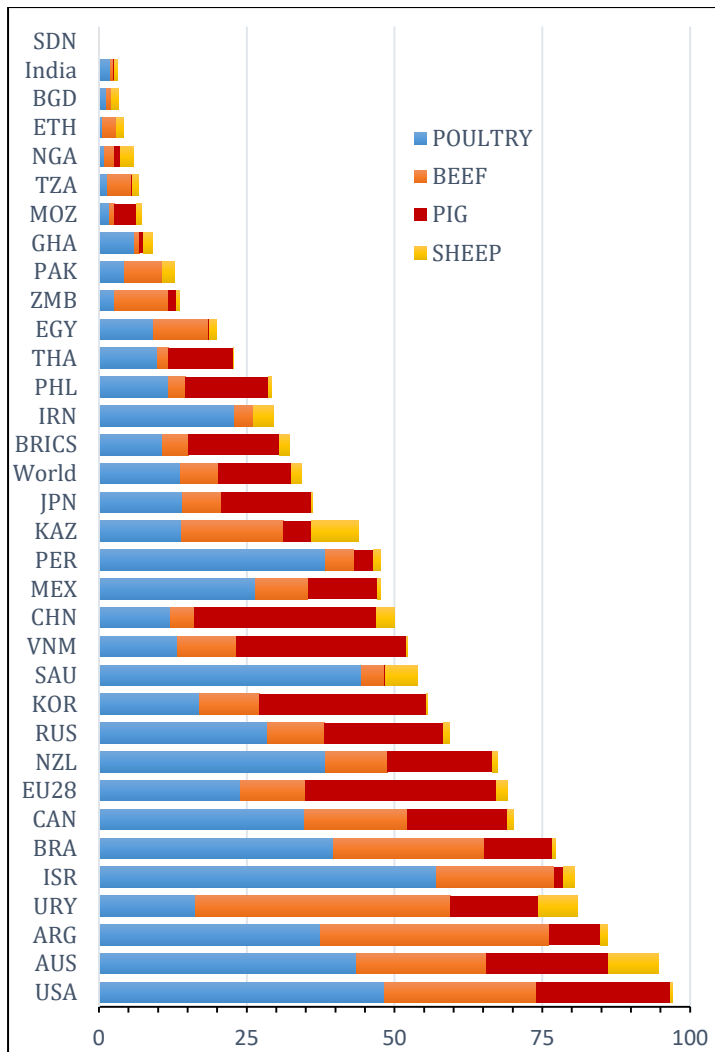
Livestock by-products form an integral part of various products of secondary sector, like some processed foods, wax paper, crayons, margarine, paints, brushes, cleaners, adhesives, lubricants, candles, soaps, lipsticks, shaving cream, water filters, insulation, antifreeze, certain plastics and rubber, upholstery, vaccines, pharmacological proteins, floor waxes, sporting goods, etc. Like other forms of agriculture, livestock farming is an extensive subject and the commodities that result touch every aspect of human life.

Table 11.1 Livestock Population in India (in million) – Livestock Census, 2012

Species	1951	1982	1987	1992	1997	2003	2007	2012
<i>Cattle</i>	155.3	192.5	199.7	204.6	198.9	185.2	199.1	190.9
<i>Buffalo</i>	43.4	69.8	76.0	84.2	89.9	97.9	105.3	108.7
Total Bovines	198.7	262.4	275.8	289.0	289.0	283.1	304.8	300.0
Sheep	39.1	48.8	45.7	50.8	57.5	61.5	71.6	65.1
Goats	47.2	95.3	110.2	115.3	122.7	124.4	140.5	135.2
Horses & Ponies	1.5	0.9	0.8	0.8	0.8	0.8	0.6	0.6
Camels	0.6	1.1	1.0	1.0	0.9	0.6	0.5	0.4
Pigs	4.4	10.1	10.6	12.8	13.3	13.5	11.1	10.3
Mules	0.1	0.1	0.2	0.2	0.2	0.2	0.1	0.2
Donkeys	1.3	1.0	1.0	1.0	0.9	0.7	0.4	0.3
Yaks	NC	0.1	0.0	0.1	0.1	0.1	0.1	0.1
Total Livestock	292.8	419.6	445.3	470.9	485.4	485.0	529.7	512.1
Poultry	73.5	207.7	275.3	307.1	347.6	489.1	648.9	729.2
Dogs	-	18.5	18.0	21.8	25.5	29.0	19.1	11.7
Rabbits	-	-	-	-	-	0.5	0.4	0.6

11.3. Primary Livestock Consumption

Meat consumption in India is much lower than global averages, for cultural and religious reasons. But India has shown extraordinary growth in the consumption of milk, eggs, and poultry meat. Poultry is in fact one of the fastest growing segments of the agricultural sector in India today. Poultry meat is the primary growth driver among meats, with growing preference for this over more traditional red meats. As a result, the industry estimates the broiler meat market is at about Rs 65,000 crore and pegs egg market at Rs 30,000 crore.



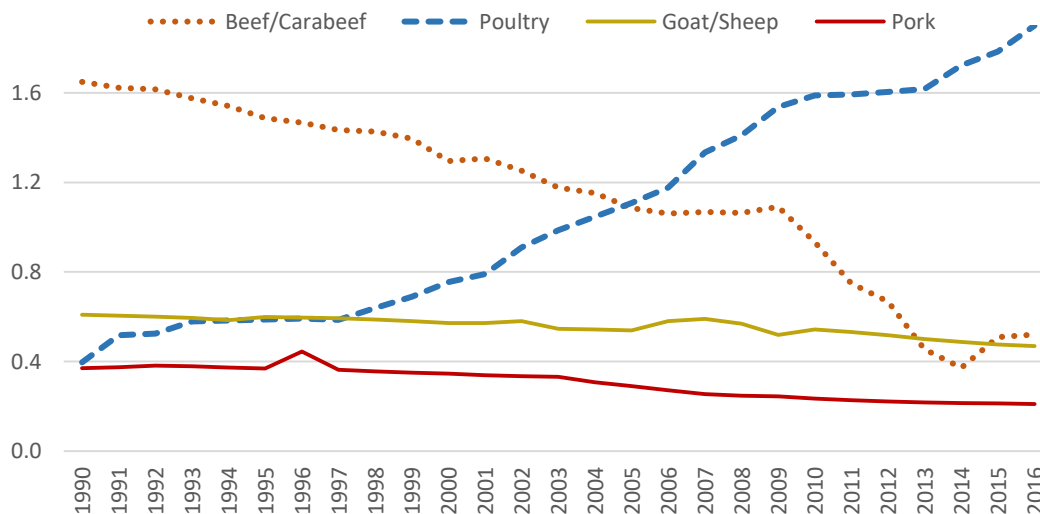
As per OECD (2018), Meat consumption (indicator), the total meat consumption in India, is 3.099 (kilograms per capita). In comparison, the World per capita consumption at 34.24 kgs and in BRICs the consumption is reported at 32.22 kgs per capita.

The breakdown of meat consumed by Indians, by type, is as follows – poultry has the highest share of consumption at 61 per cent, followed by beef and sheep (goat) at 17 and 15 per cent each, and pig meat at 7 per cent.

Worldwide indicators show that poultry holds the highest share at 40 percent, followed by pig meat, beef and sheep at 36, 19 and 5 per cent respectively (in quantity 13.8, 12.3, 6.6 and 1.7 kg per person per annum respectively)

Meat consumption is measured in carcass weight (except for poultry expressed as ready to cook weight) and in kilograms of retail weight per capita. Carcass weight to retail weight conversion factors are: 0.7 for beef and veal, 0.78 for pig meat, and 0.88 for both sheep meat and poultry meat. Trend lines indicate retail kg per capita.

Figure 11.1 Meat consumption trends in India (OECD-FAO data)



Source: OECD-FAO Agricultural Outlook (Edition 2017)

Historical trends indicate that red meat consumption is generally declining while that of poultry meat is growing rapidly in India. These trends are also indicated by other observations. The per capita consumption data from multiple NSSO rounds, also indicates that domestic demand for red meat is declining whereas protein intake in the form of poultry, fish and eggs shows consistent increase. Pork consumption has grown 1.4 per cent in the last five years, below par with vis-à-vis population growth rates. Beef consumption has shown overall 25 per cent decline in consumption since 2011. Meanwhile, consumers show significant preference for poultry with a growth of 16 per cent in five years. Evidently, domestic demand for red meats is generally slowing down and even reversing, while demand for white meat (chicken and fish) is growing robustly.

Figure 11.2 Trends in mutton consumption (per capita annual)

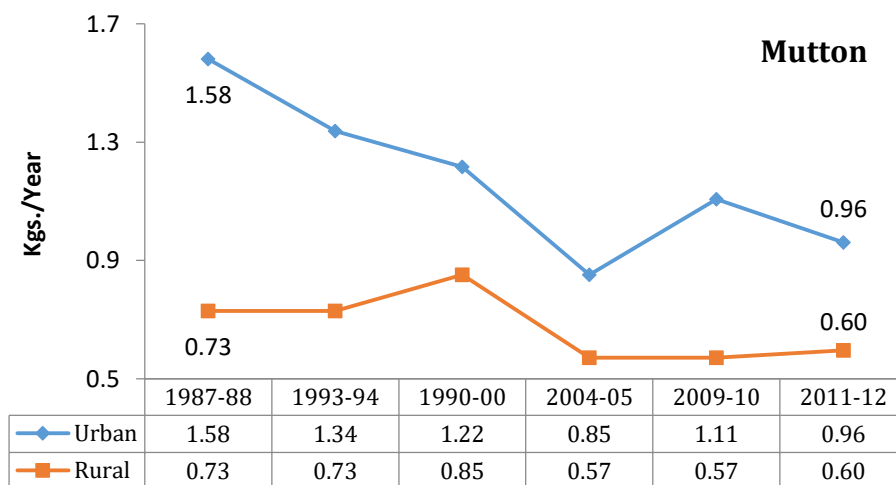
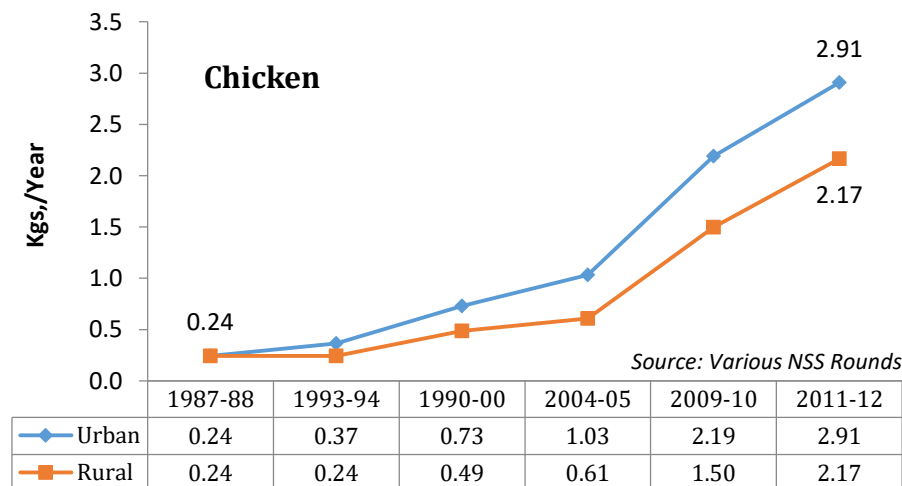


Figure 11.3 Trends in chicken consumption (per capita annual)



Nevertheless, the per capita consumption in poultry is yet only in the range of 1.5-2 kgs per annum. The poultry industry is categorised into the layer (egg) industry and the broiler (meat) industry. There are obvious overlaps between the two, with layer farms that focus on egg production also providing broiler meat. The small layer farms are increasingly giving way to large layer units with hundreds of thousands of birds in a single unit. The layer farms are

concentrated in certain states and the fresh eggs are transported to other regions across the country. Consumption of eggs shows constant growth, having doubled in the past decade. This coincides with consumption growth in poultry meat.

Figure 11.4 Trends in Egg Consumption (per capita annual)

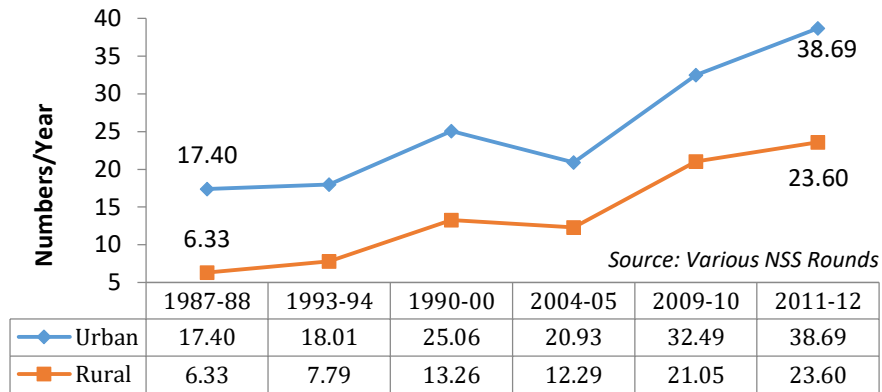
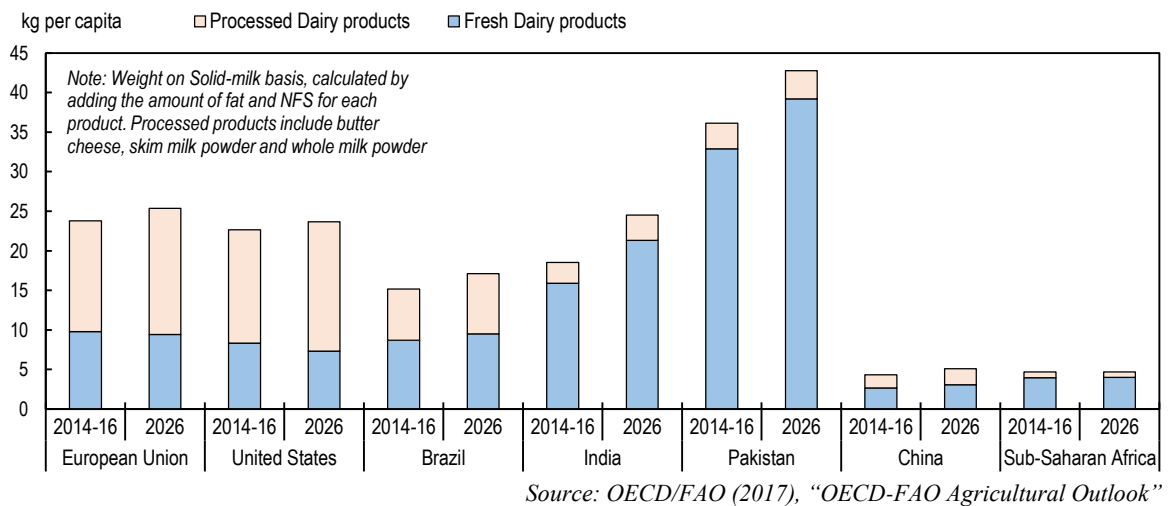
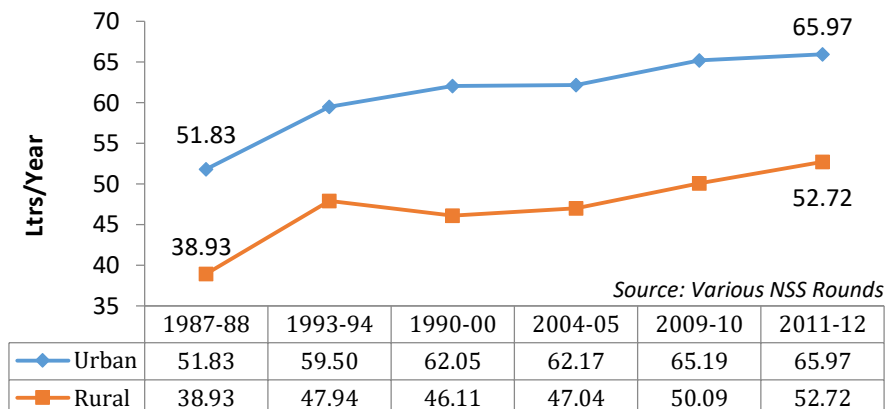


Figure 11.5 Trends in milk consumption (per capita annual)



Consumption of fresh dairy is more prevalent in India, unlike a preference for processed dairy products in western countries.

Figure 11.6 Trends in milk consumption (per capita annual)



11.4. Status of Marketing of Livestock Commodities

Markets are anticipated to facilitate trade and provide for growth. Value addition on the produce, optimises and aligns the output with consumer demand and further assists growth. The potential of livestock sub-sector in sustaining agricultural growth is increasingly recognised. The lack of producers' access to markets may stall such expected growth. Livestock marketing involves the trade of many commodities resulting from farming of quadrupeds, birds, insects and fish. This chapter broadly deals with the marketing of the following:

- i. Live animals (cattle, buffalo, goat, sheep, poultry)
- ii. Livestock Products (meat and dairy products)
- iii. Produce of live animals (Milk, Egg, Wool)

These three segments are discussed vide sections 11.4.1, 11.4.2 and 11.4.3 respectively. The marketing of fisheries is dealt separately. As regards in this the production from beekeeping and silkworms (sericulture), they are discussed in Volume VIII of this Report, and therefore not included herein. That their marketing too is important needs to be recognised.

11.4.1. Marketing of live animals

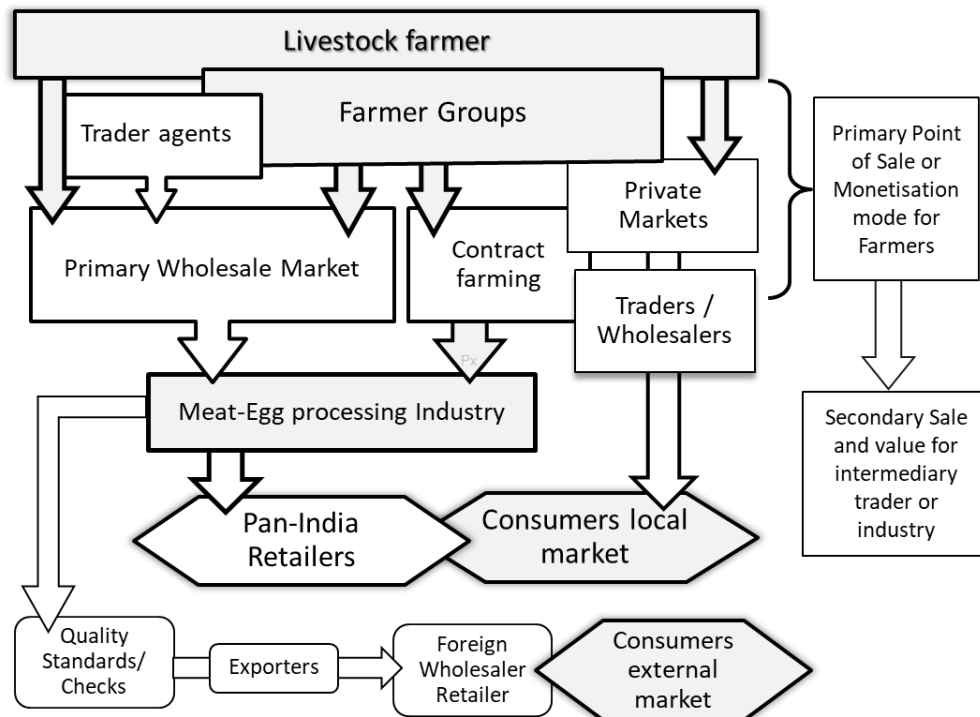
Like other agricultural markets in India, those for livestock have also remained underdeveloped, in fact, much less developed in comparison to crop based commodities. There are about 2,000 markets for live animals, falling under the jurisdiction of state governments and managed by local bodies such as Municipal Corporations and Gram Panchayats. Most of these markets are irregular, lack transparency in transactions and are short of basic infrastructure and marketing facilities. In handling live animals, the role of available infrastructure is important to comply with animal welfare and to maintain the health of the animal. The traded livestock subsequently undergoes transportation between markets; as also market and final buyer. Initiated at such market centres, special care needs to be taken, not to treat the living animals like other "cargo". This will though add to the transportation/transaction cost.

A considerable proportion of live animals, mainly small ruminants (sheep & goat) are exchanged amongst livestock farmers themselves and between farmers and intermediary traders. Intermediaries assemble animals from farmers for further sale to larger traders as well as to slaughter houses and butchers. Bulk of the trade with farmers of small ruminants takes place with intermediary traders. Large livestock farmers generally are able to directly access the organised markets for sale. Sometimes, small producers assemble their produce to sell collectively to large buyers. Butchers-cum-retailers in small towns too procure live animals directly from producers. Unlike in case of fruits and vegetable farmers, direct sales to end-consumers are rare.

There are a number of reasons for low participation of livestock producers in markets. The marketed surplus is often small, while markets for live animals are thin, irregular and often at

far distance from the production centres. These escalate the cost of transportation and associated activities like housing for animals, and the opportunity cost of time. Further, lack of basic facilities in markets, for producers as well as animals also discourages producers to bring their animals to the markets. Most livestock produced by smallholder farmers are marketed by non-farming entrepreneurs, who operating as a marketing chain, collect, pool and distribute the livestock products to processing industry and wholesale buyers.

Figure 11.8 Typical marketing chain for livestock farmers



Ease of livestock movement, including the documentation to ensure safe transit, is also an aspect that livestock markets are expected to facilitate. Prices of live animals, especially ruminants, are negotiated by buyers and sellers, taking into consideration the animal characteristics, such as age, body weight and structure, appearance, breed, yield and health status. However, no harmonised standard of the identified parameters is uniformly applied.

Marketing of poultry live birds is similar, though more organised, where the producers have integrated their output into the supply chain of the poultry processing industry. Bulk of trade in live broilers and eggs takes place between producers and traders, directly or indirectly through commission agents, in designated markets or at the farm gates. Retail traders procure broilers either directly from producers or from wholesale traders. Direct sale between producers and consumers/retail traders is comparatively limited. In some states, poultry co-operatives also facilitate marketing, but on a limited scale.

Live poultry markets can range from local markets at a community or district level that open intermittently and may only sell a few dozen live birds in a day, to large wholesale markets with a daily throughput of thousands of poultry, where hundreds of birds are sold, slaughtered

and butchered on a daily basis. Poultry marketing, is undergoing significant transformation in major producing regions. Contract farming in poultry has emerged big taking poultry down the path of industrial farming. Producers associations like Broiler Producers Marketing Association (BROMARK) set the daily harvest prices depending on the market.

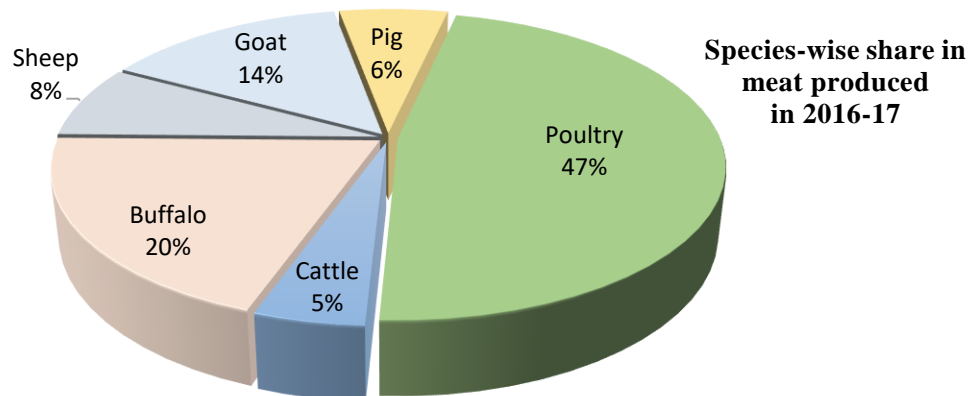
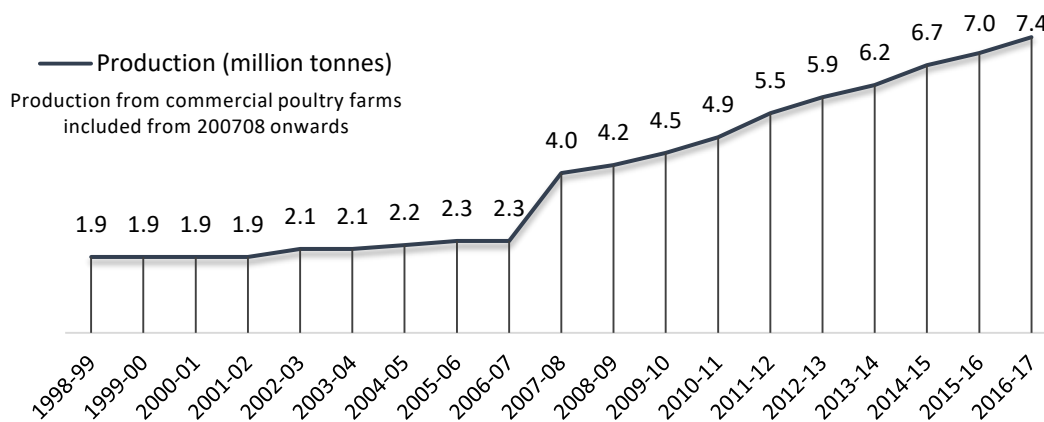
The majority of domestic consumers prefer poultry meat from small butchers, and reports indicate that more than 90 per cent of chicken is sold freshly butchered at retail level. This allows smallholding farmers to continue trade in the live animals with small town butchers and wet market retailers. Smallholder farm enterprises have organised themselves to undertake direct marketing of chicken and eggs into adjoining cities (Volume III, 3.2-A), resulting in income growth. In these cases, peri-urban poultry farmers have opportunity to capture a larger share of the consumers spend. Both market channels, formal and non-formal, are valuable to the farmers.

11.4.2. Marketing of livestock products

11.4.2.1. Meat

The country is produced about 7.4 million metric tonnes (mMT) of meat, including poultry meat, in 2016-17.

Figure 11.9 Meat production India (million metric tonnes)



Source: DAHD Annual Report, 2016-17

This quantum of meat is routed through slaughter houses, to organised domestic and export trade or through the informal fresh market retail system. There are said to be about 4,000 slaughter houses registered with local bodies and more than 25,000 unregistered premises. Other accounts indicate even higher numbers. As per status shared by Food Safety and Standards Authority (FSSAI), among these 120 slaughter houses are central licensed, 389 slaughter houses are state licensed and only 2,409 slaughter houses are registered under FSSAI. In case of meat processing units (active), 225 have central license and 181 units have state license. Slaughter houses have agents to procure animals directly from farmers or through the livestock markets.

The slaughter ratio for cattle and buffalo population is about 2 per cent every year, and in case of sheep, goat and pigs it is 40, 46 and 80 per cent respectively. Most of the slaughter houses are overcrowded and the practices are traditional, resulting into low recovery rate, and wastage of by-products like blood, skins, tallow etc. The meat slaughter houses are intrinsically linked to hide production and the leather industry.

Table 11.2 Export of carabeef and poultry (2016-17)

Product: Carabeef

Port (State)	2016-17	
	Qty (tons)	Rs. Crore
Andhra Pradesh	15351.57	280.99
Bihar	2.3	0.03
Delhi	9065.06	268.73
Haryana	160841.17	3287.04
Kerala	2119	38.57
Maharashtra	559399.42	11234.74
Punjab	430	6.12
Tamil Nadu	71657.35	1238.56
Uttar Pradesh	504696.59	9806.54
West Bengal	13.58	0.16
Total	13,23,576	26,161

Product: Poultry (eggs and meat) items

Port (State)	2016-17	
	Qty (tons)	Rs. Crore
Andhra Pradesh	12896.21	70.8
Delhi	87.36	1.22
Gujarat	0.85	0.03
Karnataka	5647.56	65.78
Kerala	24595.3	12.45
Maharashtra	19621	80.62
Tamil Nadu	385024.96	289.9
Uttar Pradesh	64	0.15
West Bengal	787.39	9.49
Total	4,48,724	530

Source: DGCIS

Table 11.3 Export of small ruminants, processed meats, casings (2016-17)

Product: Sheep/Goat meat

Port (State)	2016-17	
	Qty (tons)	Rs. Crore
Andhra Pradesh	238.41	8.99
Bihar	0.6	0.02
Delhi	12115.94	496.56
Haryana	137	4.2
Kerala	0.99	0.06
Maharashtra	8004.71	308.31
Uttar Pradesh	1510.9	51.59
Total	22,008	870

Product: Processed meats

Port (State)	2016-17	
	Qty (tons)	Rs. Crore
Andhra Pradesh	14	0.25
Maharashtra	126.7	4.33
Total	140.7	4.58

Product: Animal Casings

Port (State)	2016-17	
	Qty	Rs. Crore
Delhi	14.01	2.02
Gujarat	0.2	0.01
Maharashtra	159.03	11.81
Total	173.24	13.84

Source: DGCIS

On the export front, private enterprises have achieved well in marketing of meat. The country has 28 integrated meat processing plants that have been approved by APEDA, besides 80 stand-alone abattoirs cum meat processing plants.

These export plants follow sanitary and phyto-sanitary (SPS) guidelines of the Codex Alimentarius and have HACCP (hazard analysis and critical control points) and ISO certification. The live animals are bought by the slaughter house from a disease free zone, about 100 km in radius around the plant, where disease control programmes are in place. The plants have various facilities for holding of animals, lairage, race, knocking box, stunning units, abattoir with slaughter line, de-boning, chilling freezing, packaging and cold storage. Facilities for by-product processing, effluent treatment, bio-methanation, rendering, etc. are also incorporated. The animals, bought at the local livestock markets, are first tagged to ensure traceability and transported as per guidelines of Society for Prevention of Cruelty to Animals (SPCA) Act, 1960 and Bureaus of Indian Standards (BIS), 2007 Standards to take care of animal welfare. Standard Operating Procedures (SOPs) are followed, including those required by importing countries. After slaughter and skinning, the carcass is chilled and then de-boned or cut before being packed and subjected to refrigerated processes before the frozen meat enters the cold-chain for market linkage. All the integrated plants have separate line for handling small ruminants (sheep, goat). The meat from most of the small ruminants meat is exported to Gulf region. The frozen meat is loaded onto refrigerated containers, maintained at -18°C to -20°C, for onward connectivity to importing countries through seaports or airports.

India, as of now holds the top position in beef exports, albeit carabeef (buffalo meat), over a few years, indicating a well-established marketing and supply chain network. However, the domestic marketing system does not demonstrate equal quality and standardisation in these products. India's exports of animal meat products include buffalo meat (USD 3.9 billion), sheep/goat meat (USD 130 million), poultry products (USD 79.5 million), animal casing (USD 2.1 million), processed meat (USD 0.69 million). The main markets for Indian buffalo meat and other animal products are Vietnam, Malaysia, Iraq, Algeria, Egypt, Indonesia and UAE. Poultry products go to Oman, Saudi Arabia, Indonesia, Russia and Maldives.

The status in meat exports indicates, that further development can be undertaken to capture a larger share of world markets, thereby providing more income generating opportunity to the local farmers. Having demonstrated the capability to maintain standards through large export presence, the improvement in domestic marketing is also feasible, and is largely related to lower per capita demand for meat, among the lowest in the world. Meat exports are affected by health concerns and the indiscriminate use of anti-biotics is a major challenge, especially in poultry. India is also one of the biggest consumers of agricultural antibiotics, accounting for 3 per cent of global consumption. Though antibiotics aid in intensive food production, their uncontrolled use on farms is a concern. In India, standards for tolerance of antibiotic residues in poultry are yet to be adopted, although such standards do exist for seafood.

Poultry market is currently dominated by meat of broiler birds, whereas earlier chicken

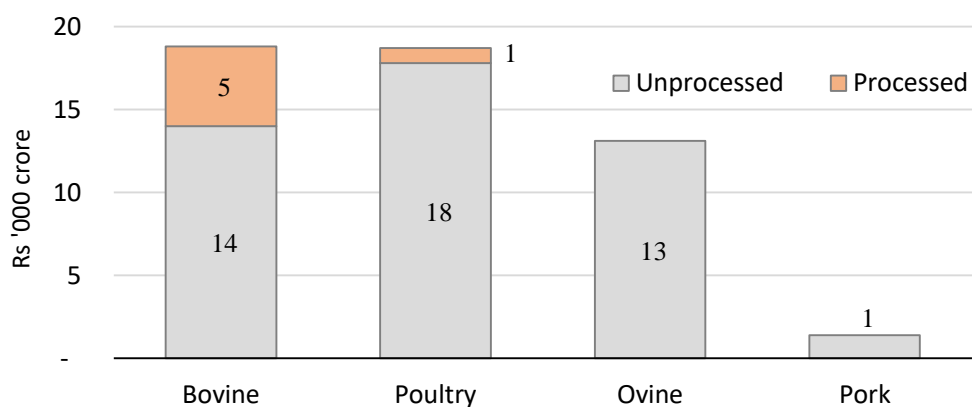
implied “spent hens” or male birds. Broiler birds made inroads into India around 1975, when hatcheries imported the parents of the hybrid broilers. The breeding operations started in Delhi, and hatcheries sold day-old chicks to farmers who raised them and sold to traders. Live broilers have tender meat and are more efficient, and became a food entity within 10 years. Movement of parent stock, hatching eggs, day-old chicks initiated the broiler growing everywhere and later concentrated in South India. Live broilers are typically not transported for long distances.

Further development in domestic meat markets, from the farmers’ income perspective, will be demand led. However, interventions for food safety by the health ministry, are expected to have their impact in organising the meat processing industry and its marketing. Currently, the majority of the domestic meat consumption is in the fresh format, through retailer/butchers.

The meat is mostly marketed in fresh cut format, where local butcher dress the meat on demand. The majority of consumers, both occasional buyers and regular eaters, have not taken to pre-cut and packaged meat as is the case in western countries. There are various reasons for domestic consumers preferring meat freshly cut in corner shops, over processed and pre-cut meats, including the differentiated cooking practices which traditionally involve many processes, unlike in case of barbequing or roasting of meat. The fresh meat selling process is expected to continue to predominate in the Indian meat market.

A 2012 study on Indian Agribusiness¹⁸ by the Boston Consulting Group, analysed the sales of meat in India, which highlights the market share between processed and unprocessed consumption. It indicates that the bulk of meat demand was routed via the fresh or wet markets. Not much has changed in ensuing years, and the growth in consumption has maintained a similar ratio in markets between processed and unprocessed meats. In case of bovine meats, the processed volume is mainly for export markets.

Figure 11.10 Meat market share India (Rs '000 crore in 2010)



Source: BCG Study on Indian Agribusiness 2012.

In case of poultry, majority of the consumers still prefer buying the meat that is freshly

¹⁸ Indian Agribusiness – Cultivating Future Opportunities, Boston Consulting Group, 2012

harvested at point of sale, and only a small share of output is marketed as chilled, frozen, or further processed products. It is worth noting, that if the live poultry is kept disease-free and safely tended until point of consumption, the supply does not require complicated cold-chain with its associated costs and hazards, and the meat is safe for consumption. However, such process can generate waste in the form of unutilised offal and by-products are not properly captured. The costs of moving live birds, including transport, shrinkage, and mortality costs, also limits the inter-regional movements. As a result, poultry markets are regional, rather than national in scope. The potential for low-cost producers to market their product in higher priced markets is limited and this is captured by interventions by the industrial sector.

The lowering of costs and marketed prices can further ramp up demand from consumers. This increase in demand, would be beneficial to the farmers who can then safely scale up production. However, the poultry industry is one of the most organised and a recent report by ICRA in March 2018 indicates, that the broiler volume growth is intentionally kept at lower levels by the organised players, to control the supply and ensure reasonable broiler realisations. This strategy might be restraining from faster growth in domestic consumption; and given the easy acceptability of chicken meat, domestic demand would get a fillip from lower prices, and result in far greater volumes in sales, which would bring down fixed costs in the overall supply chain.

Though many projections suggest, that over time the Indian consumer might eventually opt to shift consumption from unprocessed to processed meat, the ground reality of current consumer preference cannot be disregarded. Therefore, to the immediate benefit of farmers, organising the supply chain into the fresh or unprocessed market is important. Farmers should be enabled to capture a greater share of the existing trade, rather than await a long term shift in consumption habits and growth in demand.

The current demand-supply gap in the meat processing industry is largely attributed to the capital involved in maintaining cold chain temperatures. Large capital is also required for processing and preservation of meat, which results in higher costs, and sellers having to spike up the price of the meat. Food safety concerns are sometimes used to justify such options. However, provided the live animal and harvested carcass is kept hygienic, the fresh meat is safe for the short term. Fast selling cycles ensure that stock is not held for long and the meat is normally harvested and replenished on a daily basis.

About five to six per cent of poultry meat is sold in processed form, of which only about one per cent undergoes processing into value-added products (ready-to-eat/ready-to-cook). However, for farmers, the growing demand for poultry meat is an opportunity to scale up volumes into their existing markets. The poultry market is expanding, as there are very few social barriers for consuming poultry meat and also because of it being relatively more affordable than other meats.

In such a market situation, the informal status of markets with regionally limited supply lines, is an opportunity for start-ups to initiate differentiated online marketing and local delivery

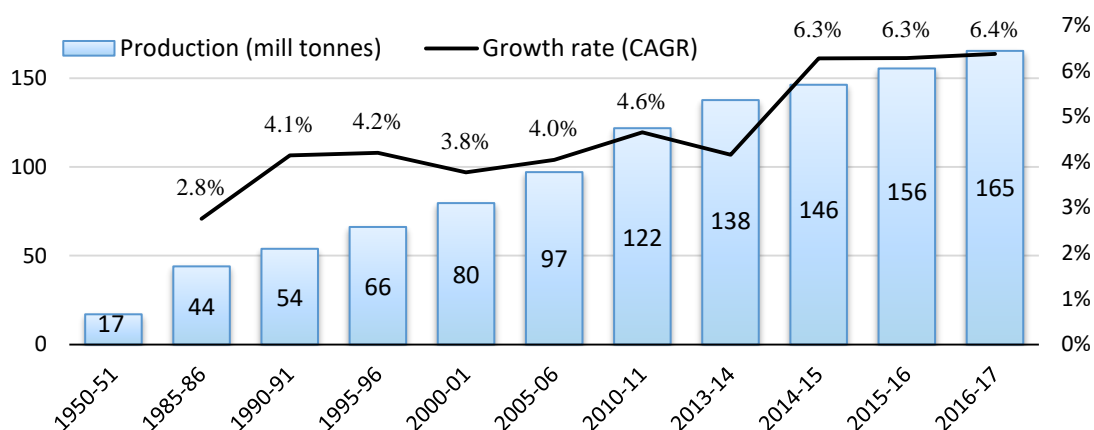
services. Instead of developing long distance supply systems, the start-up entrepreneurs can organise the steady demand from urban centres to provide a service to both farmer and consumer, by linking source with nearby demand for fresh meat. This is seen in growing use of ICT platforms, to streamline the marketing channel of many perishable foods. Farmers with small land-holding can grow broilers on contractual arrangements for a company, which can reach the housewife directly to supply the chicken, cutting down the middlemen. Such mechanism is already being practised by farmers, who get better and assured returns compared to crops that are more nature-dependent and uncertain.

11.4.3. Marketing produce of live animals

11.4.3.1. Milk

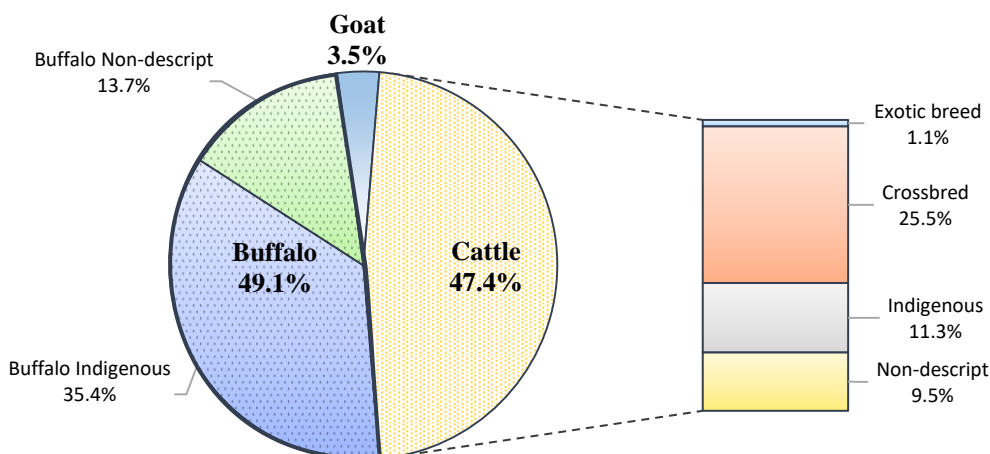
The total milk production in India was 17 million tonnes during the year 1950-51 and this has grown to touch 165 million tonnes in 2016-17. India remains one of the largest milk consumers and also the producers in the world and demand for fresh milk and dairy products is expected to grow in the coming decade.

Figure 11.7 Milk production and corresponding Growth Rate



Source: data from DAHDF

Figure 11.8 Share in milk production by species (2016-17)



In comparing the milk contribution by the major species, the highest share is from buffalos.

Though marketing and transaction costs are also high for milk, dairy co-operatives have fairly succeeded well in linking the producers to markets, especially in Gujarat, Maharashtra, Karnataka, Tamil Nadu and Kerala. Coincidentally, these states account for large tracts of rainfed cultivation. Procurement of milk by cooperatives in most other states is reported to be less than 7 per cent of the milk produced. The private sector has a larger presence than cooperatives in Uttar Pradesh, Punjab and Haryana, and these states account for more than 50 per cent of the private dairy processing plants. These were the states, where dairy cooperatives had not developed during the pre-reform period. With the launch of economic liberalisation in 1991 in the country, dairy sector too was opened up to private sector. It appears that in states where no robust cooperatives enlisted, private sector grew up appreciably.

Being a homogenous produce, milk supply is readily organised through establishing pooling points or collection centres, to thereafter communicate it in most economical way to consumers, including processing factories (see Volume III, 4.6.2). Dairy cooperatives, as well as private sector processors, have adopted this aggregation and supply model, establishing many hub-spoke sourcing and delivery systems. The linking of milk producers to domestic markets, has acted as a stimulant to growth. A good supply chain network and growing demand also protects the Indian farmer from global price crashes, as observed in 2015-16. Milk and dairy products hold cultural significance in the Indian diet and a large portion of the population is lacto-vegetarian. The demand for milk and dairy products is income-responsive, and growth in per capita income is expected to increase demand for milk and milk products.

Projections indicate, that by 2025 the production of milk in India will cross 200 million tons per annum, implying a growth of over 30 per cent over the average of annual production in 2013-2015. All other countries are expected to enhance their milk production by 2025, with growth ranging from 1 to 29 per cent (average growth of 13 per cent) over their 2013-2015 production average. As there continues demand for milk and dairy products from consumers, the sector will benefit most from productivity increase by expanding its network of milk collection centres.

Domestic demand is primarily centred on fresh milk, and some value added products such as powdered milk is a result of milk surplus being converted into long term storable format. Indian milk economy is worth Rs. 5 lakh crore, growing at 15 to 16 per cent per annum, of which the processed milk economy is estimated at Rs. 80,000 crore. As per the annual report (2015-16) of National Dairy Development Board (NDDB), almost 80 per cent of the milk procured by cooperatives is marketed as liquid milk. In 2015-16, the dairy cooperatives collectively procured 15.58 million tonnes of milk, of which liquid milk marketing stood at 12.08 million tonnes (an increase of around 2.73 per cent over the previous year).

The post-production activities for milk are well exemplified in the supply chain model deployed. The model includes provision of village level pooling/collection points which initiate

the post-production market linkage. The pooling points are strengthened by supporting village level capital items like bulk milk coolers, milk cans, etc. This system has resulted in greater transparency and fairness in milk procurement, as well as improvement in quality of milk. In this same sector, private companies also exist and compete with farmers. The competition has also brought greater transparency and economic benefits to the farmers.

Private sector found an entry into this segment only after 1991, when the country embarked upon economic liberalisation. Till then the dairy sector was cooperative-sector, protected from external competition by import restrictions, and from the domestic market by disallowing the private players.

The use of appropriate technology, has ensured that the milk can safely travel to various destinations – to processors, markets and consumers over longer distances, thereby expanding the selling reach of the farmers. The expanded marketing radius, allowed for growth in selling volumes, nurtured production and higher incomes thereof. The farmers' cooperatives have taken responsibility of pooling and chilling the milk, and in some cases, even the processing, packaging and retailing is taken up by cooperatives. The milk is sold in multiple formats, the form varying from liquid milk to ghee, butter, beverage, sweets, etc. The market is pan-India and the supply chain is dynamic with fresh milk supplies replenished twice daily at times.

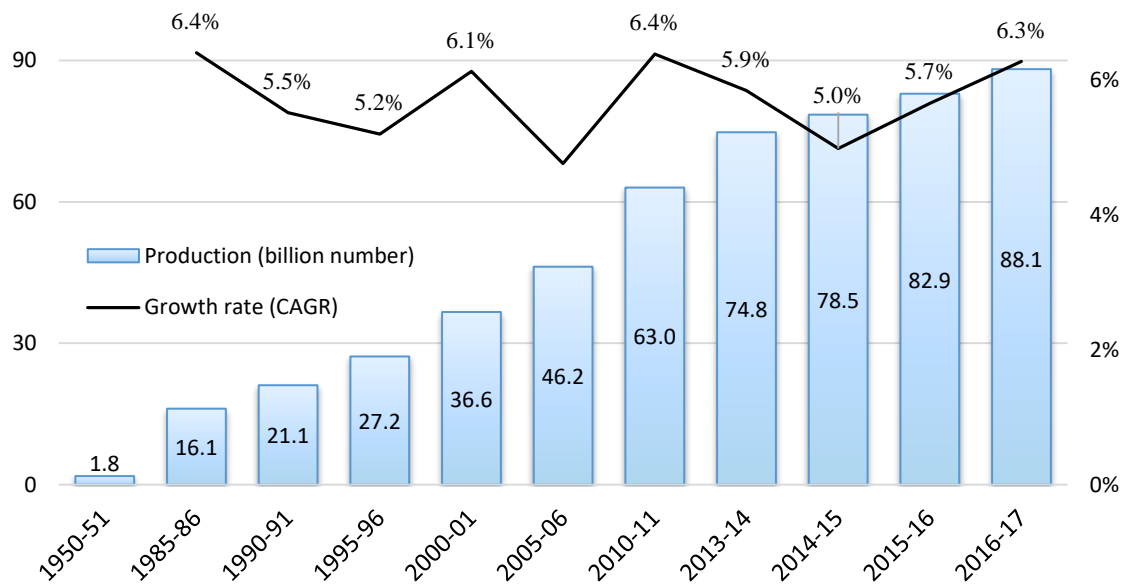
There are barriers and apprehensions for greater participation from smallholder producers' in the marketing system. There is apprehension that small-scale producers will be marginalised in the process of scaling-up of private sector in the milk production and marketing systems.

Though there is evidence to indicate, that smallholders are not altogether excluded from these systems, the concerns relate to identifying and promoting suitable institutional structures that will not disfavour the smallholders. Contract farming is one such solution that will allow smallholders to integrate their production into the supply chain of processing plants. Farmers' cooperatives also can do with a focus on rejuvenating and replicating the successful examples, especially those that focus more on marketing of farmers' production viz those that primarily focus on channelising farm inputs.

11.4.3.2. Eggs

Annual production of eggs has grown from 183 crore pieces in 1950-51 to 8,813 crore eggs in 2016-17. This amounts to about 24 crore eggs per day, every day of the year. If 60 per cent of India's 130 crore population were to eat an egg every day, the production would have to grow three-fold. Nationally, around 19 per cent of the egg production is from backyard poultry enterprises, in which 64 per cent are produced by indigenous (desi) fowl. Ducks contribute about 7 per cent of the eggs in this sector. The organised or commercial sector contributes about 81 per cent of the eggs produced. Commercial ventures also source eggs from smallholders, regularly or on contract, and are a channel for the small farmers to access the larger market.

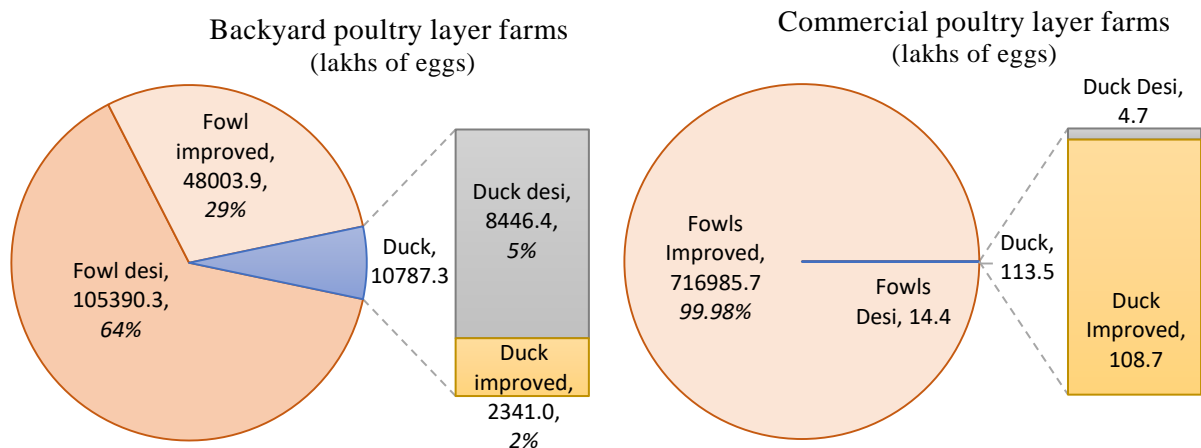
Figure 11.9 Egg production and corresponding Growth Rate



Source: data from DAHDF

The large commercial poultry layer farms are mainly concentrated in South India with Andhra Pradesh, Tamil Nadu and Telengana representing nearly 60 per cent of the egg production. The next four states, Haryana, Punjab, Karnataka and Maharashtra, account for about 26 per cent of eggs produced from commercial layer farming. Odisha, West Bengal, Uttar Pradesh, Gujarat and Chhattisgarh contribute about 2 per cent each. Ranked next are Madhya Pradesh, Rajasthan and Uttarakhand who share 3.6 per cent of such production. The rest of the states have negligible or zero output from commercial layer poultry farms.

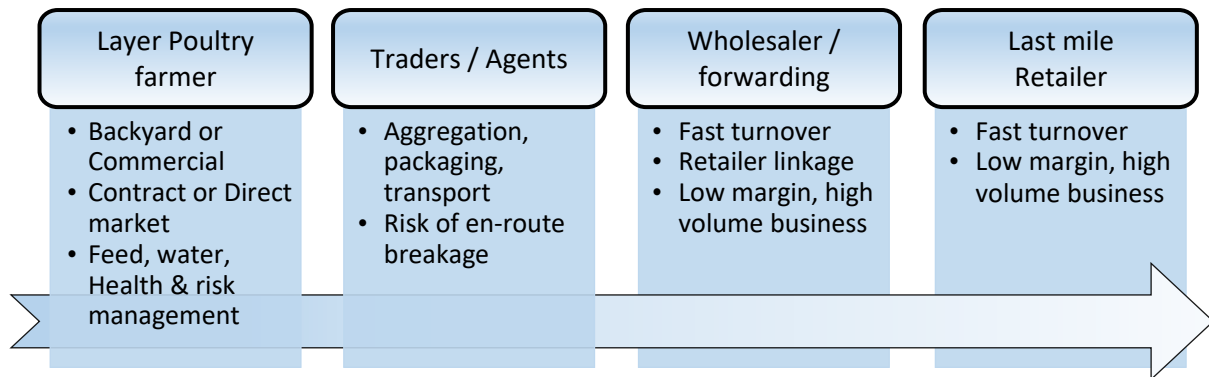
Figure 11.10 Share in egg production – backyard and commercial (2016-17)



In case of egg production from backyard poultry farms, West Bengal alone contributes nearly 30 per cent of the total egg production, with Kerala providing around 14 per cent of the eggs. The next two states, Maharashtra and Bihar contribute around 6.8 and 6.4 per cent respectively. Andhra Pradesh, Telengana and Uttar Pradesh account respectively for 5.6, 4.4 and 4.2 per cent

each. The next dozen states share about 25 per cent of the egg production from backyard poultry farms. Meghalaya, Manipur, Uttarakhand and A&N (Andaman & Nicobar) islands rank next with production share of 0.6 to 0.5 per cent. Backyard poultry farms are prevalent across the country and more dependent on their reach into nearby markets.

Figure 11.11 Eggs market chain



In all, Tamil Nadu is the largest producer of eggs followed closely by Andhra Pradesh, respectively holding 18.9 and 18.0 per cent share in the total eggs produced in the country. Telangana is the third largest egg producer state with 13.4 per cent share in the total egg production. These production figures are not to infer as a reflection of state-wide per capita egg availability or consumption of eggs, as these are traded and transported across regions, making per capita availability more a factor of the forward supply chain.

To meet the increasing demand, apart from egg production, efficient egg marketing is necessary. It is difficult to run a profitable business without proper and organized marketing system. The channelling of eggs to markets through commercial organised enterprises is different from those produced by backyard layer poultry farms. In the marketing systems used, transport logistics (costs and availability) are the key differentiators.

The smaller backyard layer farms, typically do not have capacity to transfer the eggs directly into demand centres, and hence it is the intermediary who aggregates and transports to markets. In case of commercial layers, the organisation of the logistics is more easily facilitated due to commercial scale production as the first stage of aggregation is eased.

The egg prices fluctuate across the markets, directly influenced by the consumption trends. Increased consumption (by 20 per cent) of egg during winter season results in higher demand and prices in the market. The demand is also high around festivities and dips during fasting periods.

The price is lowest in summers due to poor demand in the hot weather season during months of March, April and May. In fact, reports have observed that when vegetables turn costly in winters, consumers substitute with eggs, which in turn pushes up their price. To illustrate, in the year 2017 winters, the spike in egg prices was largely attributed to the rise in prices of

vegetables such as beans, cauliflower, cabbage, brinjal, etc. However, the price variations in egg are less than those experienced in perishable fruits and vegetable crops, largely because of the extensive supply chain network into markets and the organisational capacity to adjust production.

Table 11.4 Egg wholesale price (monthly average over 5 years) - Rs per 100 pieces

Year/Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2013	334.2	349.9	289.6	257.7	254.9	337.7	315.0	301.6	312.6	326.6	379.9	389.0
2014	374.3	337.0	320.9	263.2	303.2	321.8	318.5	301.8	336.7	333.1	381.6	381.4
2015	349.3	279.1	262.5	253.0	282.2	359.3	313.4	308.7	296.0	304.1	357.2	395.0
2016	397.8	350.7	303.9	298.2	369.7	386.1	417.0	348.9	347.3	365.1	379.2	381.7
2017	338.5	325.9	329.2	280.1	325.8	359.0	342.3	344.6	357.7	383.0	475.8	383.5
2018	396.0	367.7	323.8	299.5	-	-	-	-	-	-	-	-
Average	371.2	332.1	308.1	278.8	320.2	356.6	347.8	326.0	334.4	346.3	398.5	385.4
Median	374.3	337.0	320.9	280.1	314.5	359.2	330.4	326.7	342.0	349.1	380.4	383.5

Source: National Egg Co-ordination Committee

Large egg layer commercial ventures are organised to adjust their production with forecasted demand. The National Egg Co-ordination Committee (NECC), registered as a Trust in 1982, is an Association of more than 25,000 farmers and traders. Among other aspects, it monitors and manages surplus stock into deficit markets and advises farmers on the sale price of eggs.

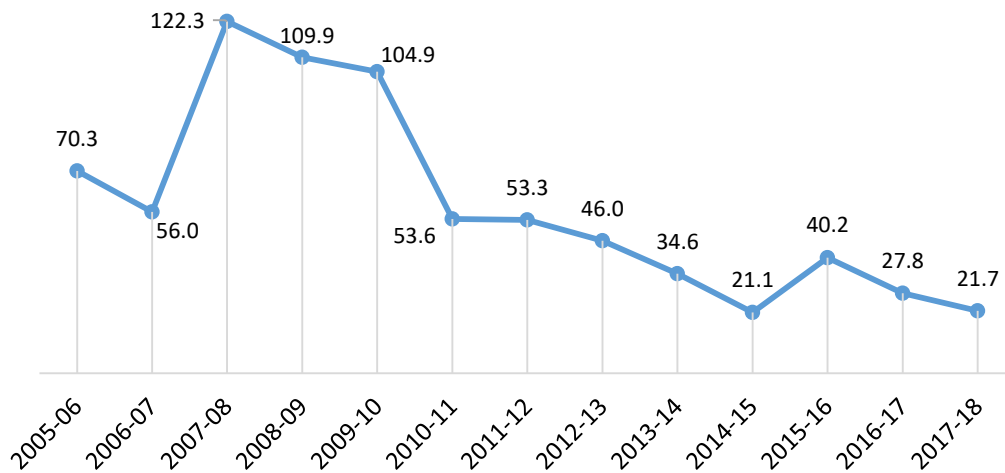
For example, in Namakkal zone (Tamil Nadu) in 2016, after reports that traders were driving down prices of smaller eggs, the NECC held a special meeting to discuss discrepancies in egg procurement by the traders and to fix categories. It decided, that from 1st May, 2016 farmers would sell eggs as per following categories - 53 gram plus egg (large eggs), and 40 gram to 53 gram egg (export eggs), for which the price per piece is large egg price less 10 paise; 45 gram to 48 gram (medium eggs), for which price is 20 paise less large egg price; and 40 gram to 44 gram (small eggs) for which large egg price less 30 paise was set. The average weight of egg produced in the country is 53 gram.

Though sensitive to breakage, eggs are normally safe if kept free of moisture – moisture allows bacteria to penetrate the shell and washing dirt off the shell can infest it with salmonella if water is untreated. In studies, it was observed that fresh eggs collected at farms had less incidence of salmonella contamination, compared to those collected at retail shops. This indicates that transportation and handling in the logistics chain needs to be improved. FSSAI has proposed standards for fresh eggs, laying down parameters that eggshell must be free of blood rings, not be soiled or have faecal matter and must not be cracked or leaking. FSSAI has also laid emphasis on the storage conditions like moisture and temperature so as to reduce chance of microbial contamination. These proposed standards will come into force if approved.

On the export front, a downwards trend is seen. India mainly exports table eggs, egg white powder & egg yolk powder. The bulk of exports is as eggs & egg powder to Afghanistan, Angola, Bahrain, Comoros, Congo, Cote D'Ivoire, Gambia, Hong Kong, Indonesia, Iran,

Kenya, Lebanon, Liberia, Malaysia, Maldives, Mozambique, Nepal, Nigeria, Oman, Philippines, Russia, Saudi Arabia, Singapore, South Africa, Sri Lanka, Sudan, Taiwan, Tajikistan, Tanzania, Thailand, UAE, Vietnam.

Figure 11.12 Egg exports from India (numbers in crore eggs)



Note: 2017-18 figures till January 2018.

Exports are affected by factors such as bird flu and other food safety and health concerns, besides other international trade dynamics. In revenue terms, India is among the top fifteen exporters of shell eggs though in terms of total export volume, the ranking is higher. Improved terms of trade of exported shell eggs will help farmers. However, the domestic consumer is an immediate and growing market opportunity.

On an average, eggs sold to domestic consumer are laid about 10 days to two weeks earlier. In summers, the eggs can stay saleable for another week or two without refrigeration, and upto a month or more in winters in the northern markets.

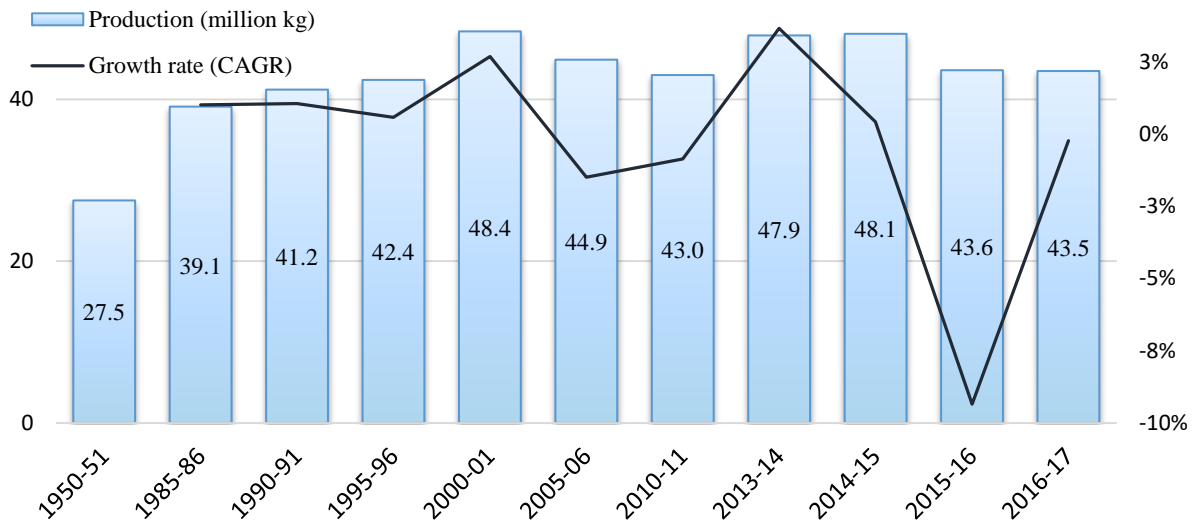
Traditionally in India, eggs are perceived as commodity products, with little or no differentiation in terms of quality. Reports indicate that sale of eggs through modern retail formats have no impact to those sold through traditional formats. Eggs are purchased from the neighbourhood groceries, and these are highly dependent for supply on the regularity and efficiency of the logistics. The produce from backyard layer poultry farms can have a far shorter market cycle if farmers organise delivery to nearby towns and cities.

Egg marketing is an opportunity for social entrepreneurs and start-ups. Sourcing from smallholder famers and organising the supply into homes, retailers and institutional buyers will benefit the farmers and facilitate safe supply to buyers. Branded and speciality eggs are slowly picking up in market and are projected to be richer in proteins, contain less fat and are picked from bio-layer farms. With attractive packaging and promise of a healthier proposition, these eggs command a premium over ordinary eggs. These enriched and low-fat branded eggs are becoming a staple choice of some families, as income levels and health consciousness rise.

11.4.3.3. Wool

India is the seventh-largest producer of wool in the world with a global production share of nearly 1.8 per cent. More than 80 per cent of the country's wool is produced in the states of Rajasthan (32.9%), Jammu & Kashmir (16.7%), Karnataka (15.1%), Telengana (10.7%) and Gujarat (5.2%). Raw wool production grew steadily from 27.5 million kgs in 1950-51 and peaked during 2002-03 at 50.5 million kgs (50,500 tonnes).

Figure 11.13 Wool production and corresponding Growth Rate

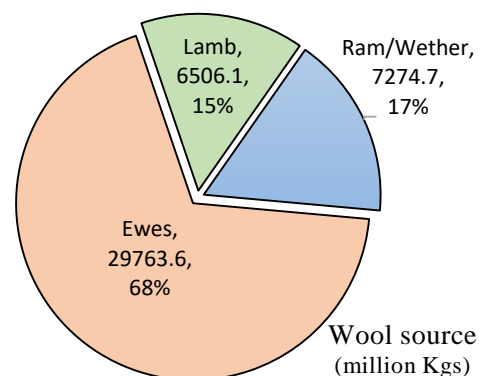


Source: Department of Animal Husbandry, Dairy and Fishery Development (DAHDF)

The wool is supplied to the woollen industry, which is mainly concentrated in Punjab which alone accounts for about 35 per cent of wool production units, followed by Maharashtra and Rajasthan; and with a few others located in Haryana, Uttar Pradesh, and Gujarat. The product portfolio from textile intermediaries is divergent, ranging from finished textiles, knitwear, blankets, carpets and some presence in technical textiles. Woollen products face stiff competition from artificial fibres and this has been depleting the hosieries in many towns and the woollen industry has undergone a consolidation phase since its heydays.

The wool is primarily produced from sheep, categorised by ewe (adult female sheep), Ram (adult male), wether (castrated male), lamb (young sheep). The ratio of wool from these sources is shown in the adjoining graphic.

Figure 11.14 Wool Production by animal source (2016-17)



Yaks are another source of wool though the production is minimal. At the last livestock census in 2012, India had 65,069 thousand sheep and about 77 thousand yaks. The total wool production in India is not enough to meet the requirement of the country's woollen industry. The bulk of Indian wool is of rough quality and is used mostly in

the hand-made carpet industry.

The woollen industry in the country is of the size of Rs. 11,484.82 crore and broadly divided & scattered between the organized and decentralized sectors, comprising composite mills, combing units, spinning units, knitwear and woven garments units, machine made carpets manufacturing units and smaller hosiery and knitting, power-looms, and independent dyeing, process houses, woollen handlooms and hand knotted carpets, rugs and druggets.

The Ministry of Textiles reported that of the total wool produced, 85 per cent is carpet grade wool, 5 per cent is apparel grade and the remaining 10 per cent is coarser grade wool used for making rough *Kambals*, etc. India depends almost exclusively on the import for fine quality wool, which is demanded by the industrial woollen mills and decentralised hosiery sector.

Table 11.5 Raw wool imports by India

Year	Quantity (in million kgs.)	Value (Rs.in crore)
2010-11	94.77	1434.65
2011-12	76.29	1876.87
2012-13	77.16	1801.90
2013-14	89.60	1967.72
2014-15	96.53	2125.74
2015-16	97.83	2016.12
2016-17	87.15	1894.26
2017-18	79.95	1884.59

Source: Ministry of Textiles, DGCI&S

The gap between wool production and wool demand form the woollen industry is an opportunity for Indian farmers.

The following countries are the top six raw wool exporters to India in 2017-18:

SN	Country	Qty. in million kgs (2017-18)
1	Australia	14.08
2	China	10.51
3	New Zealand	9.16
4	Saudi Arabia	4.92
5	Pakistan	4.69
6	Syria	4.50

Source: Ministry of Textiles, DGCI&S

The quantity of raw wool imports, is nearly double the domestic wool production. Combined domestic raw wool production and the imports in 2016-17 indicate that total wool requirement was 130.65 million kilograms. The Ministry of Textiles, in its National Fibre Policy of 2010,

has projected wool consumption in India to increase beyond 200 million kgs by 2020.

Notwithstanding such projections, the fact that the woollen industry is importing large amounts of raw wool, can be addressed through appropriate interventions at production and post-production levels. These will include improving the quality of wool and the handling of raw wool, such that it can compete with the quality from global supply. This will not help farmers capture more of the demand from textile units, and in turn motivate them to adopt better practices and achieve greater productivity.

The constraints faced by wool sector can be summarised as follows:

- Low priority of state governments in development of wool sector.
- Shortage of pasture land, forcing breeders to migrate their flock from one area to another throughout the year.
- Piecemeal value capture by the sheep breeders i.e. from sale of raw wool, live sheep, manure, milk, mutton, skin, etc., without reaping full benefit from value capture across all possible outputs.
- Inadequate production of specialty fibres i.e. pashmina goat wool, angora rabbit wool, etc. and low productivity per animal.
- Lack of contract farming and associated motivation to adopt modern methods of animal management, machine shearing of sheep, washing & grading of raw wool etc. (a Model Contract & Servicing Act, can be expected to support contracts in this area).
- Inadequate raw wool marketing facilities and infrastructure.
- Ineffective role of state wool marketing organisations in wool producing states.

The weakest link after wool production is primarily the marketing of wool. The wool marketing is essentially in the hands of private wool merchants and traders. The wool producers do not have the benefit of organized market of wool available. The prices of wool have been widely fluctuating, and in real terms there has been hardly any increase in the price of wool in last decade.

To bring greater focus on marketing of raw wool, the Ministry of Textiles has introduced a new scheme, namely, Wool Marketing Scheme (WMS) in all major wool producing states to support greater procurement of wool on remunerative price by creation of Revolving Fund for Marketing of Wool.

Other activities supported are operation of e-portal for auction of wool, formation of wool producers' societies, financial assistance to strengthening infrastructure required for marketing of existing wool mandi/grading centres (storage halls, auction facility, testing platform etc.). A financial provision of Rs. 10 crore has been made under this scheme for implementation for the years from 2017-18 to 2019-20.

11.5. Interventions in Livestock Marketing

Marketing is typically associated with production and productivity of livestock, the latter affecting the economics or cost of production. These aspects, including making available grazing lands, breed and feed improvements, better rearing practices, etc. are dealt with in Volume VIII-D of this Report. At this stage of development in livestock farming, it is imperative that eased access to markets, standardisation of market parameters, health and safety of livestock, bio-security of animals and humans, and overall ease of business in the post-production cycle, are taken care of. Livestock marketing involves trade in live animals as well as commerce in the produce from live animals. When managing living animals, their welfare is to be facilitated, as much as hygiene and safety of produce and products from the livestock.

The live animals are traded between farmers, largely for purpose of breeding and farm labour, or to build on existing livestock assets. The trade of live animals also occurs between farmers or their intermediaries with meat processing factories, who optimise on the meat as their primary product and feed leather, blood, feathers and other by-products to other industries.

Live animals are also bought by local wet market butchers and retailers. As bulk of livestock owners are smallholder farmers, a primary intervention will be to facilitate the grouping and transport of their assets to wholesale buyers. Such organisation is also envisaged for crops, through the Gramin Agri-Markets (GrAMs), which are discussed in Volume IV of this Report under the nomenclature of Primary Retail Agricultural Markets (PRAMs).

Production enhancing policies have pushed economies of scale on feed and production, but the output marketing systems have not been given suitable focus. Markets have remained informal and at times exploitative of small producers. This demotivates them from adopting modern practices and new technologies. Easing of market access and connectivity will benefit the large number of small livestock owners.

The country has no authentic market for quality, disease-free germplasm in the form of i) sperm; ii) embryos; iii) calves; iv) heifer; and v) adult bovines. As such, poor quality of germplasm with unknown genetic is sold in unorganised markets. This is of importance if indigenous breeds are to be refined and promoted.

11.5.1. NCDFI eMarket - Digitalization of dairy cooperative trade

The National Cooperative Dairy Federation of India, has its primary objective to facilitate the working of dairy cooperatives through coordination, networking and advocacy.

NCDFI supports 27 state milk federations comprising of 218 District/Tehsil processing unions that incorporate about 1.73 lakh primary village societies that focus on milk production and collection. Among its major activities, is the coordination of milk and dairy product supplies, arranged on contractual terms, to the Ministry of Defence, functioning as a 'carry & forwarding agent' for frozen semen doses, and coordinating the sale of dairy commodities and procurement of agri-commodities through its eMarket.

The transactions are conducted by way of auctions, using the following two methods:

1. Forward Ascending Price Auctions, for the following products:
 - Milk Powder (Skimmed & Whole)
 - Ghee
 - Butter

An overview of the forward auction process is depicted in the following figure.

Figure 11.15 NCDFI eMarket Forward Auction process

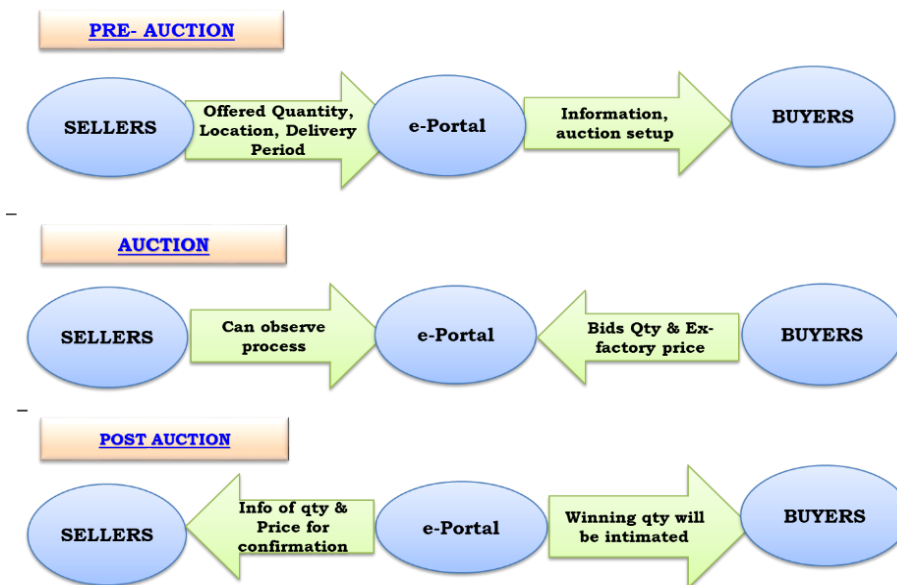


Table 11.6 Dairy Auctions on NCDFI eMarket

Period	SMP (MT)	Butter (MT)	WMP (MT)	Ghee (MT)	Turnover (Rs crore)
Jan 2015 - Mar 2016	3,667	4,701			162
Apr 2016 - Mar 2017	15,904	3,623	850	143	415
Apr 2017 - Mar 2018	14,576	3,115	2,000	5	371
Totals	34,147	11,439	2,850	148	948

Source: NCDFI

Since its launch in January 2015, a total of 48,584 tonnes of dairy products have been traded, using the NCDFI eMarket.

2. Reverse Descending Price Auctions, for the following products:
 - Cattle Feed

- Mineral Mixtures
- Edible Oils
- Sugar
- Maize
- De Oiled Rice Bran (DORB)

An overview of the forward auction process is depicted in the following figure.

Figure 11.16 NCDFI eMarket Reverse Auction process

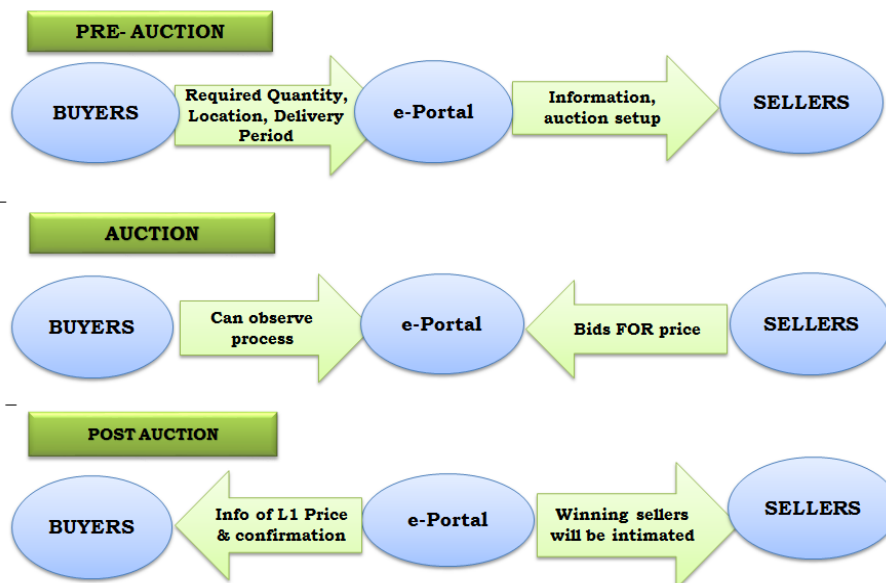


Table 11.7 Overview of Reverse Auctions on NCDFI eMarket

Period	Maize (MT)	DORB (MT)	Rice polish (MT)	Others (MT)	Turnover (Rs crore)
Dec 2015 - Mar 2016	190	6001			0.92
Apr 2016 - Mar 2017	66,199	33,450	3,925		153.96
Apr 2017 - Feb 2018	2,49,072	81,855	12,300	11,974.5	507.84
Totals	3,15,461	1,15,905	16,225	11,974.5	662.72

Source: NCDFI

Reverse auction of agri-commodities was launched in December 2015, and total of 4.598 lakh tonnes of commodities have been traded, using the NCDFI eMarket.

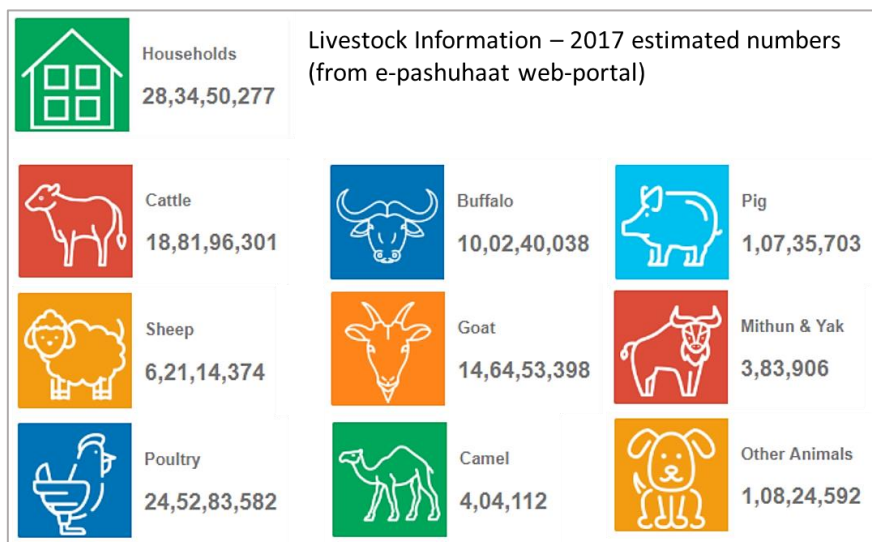
The auction process facilitates price discovery based on market led fundamentals, with buyers and sellers competing for the goods basis demand-supply situation. The NCDFI eMarket has established a Market Oversight Committee to assist in resolving any dispute or difference in respect of any matter relating to, or arising out of the contract. If the parties do not agree to the

resolution proposed by Market Oversight Committee, the parties are then free to appeal to the National Dairy Development Board (NDDB), whose decision shall be final and binding on all parties. The NCDFI eMarket was developed, with technical support of NCDEX, designed to facilitate fair market price discovery, to overcome time consuming tender procedures and to bring in faster processes while having wider participation and transparency in the process. This eMarket exemplifies the role of market platforms in transparently intervening across regional demand and supply variations and allowing for a more harmonised pricing mechanism. Such market platforms need to be further strengthened to help to balance the demand and supply gaps at a national level.

11.5.2. Markets and online trading in livestock and produce

The Department of Animal Husbandry, Dairying and Fisheries Development (DAHDF), Ministry of Agriculture & Farmers Welfare has launched a web-portal, epsahuhaat.gov.in, to provide an electronic platform that provides real time access to relevant information on germplasm and live animals. The platform helps connect breeders, state agencies and farmer stakeholders. Initiated in 2016, the portal has also helped in updating estimates on the livestock population, for which a census was last held in 2012.

The ePashuhaat platform also lists information on availability of artificial insemination technicians with contact details, real-time availability of germplasm, identification and traceability of germplasm and other related information. Live animal exchange is also a function. The platform is the first step in unifying and harmonising the livestock market.



To fully facilitate livestock transactions, the next steps require the organising and modernising of the existing livestock market places to safeguard the living animals, to minimise their suffering and thereby securing their imminent health and their ability to resist disease. This warrants appropriate focus on livestock market infrastructure. It is recommended that livestock markets be developed so that-

- i. The bio-security at the physical markets is improved. This will reduce risk of disease spreading from one animal to the other, or from animals to human. Live poultry markets are frequently implicated in zoonotic transmission of avian flu from birds to humans.
- ii. The Department of Animal Husbandry, Dairying and Fisheries Development in coordination with the recently set up Intersectoral Coordination Committee and the Core Working Group on Anti-microbial Resistance (NAP-AMR) 2017-2021, is to develop suitable protocols at animal markets to maximise animal and human safety at the live animal markets. It should also intervene on indiscriminate use of antibiotics.
- iii. Proper standards should be implemented at live animal markets, such as providing for non-porous or tile floors and walls, segregation of animals, sufficient potable water for animals, feed and fodder, washing system and covered drains, liquid waste treatment systems, handwashing and sanitation facilities for traders and farmers, separate entry and exit gates for vehicles bringing animals, etc. No retail activity or slaughtering should be allowed inside premises of wholesale live markets
- iv. Tagging of animals at live markets to ensure traceability will improve the marketing system and aid in food safety implementation. No wild animals must be sold at markets. The accuracy of tagging can be ensured by adopting technologies like RFID, micro-chips etc.
- v. Premises for quadrupeds and ruminants should be developed to separate them from bird markets. Shade and water availability (troughs, etc) should be made mandatory for live animal at the markets.
- vi. Rodent and insect control programs and systems must be in place and rigorously monitored.
- vii. Safe disposal of dead animals must be built into the marketing mechanism, including a dead animal testing and reporting system.
- viii. A complete list of live animal market infrastructure and facilities may be circulated and markets should be jointly inspected, regularly with producer associations, state government and central government officers.
- ix. India's development story in livestock is replete with the mobility of animals across the country. Cross-regional movement of live animals (quadrupeds and poultry) is essential and the transport of live animals from their breeding grounds to markets and processors should be facilitated. Relevant documentation allowing unhindered inter-state passage is required.
- x. Prices of live animals, especially ruminants, are negotiated by taking into consideration the characteristics, such as age, body weight and structure, appearance, breed, yield and health status of the animal. These parameters need to be standardised, as far as practical, to streamline the market transactions.
- xi. The DAHDF, Ministry of Agriculture & Farmers Welfare had four Regional Directorates for poultry development with various farms and units. In 2003, all the

poultry units of the central government were restructured into Central Poultry Development Organisations. The development work however, is still largely focused on production side and marketing is not directly addressed. **The National Action Plan for Egg & Poultry-2022**, also needs to focus on market development and marketing to the benefit of small holder farmers. Commensurate market development will avoid the situation as in crops, where surplus production has had to be supported through government procurement. Given the higher perishable nature of eggs and poultry meat, an efficient marketing system supported by needed agri-logistics is a sine-qua-non.

- xii. Wool markets can be improved by providing modern shearing facilities. Similar facilities can be developed at specialised GrAMs (proposed for development) in sheep rearing areas. The shearing tools and raw wool handling can be provisioned as service option at these GrAMs, besides subsequent e-marketing to the woollen industry. Clean wool handling will protect the quality of wool and help meet some of the demands from industry. Speciality wool development can also be undertaken, since wool from rabbits and yaks is mostly in hand of small and marginal farmers.
- xiii. Livestock export is normally not in live animals (live animal trade is on the decline), but mainly is in the form of meat and other products. There is considerable scope to increase buffalo meat exports due to its price competitiveness and huge production potential. Such trade also supports the important hide and leather industry. Efforts need to be made to remove bottlenecks to further growth in such trade.
- xiv. Export of meat from small ruminants is limited, largely due to higher domestic demand. However, the demand from existing markets for goat meat from Gulf countries can be developed further. Domestic demand for poultry is also high, and a priority would be to improve the market network and access of backyard poultry farmers into niche peri-urban markets, especially for traditionally reared *desi* fowl and duck meat.
- xv. Modernisation of milk collection points and rejuvenation of cooperatives is necessary. Imports and private sector dairy plants have competed with cooperatives, since removal of quantitative restrictions and de-monopolisation of imports post the liberalisation of Indian Economy rolled out in 1991. The competition is healthy, as it has helped build new products and capabilities. However, capacity building and greater technology support can be provisioned for cooperatives and farmer producer groups.
- xvi. Most livestock development programs are focused on setting up infrastructure and on-production side of the products. At the same time, concerted effort needs to be applied to strengthen the supply side from small and marginal farmers, to link them with markets and bulk buyers where possible. This will require developing a back-end operations where small farmers can aggregate their poultry, small ruminants and connect onwards to markets. Existing trade in this activity can be modernised with the necessary infrastructure if the client farmers of the existing traders are provided equity or other sharing mechanism in the service.

- xvii. The processing industry has been developed to an extent where the units are not always acting to the benefit of farmers. Policies and government support should be linked to demonstrable measures of economic growth leading to the doubling of farmers' income.
- xviii. Trade in livestock by-products needs to be promoted. With a large livestock population and growing meat, egg and dairy industry, various by-products like extracts, bone char, hair, hide, enzymes, and many more are generated. These items have not caught active attention on development front. These possess value and capture of this value is important from the perspective of generating additional income to the livestock farmers.
- xix. Livestock sector will benefit by organising a division on livestock marketing under the Department of Animal Husbandry, Dairying and Fisheries Development. The focus on infrastructure development can include parameters to ensure that the infrastructure is brought to use to benefit income growth in small farmers.

11.6. Fisheries Marketing

Fish and fish products have presently emerged as the largest group in agricultural exports of India, with 995.1 thousand tonnes in terms of quantity and 5.4 million US dollars in value. This accounts for around 10 per cent of the total exports of the country and nearly 20 per cent of the agricultural exports. More than 50 different types of fish and shellfish products are exported to 75 countries around the world.

On the domestic front, fish marketing system is working on traditional and informal patterns, mostly run by private traders, lacking modern facilities and involving a large number of intermediaries between producer and consumer. All this reduces the marketing efficiency and fisherman's share in consumer's rupee. Though domestic fish marketing holds a great potential, it is still vastly disorganised and unregulated. In most of the cases physical facilities and infrastructure in all types of fish markets are far from satisfactory.

11.6.1. Status of the fish processing Industry

The fish processing industry in India is focused on exports and appears well developed. Out of the 625 registered exporters, 380 are manufacturer exporters and 240 are merchant exporters. The fish processing industry consists of 215 ice plants, 481 shrimp peeling plants, 371 freezing plants, 495 cold storage units, 7 canning plants, 16 fish meal plants, 11 surumi plants and 1 agar-agar production units. Of the sea food processing plants about 95 per cent are concentrated in 20 major clusters in 9 states. HACCP (Hazard Analysis & Critical Control Points) certification is mandatory and all the sea food processing plants are HACCP complaint. About 15 per cent of the total fish landed is used for the export of fishery products.

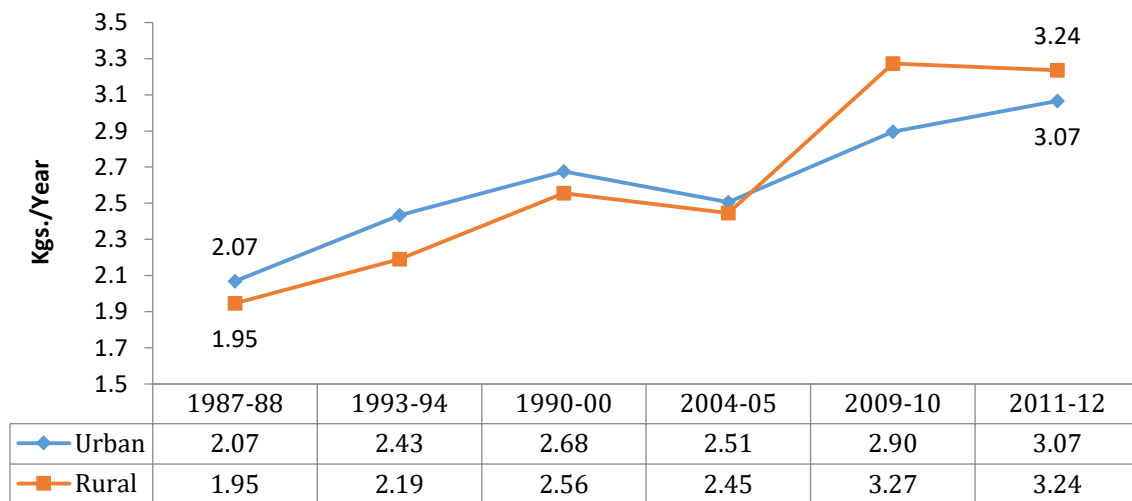
Generally, the fish passes through several intermediaries from the landing centre or fish farms to the consumer, through a network of wholesale, major, minor retail, roadside markets, etc. The intermediaries provide different services of head loading, icing, packing, transporting, processing and preservation. Value added activity happens at the primary level through sorting, grading, cleaning, icing and packing of fish. Normally fish is graded and sorted manually. If

the same fish is meant for exports the processors further grade, clean, process and pack the fish for exports.

11.6.2. Status of domestic fish marketing

The importance of domestic marketing can be understood from the fact that about 85 per cent of the fish landed, is distributed through domestic markets. As more and more trade restrictions are being imposed on the fishery product exports, the domestic market is expected to remain the mainstay of the fisheries sector. The domestic demand is also showing an increasing trend.

Figure 11.17 Trends in fish consumption (per capita annual)



Source: Various NSS Rounds

The fish market in the northern parts of the country has remained untested to a large extent. Appropriate fish handling and cold-chain connectivity will be required to deliver fish to the northern markets of the country. Private sector entrepreneurs are recognising opportunity from this unserved demand and realise, that regular and efficient supply to these untapped markets will make fish more affordable and in turn further drive consumption volumes upwards.

The key constraint in domestic fish marketing arises from the perishable nature of the fish, and the time lag to transport the fresh catch from the fish landing centres to the interior markets. Lack of proper handling results in poor quality of material, risk of food borne diseases, nutritional and post-harvest losses. Fish also needs to be segregated from other food types which tends to disallow shared infrastructure usage. The harvested fish is not evenly distributed to interior areas due to lack of refrigerated transportation.

Mostly, the fresh fish meant for domestic consumption is not processed and transportation is undertaken in insulated or covered trucks (non-refrigerated), using ice flakes to chill and pack the fish. This system is preferred for saving costs, compared to actively refrigerated transport modes (reefer containers or trucks). The commission agents and traders are known to compromise on the quantity and type of ice used, putting the hygiene and food safety at risk. Ice flakes made from non-potable water can cause serious contamination.

The majority of domestic markets have poor handling facilities and the fish that reaches the consumer for domestic consumption is already one or two days old. Availability of potable water, good quality ice, electricity, waste disposal system, etc. is inadequate. This also hampers consumer acceptance and demand for fish from hinterland population.

The various stakeholders in the marketing channels sell the fish to the next level as soon as possible, that coincidentally results in a fast selling cycle in the trade. This has advantages of reduced inventory holding costs and risks. Processed and preserved fish can be stored for longer duration and has a longer production to selling cycle.

Due to variety of reasons, fisheries sector has long been neglected and serious efforts are needed for efficient marketing of fishes so as to match up with its production. Fish marketing usually starts with the auction system which is highly irregular, disorganised and unregulated in most states of India, making it a very tough task for any new entrant to enter into these markets. There is need for improvement in various regulation by the cooperative federations so as to make entry easy for new entrants, also there is need for improvement in facilities like creating and maintaining much needed infrastructures such as launching cold storages at major collection points, improved road access to fish catching centres (ponds, rivers etc.), from the main markets, ice factories, etc.

The domestic marketing channel of fish, irrespective of its form, i.e. fresh, dried, processed, etc. is multi-layered and requires collaboration among various actors in the marketing chain. However, in case of ornamental fish, the business is more closely integrated in the hands of a few enterprises. The ornamental fish production and trade are also emerging as a lucrative commercial aquaculture venture.

Table 11.8 Quantity of ornamental fish sold in selected markets of India (2015) (In lakhs)

Name of the Ornamental Fish	Kolkatta (Howrah)	Chennai (Kolathur)	Mumbai (Kurla)
Molly	40.30	27.8	11.20
Guppy	24.20	27.80	19.00
Platy	24.20	10.70	11.20
Gold Fish	56.40	49.50	23.40
Koi Carp	9.70	14.30	6.10
Zebra	19.30	10.70	8.90
Angel Fish	24.20	25.70	16.20
Total (in lakhs)	198.30	166.50	96.00

Source: Nightingale Devi B. 2014

Ornamental fish markets are located in different parts of the country. The most important ornamental fish markets in the country are located at Howrah, Kolkatta, Kolathur, Chennai and Kurla, Mumbai. Many other centres like Kochi, NCR (National Capital Region) of Delhi are developing as important hubs. Vertical integration is high at 64.44 per cent among ornamental

fish marketing firms in Kurla, 83.33 per cent in Howrah and 76.19 per cent in Kolathur.

Vertical integration essentially implies that the firms are performing more than one function at a time, in the marketing process. The firms in these markets work as wholesalers, commission agents, retailers and post production service agents of ornamental fishes. The extent of horizontal integration in selected ornamental fish markets was negligible at 6.64 per cent, which indicated that the number of firms having a spread of outlets performing the same function was almost negligible. The vertical integration also concentrates market power in the hands of a few firms; the top three account for 10.6, 8.5 and 9.8 per cent of total ornamental fish transactions respectively. The extent of concentration of market power indicates a lower degree of market freedom.

11.6.3. Value to fishermen

As in case of all perishable produce, the farmer or fisher, has little time to evacuate the harvest, and without any market connectivity services, has to sell off the produce at first instance to the local agents. The price discovery therefore is made on the basis of incoming daily catch and demand that is monopolised by the commission agents. Therefore, the fish farmers are obliged to take the price offered by the commission agents who in turn can delay payments by as many as 6 months to 1 year. Such delays can bind the farmers in a debt trap.

Marketing services in the form of refrigerated connectivity with the up country consumers is lacking and would empower the fishing community with a seller's choice. Such marketing services would also help them capture a greater share of the final wholesale value at terminal markets.

11.7. Institutional Support for Fish Marketing (Domestic / Exports)

11.7.1. National Fisheries Development Board

The National Fisheries Development Board (NFDB), established in 2006 under the administrative control of the Department of Animal Husbandry, Dairying & Fisheries, Ministry of Agriculture and Farmers' Welfare works to enhance fish production and productivity in the country and to coordinate fishery development in an integrated and holistic manner.

A wide range of fishery development activities are supported through state governments and implementing agencies. These include, intensive aquaculture in ponds and tanks, culture based capture fisheries in reservoirs, coastal aquaculture, mariculture, sea weed cultivation, establishing infrastructure like fishing harbours and fish landing centres, fishing dressing centres, solar drying of fish, domestic marketing, fish processing, ornamental fisheries, etc. Capacity building of fishermen and fish farmers is also being supported. The activities of NFDB are overseen by its Governing Body, chaired by the Union Minister of Agriculture and Farmers Welfare. The Executive committee, has the Secretary of the Department of Animal Husbandry, Dairying and Fisheries as its Chairman, and provides the general superintendence, direction and control of the affairs and functions of the Board.

In the backdrop of the above, the following areas have been identified for the development of domestic fish marketing system in the country:

- Modernisation of wholesale markets
- Cold-chain and hygienic retail outlets of varying levels

The retail outlets are an important link in the domestic marketing system. It is only through retail markets that the fish is traded to the outlets to reach the actual consumer. The quality of fish that reaches the retail end, is effected by the conditions of the wholesale markets and connecting cold-chain logistics.

The main drawback of the retail market, is that the fish reaching for distribution is in poor quality due to weakness as that exist in the wholesale handling, storage and transportation. Initial freezing and refrigerated transport to safely connect the primary producer to the domestic consumer in the system is necessary. Apart from a dynamic cold-chain, provision of other amenities like hygienic retail outlets for merchandising, are required.

Schemes under rural development department for promoting women and weaker sections in domestic fish marketing are also undertaken by NFDB.

11.7.2. Marine Products Exports Development Authority (MPEDA)

The erstwhile Marine Products Export Promotion Council established by the Government of India in September 1961 was converged in to MPEDA on 24-August-1972, by an Act of the Parliament. MPEDA is given the mandate to promote the marine products industry with special reference to exports from the country.

The organisation is envisaged to take all actions to develop and augment the resources required for promoting the exports of “all varieties of fishery products known commercially as shrimp, prawn, lobster, crab, fish, shell-fish, other aquatic animals or plants or part thereof and any other products which the authority may, by notification in the Gazette of India, declare to be marine products for the purposes of (the) Act”.

The Act empowers MPEDA to regulate exports of marine products and take all measures required for ensuring sustained, quality seafood exports from the country. MPEDA is given the authority to prescribe for itself any matter, which the future might require, for protecting and augmenting the seafood exports from the country. It is also empowered to carry out inspection of marine products, its raw material, fixing standards, specifications, and training as well as take all necessary steps for marketing the seafood overseas.

MPEDA is the nodal agency for the holistic development of seafood industry in India to realise its full export potential. Based on the recommendations of MPEDA, Government of India notified new standards for fishing vessels, storage premises, processing plants and

conveyances. MPEDA's focus is mainly on market promotion, capture fisheries, culture fisheries, processing infrastructure & value addition, quality control, research and development.

MPEDA activities include:

- Registration of infrastructural facilities for seafood export trade.
- Collection and dissemination of trade information and the promotion of Indian marine products in overseas markets.
- Implementation of schemes vital to the industry by extending assistance for infrastructure development for better preservation and modernised processing.
- Promotion of aquaculture for augmenting export production through development of hatcheries, new farms, diversification of species and technology upgradation
- Promotion of deep-sea fishing projects through test fishing, joint ventures and up gradation & installation of equipments to increase the efficiency of fishing.
- To carry out inspection of marine products, its raw material, fixing standards and specifications, training, regulating as well as to take all necessary steps for maintaining the quality of seafood that are marketed overseas.
- Impart trainings to fishermen, fish processing workers, aquaculture farmers and other stake holders in the respective fields related to fisheries.
- Conduct research and development for the aquaculture of aquatic species having export potential through Rajiv Gandhi Centre for Aquaculture (RGCA).
- Conduct extension and awareness activities, trainings etc through Network for Fish Quality Management and Sustainable Fishing (NETFISH) & National Centre for Sustainable Aquaculture (NaCSA).

MPEDA also launched the Fish Exchange Portal', <http://fishexchange.mpeda.gov.in>, to enhance the export trade between registered seafood exporters of India and buyers abroad. The portal provides a platform for buyers across the globe to interact and source the 'Irresistible Seafood from Incredible India' from the registered exporters under this Authority. The portal also features latest and updated information on world's and India's seafood trade statistics, production information and price trends, for the users to refer and understand the market scenario. It is loaded with directory of Indian seafood exporters, country profiles, regulatory, and tariff information, standards, notifications, information on upcoming business events / fairs etc. so that it will act like a 'one stop shop' for the trade needs.

11.8. Annotation

Livestock and fisheries sub-sectors are important contributors to Indian agricultural growth and to income growth of farmers. Various improvements, especially to enhance income opportunity for small farmers in small ruminants, poultry and fishery are desirable. In dairy products, despite achieving enviable scale and efficiencies, continued growth in demand for fresh milk,

requires further optimisation in the marketing of milk. Large surplus stock of milk powder finds less demand in domestic market.

Poultry sector is well organised in the broiler segment, but the backyard poultry in the hands of small and marginal farmers requires greater marketing support. The government can play an important role by promoting marketing entrepreneurs or start-ups to aggregate demand and link it with supply from backyard farmers.

Goat and sheep sector can also benefit from modernising their market network, as well as by facilitating marketing of various by-products. Across all segments, modernising of market infrastructure, including for live animals in compliance with animal welfare is required. Similar is the case with fishery marketing.

On the export front, livestock products, including fisheries have demonstrated excellence by capturing a large share of the global market and establishing India among the top exporting countries. However, a similar level of efficiency is not observed in the domestic marketing network. Food processing focus in the livestock and fisheries sector is imperative, as the produce cannot be marketed to wider consumer base without mediation of processing industry.

The prevailing financial and fiscal incentives to promote and develop marketing infrastructure are listed in Chapter 5 of Volume III of this Report.

Key Extracts

- Livestock sector has received sustained government support to realise increased production. The sector has also garnered private initiatives and grown. However, market and marketing development has been largely left to the devices of cooperatives and private sector. And both need to improve for higher efficiency.
- Small farmers with livestock do not have safe and easy access to livestock markets, having to rely on sales transacted by informal traders. Milk farmers are better organised as the collection points transact at prices set by terminal wholesale buyer.
- Animal welfare is not addressed at existing live animal markets. Infrastructure, including for bio-security at markets, needs to be developed at livestock markets.
- Agro-processing industry (food and non-food), should be supported to become more competitive, with provision to demonstrate measurable impact on farmers income.
- In addition to strengthening the existing livestock markets (2000 in numbers) across the country, market integration by upgrading ePashuhaat (the online trade platform) needs emphasis. Similarly, the initiatives like NCDFI eMarket for diary sector participants need to be strengthened.
- Domestic fish markets are the mainstay of fishers and hinterland demand remains untested due to insufficient cold-chain connectivity.
- Unlike horticultural produce almost all production from livestock and fisheries benefits from processing as a marketing intervention. Special attention to bring greater development of food processing industries in these sub-sectors is required.

Chapter 12

Nutrition led marketing

There are many produce types, having high nutrition value and ecologically ethnic to India, that are not being ably marketed to the domestic consumers. The population is increasingly facing nutrition linked health concerns on both extremes; from obesity as well as under-nutrition. This raises concerns of long term health degradation and the need for nutrient led marketing is discussed in this chapter.

12.1. Context

Nutrition in India, has been an area of concern for many decades. The nation is not only food self-sufficient, it also generates exportable surpluses. Paradoxically, nutrition adequacy is yet a goal post to be arrived at. As per the recent estimates, about 37 per cent of under five children are underweight, 39 per cent are stunted, 21 per cent are wasted and about 8 per cent are severely acutely malnourished¹⁹. The impact of under-nutrition among children is long-term, inter-generational and irreversible.

The country faces a double burden of malnutrition. India is also home to over-nutrition related health challenges at the other end of the spectrum. India is ranked as the third most obese nation of the world after US and China, and as per 2015 data, India has about 69.2 million people suffering from diabetes. Yet, many who suffer symptoms of over-nutrition, continue to suffer micro-nutrient deficiency, thanks to having imbalanced diets.

All these facts suggest that a large part of India continues to consume non-nutritious, non-balanced food, resulting either in under-nutrition, over-nutrition or micro-nutrient deficiencies. At the same time, the country produces large quantities of high nutrition foods like cereals, pulses, fruits, vegetables, milk, meat & egg.

This situation is a result of various factors, including a lack of suitable marketing of India produced high nutrition foods. Many of these food items, are not only cost effective to produce but also grow in less endowed cultivation environment. They offer opportunities to promote good health and the income of farmers. This suggests that there is a need for innovative and widespread marketing of high nutrition food items produced in India, for betterment of both farmers as producers and consumers.

The Global Nutrition Report 2016 reveals India's slow progress in addressing chronic malnutrition, manifest in stunting (low weight for age) wasting (low weight for height), as well as obesity with micro-nutrition deficiency.

The Global Hunger Index, 2017 ranks India at 100th position based on its performance-on the above parameters. This is an alarming bell that deserves urgent attention.

The repercussions of both under-nutrition and obesity on the well-being of individuals are multi-dimensional and long-lasting, making it imperative that India up its attention to nutrition.

12.2. Changed awareness for a changed food plate

In the initial phase of economic growth, a visible change in Indian diet was evident, wherein

¹⁹ Government of India. NFHS4

the per capita consumption of fatty foods, salt, sugars and artificial nutrients increased, as well as in respect of overall calorie intake. These are indicators of initial growth in relative affluence of populations. A preference for commercially marketed foods, including vegetable oils also created demand for imports. However, global experience and recent domestic trends show that with rising level of income and education, the next phase in consumer preference shifts towards more nutrient and natural foods. This is already manifesting in India, with the diet is diversifying into fruits, vegetables and an emerging trend towards animal-based food. However, this comes on the base of a declining per capita share of cereal and pulses in food.

The next stage in development, is when the consumer becomes more health and environment conscious and shifts towards organic or 'green' foods. Changes in food consumption have implication on agriculture and its trade. The country also has a large nutrient deficient population and given the large socio-economic diversity, the per capita intake of calories, protein and fat remains significantly below that of ICMR recommended requirements. The implication is that in coming years, with increasing per capita income and urbanisation, India's demand for various superior food products will see a visible rise. Such demand for high nutrient food types can be fulfilled from produce of India, and not necessarily from those which are marketed from foreign shores.

The DFI Committee is of opinion, that there are a variety of nutritious food items of India which are currently not suitably marketed and general awareness of public of such foods is ad hoc in nature. A cafeteria of such crops and commodities would include hardy crops like millets, organically grown produce, indigenous animal breeds, and certain other traditional crops that are original to specific geographies of India and over which farmers have a right.

Certain crops become inevitable under established conditions of ecology, even when market signals may not favour them. Under such situation, monetisation of the farmers' produce can be triggered by creating a demand for such produce. These kind of crops and commodities should be encouraged, by undertaking the analysis and authentication of their inherent nutritional values and unique characteristics; creating awareness through aggressive marketing promotion; and linking them to organised retail including portal based retail.

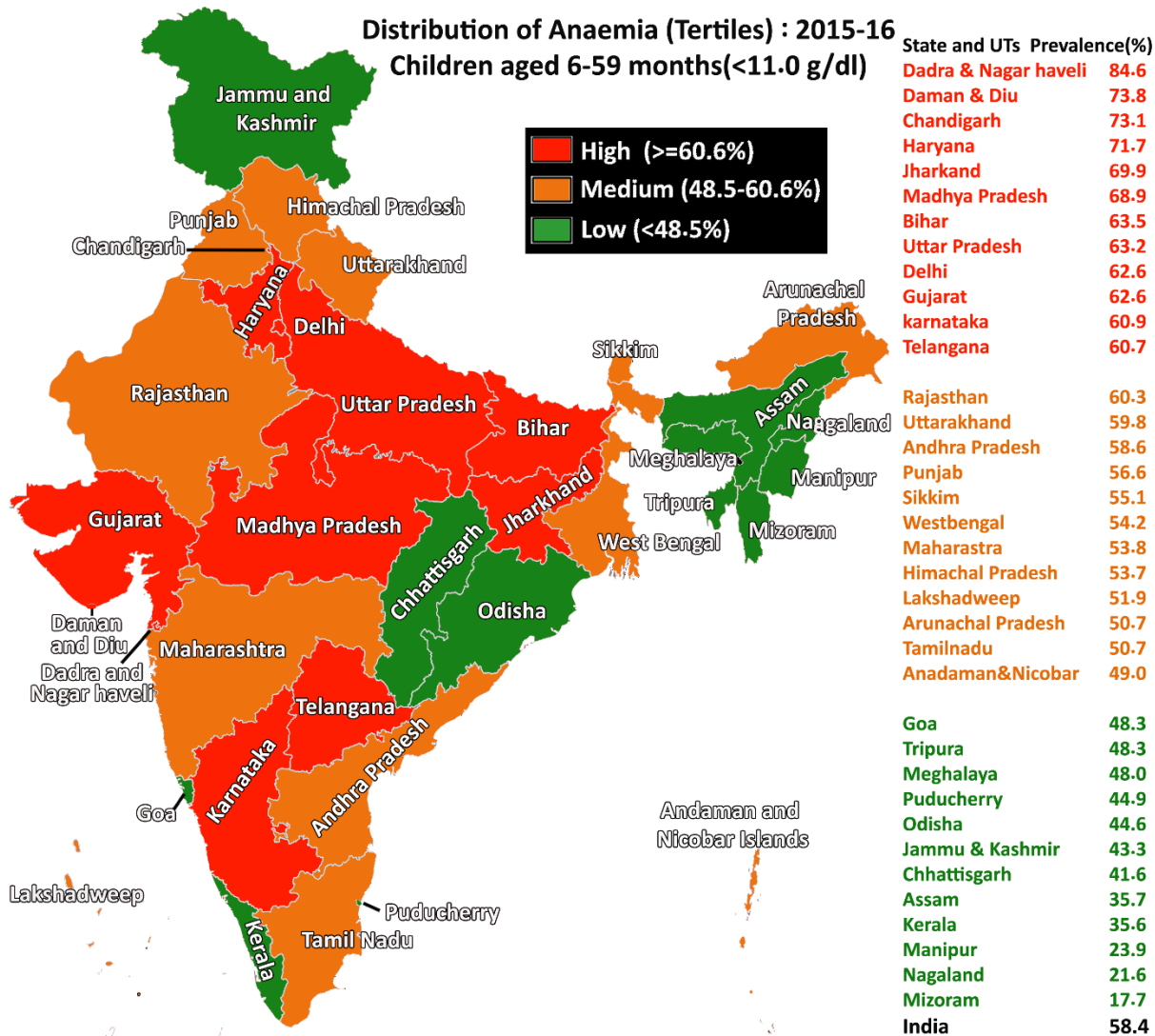
In many cases, nutritious foods widely produced in India do not feature on the plate of a large section of the consumers, sometimes as a result of misperceptions. Consumers' food choices reflect cultural preferences, habits, availability, affordability, government policies, religious beliefs and not in the least, on their awareness or lack of awareness or many a time socially influenced perceptions. For example, majority believed that millets are meant for the poor. Consumer food choices are also reflected in their health, and overall physical wellbeing.

Awareness levels for the produce that is ecologically viable and have high nutrient value is a matter of public service, and needs to be pursued through developing and pro-actively implementing pro-nutrition marketing.

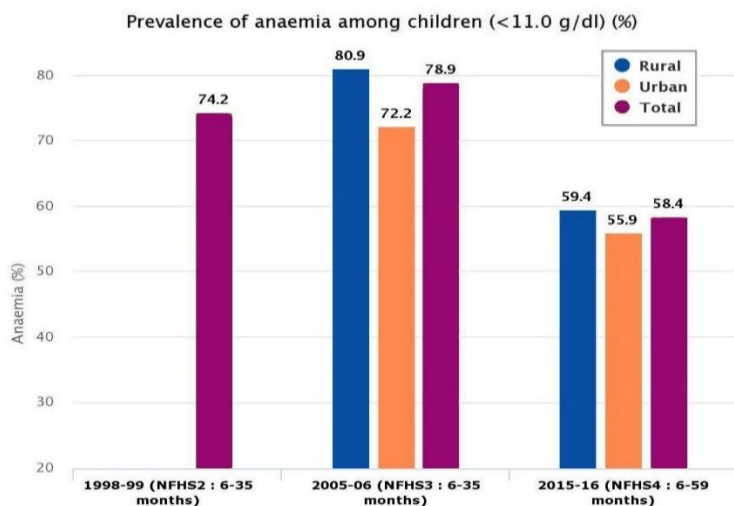
12.3. Health implications of consumer habits

Intake of nutrition is linked to both the supply of food, and the knowledge about what food to eat. Lack of basic food as well as lack of understanding of the nutrient value of food impacts the population. It is important to create awareness among the all citizens on the importance of a balanced and diverse diet to induce a positive nutrition-behaviour among the population.

Figure 12.1 Anaemia in Children



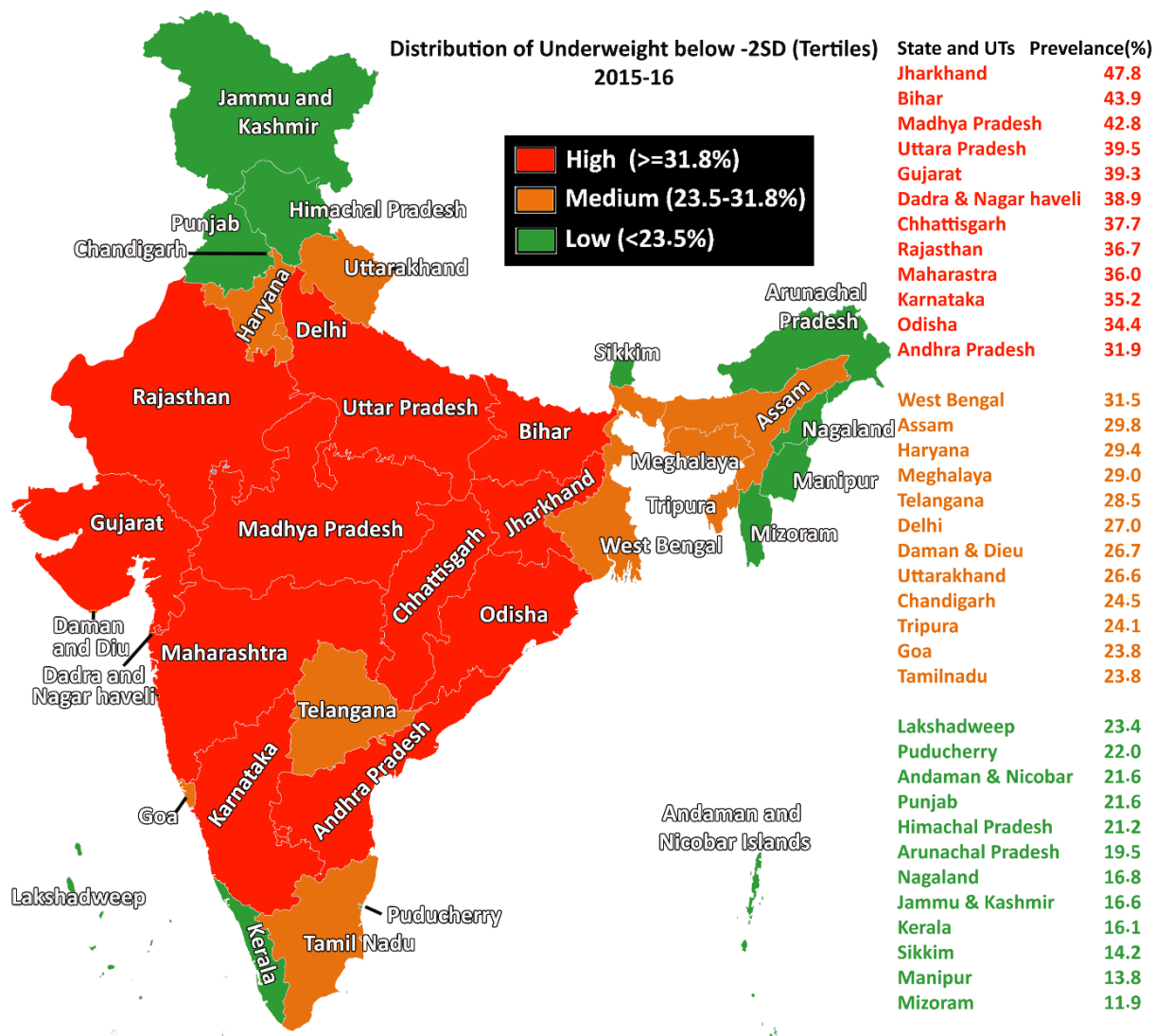
Source: National Family Health Survey (NFHS), National Institute of Nutrition



Prevalence of anaemia among children under 5 years has reduced 26 per cent in the last decade. A high prevalence of 58 per cent indicates that the ratio of suitable foods can be increased in food distribution schemes that target preschool children.

Anaemia in Children

Figure 12.2 Underweight in Children below 5 years - Weight for Age



Source: National Institute of Nutrition compiled from National Family Health Survey (NFHS), District Level Household

Survey (DLHS), and Annual Health Survey (AHS)

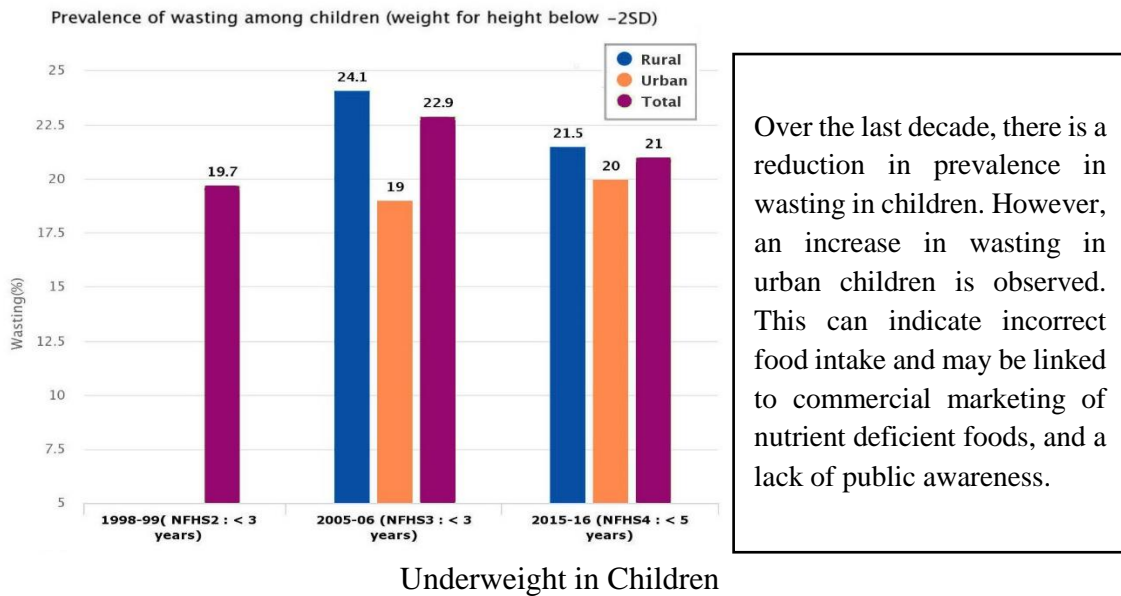
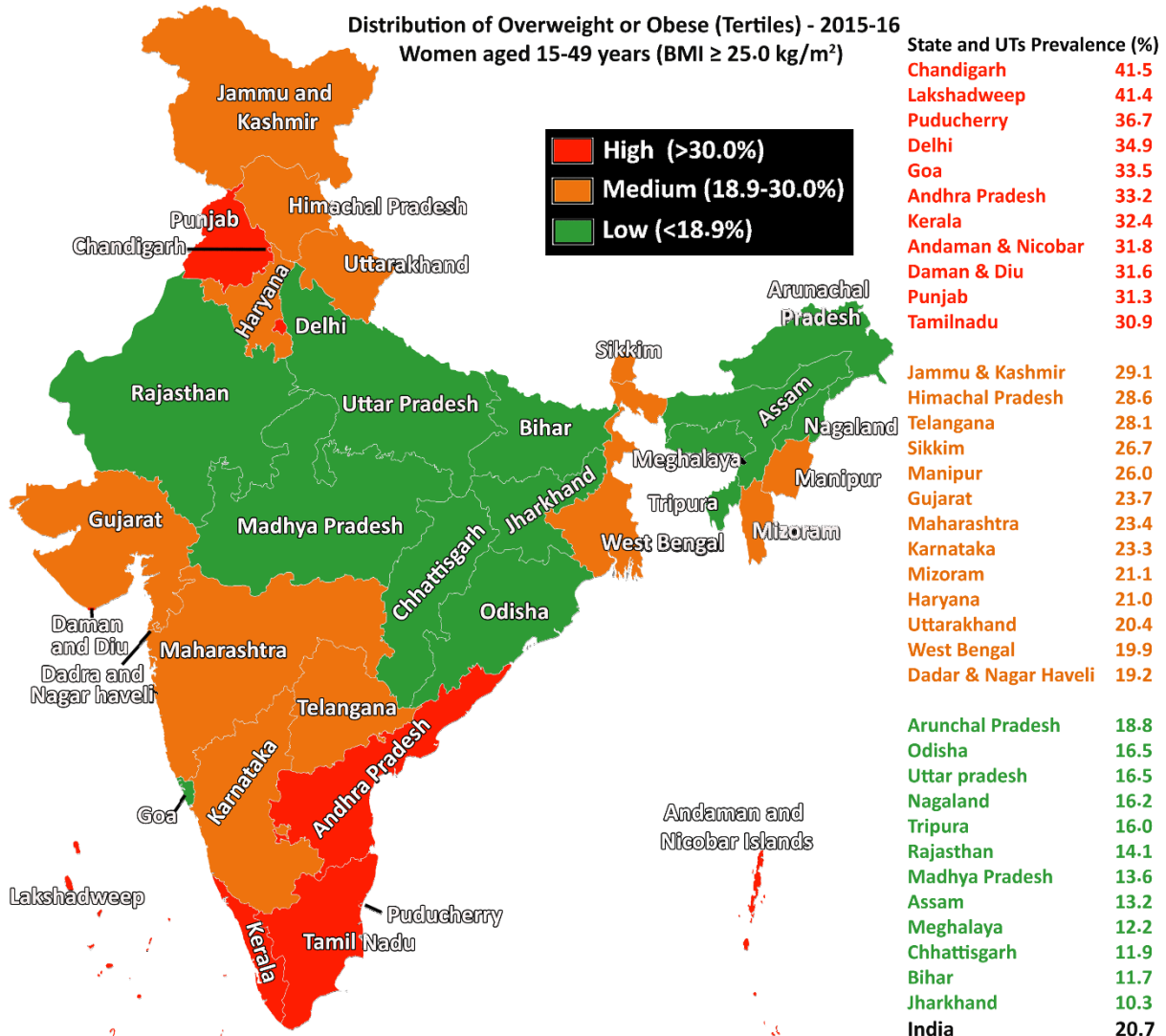
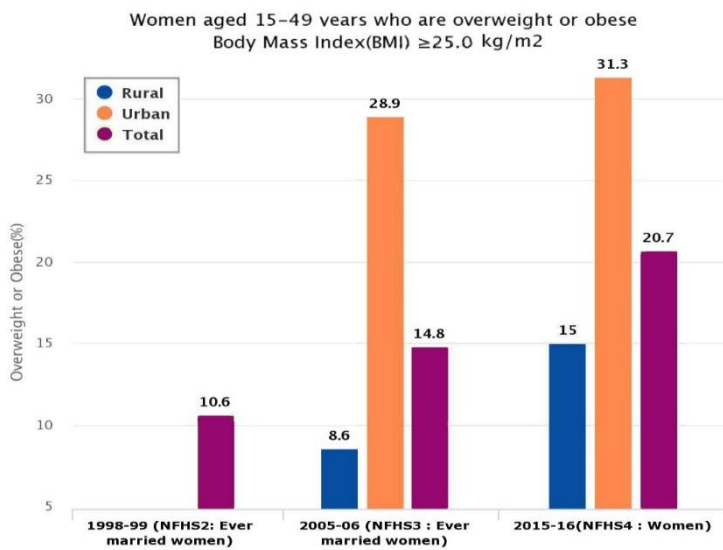


Figure 12.3 Overweight or Obesity in Women



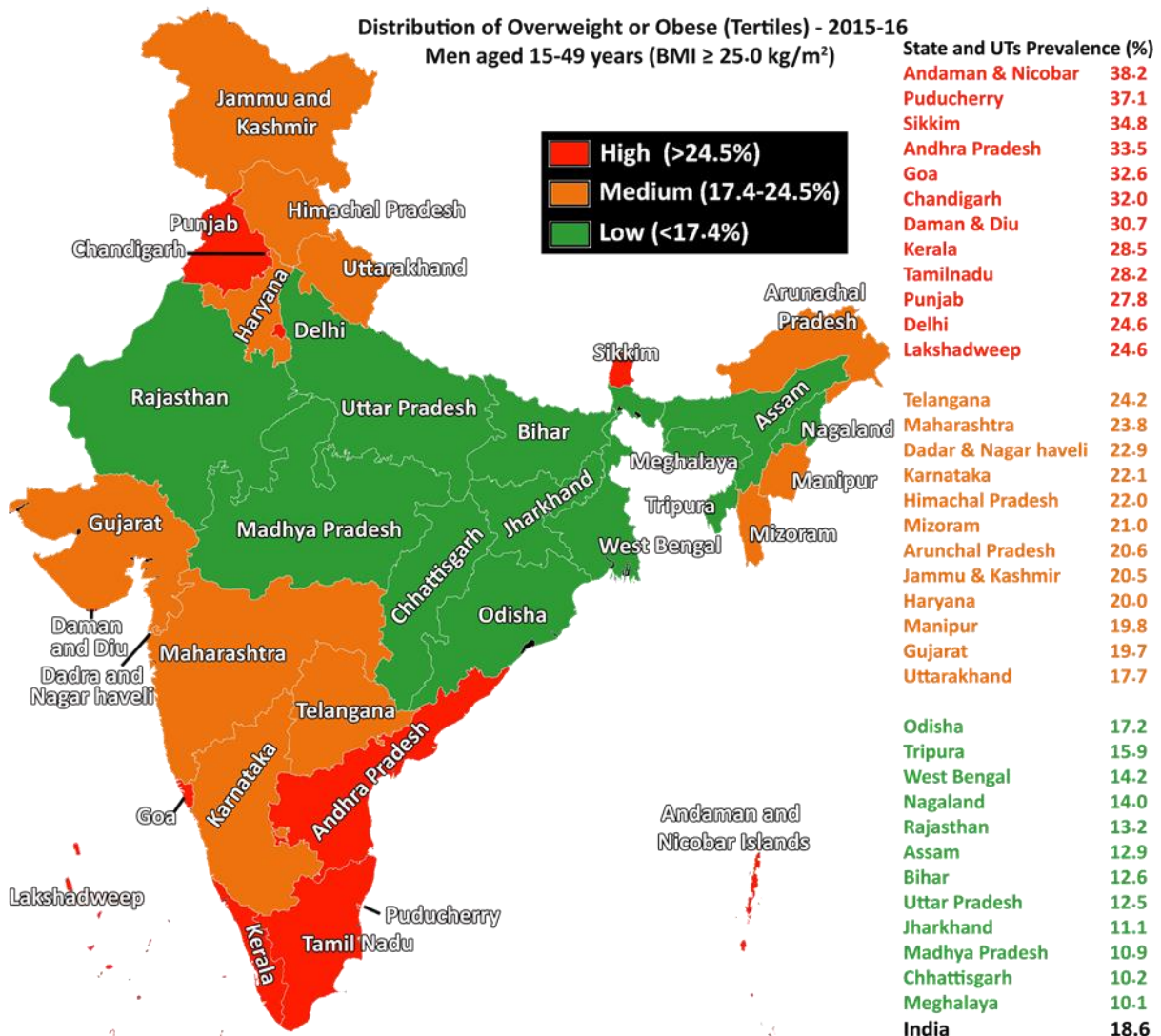
Source: National Institute of Nutrition compiled from National Family Health Survey (NFHS)



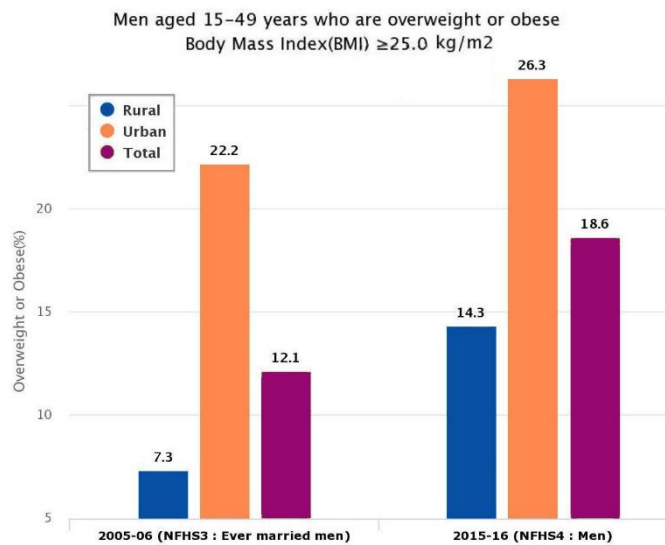
In the last decade, per cent of obesity among rural women has almost doubled. This indicates increased intake of foods associated with obesity – high in sugar, fats, salts, etc. This is likely a result of increased affluence making for consumers of foods marketed for convenience. Public service in form of nutrient awareness to counter false marketing is indicated.

Obesity in Women

Figure 12.4 Overweight or Obesity in Men



Source: National Institute of Nutrition, compiled from National Family Health Survey (NFHS)



In the last decade, incidence of obesity among rural men has almost doubled. This indicates increased intake of foods associated with obesity – high in sugar, fats, salts, etc. This is likely a result of increased affluence making for consumers of foods marketed for convenience. Public service in form of nutrient awareness to counter false marketing is indicated.

Obesity in Men

There is a case for actions to sensitise the consumer, using marketing techniques as a public service, on the availability of locally grown cost effective foods, which would also influence and mobilise public demand for food types that are optimal to local climatic conditions. Promoting a preference for healthy natural foods, ecologically inherent to India, is needed as a public service, for farmers' welfare, sustainable agriculture and for health of the nation.

12.4. Examples of unexploited nutrition


The lack of correct information often allows misconceptions among consumers which needs to be addressed by providing nutrition based awareness and attempting behavioural changes. At times, urban consumers being removed from farming traditions, get influenced by the nomenclature of certain pulses and cereals. Some of the more nutritious cereals for example are both non-charitably and disparagingly referred to as coarse cereals, which can lead to connotations of them being unsophisticated foods. Pulses are known as “poor man's food” while these are high nutrition, power foods.

The United Nations General Assembly named 2016 as the “International Year of Pulses”. In cooperation with the initiating countries of Pakistan and Turkey, as well as Brazil, Italy and Namibia, the UNECE with the Food and Agriculture Organization (FAO) had organised an event in Geneva to celebrate the extraordinary nutrition properties of pulses, to make consumers aware of the super food status of these wonder foods. A more sustained effort to propagate and maintain consumer awareness is needed, domestic and international.

Horse gram, the name that may engender erroneous image of it, is one such example of a high nutrition food. The legume was first domesticated in South India at least 5000 years ago, and consumed since ancient times. It has exceptional nutrition profile, coupled with drought resistance.

Kulthi Kollu Ulavalu Hurule Muthera

(Names of Horse Gram)



Health benefits

High caloric food, rich in protein, iron, calcium and polyphenols, almost no fat.

- Anti oxidant
- Anti bacterial, Anti fungal
- Antistringent, diuretic
- Anti hyperglycaemic (raw, unsprouted)

Traditional Medical uses

- Kidney stones
- Ulcers
- Cold
- Asthma
- Jaundice
- Bronchitis
- Leukoderma
- Water retention
- Heart ailments

Factoids

- Staple food in South India since Neolithic age.
- Highly drought resistant.
- Controls weight, gives energy
- High potential food source for malnourished.
- First domesticated in South India at least 5000 years ago

The *Kulthi* (*horsegram*) plant requires relatively low levels of light and can be grown under-cover or as understory crop. The vine grows thick and dense and prevents soil erosion. The stalks and stem are also used as nutrient animal feed. Many other such examples are available, including produce like *moringa* (drum sticks), pseudo-cereals like buckwheat, amaranth, etc.

Millets are another set of hardy extremely nutritious and cost effective cereals, with hierarchical connotations of them being a poor man's crop, resulting in consumers preferring to wheat & rice, as their purchasing power looks up. Millets are actually three to five times more nutritious than rice and wheat in terms of proteins, minerals and vitamins. Millets are rich in B vitamins, calcium, iron, potassium, magnesium, zinc, apart from being gluten-free, and low in glycaemic index (GI). These are more suitable for people with gluten allergies or high blood sugar levels. Millets need very little water for their production. Compared to irrigated commodity crops currently promoted by policy measures, millets require just around 25 per cent of the rainfall regime demanded by crops such as paddy, sugarcane and banana. Not only do they not burden the state with demands for irrigation or power, they are also most appropriate for water deficient agro-climatic zones.

Millets do not demand rich soils for their survival and are often grown on skeletal soils that are less than 15 cm deep. Hence, for the vast dry land area, they are a boon. Millet production is not dependent on the use of synthetic fertilisers, millet farmers mostly use farmyard manures and in recent times, household produced bio-fertilisers. Therefore, they not only can reduce the burden of fertiliser subsidy borne by the government, but are more naturally grown foods. Grown under traditional methods, millets do not attract any pest. A majority of them are not affected by storage pests either. Therefore, the need for pesticides is close to nil.

Another example is coconut oil, a unique oil that is suitable for both edible and non-edible uses. Yet, many think it to be rich in artery clogging saturated fats because of the negative anti saturated fat campaigns that has prevailed for decades. Scientific evaluations tell of its potential to offer protection against heart disease and a wide array of chronic health problems, including diabetes and cancer.


They are also reported to prevent and even treat infectious diseases. However, knowledge about coconut oil has been kept buried in medical journals only because of a general prejudice against saturated fats. When prioritized and supported, the coconut oil industry will not only provide foods, income and raw materials, but will also provide gainful employment engaged in coconut farming and those in processing industry.

Camel milk is yet another super food largely ignored by majority of consumers in India. Similarly, the consumption of honey is also quite limited among Indian population, though these foods are well within affordable reach of a significant segment of the population. Many locally available high nutrition foods are consumed as a matter of habit, though awareness of their health benefits are limited. Although by default, the population consuming these foods are being well served. Foods like ‘*sattu*’, a flour consisting of a mixture of ground pulses and cereals, though possessing high nutrition benefits, is considered irrelevant because of its ‘low cost’ image. The real value of such foods has not been propagated to create appropriate demand from the larger consuming population, especially from cities.

Besides food items, there are other ignored opportunities like in case of mechanically processed bamboo for clothing and under garments. These textiles inherit some of the anti-microbial properties of the plant. Bamboo is reported to have twice as much water use efficiency as trees, and better able to handle harsh weather like drought, flood and high temperatures. In comparison, cotton is a thirsty crop taking up to 20,000 litres water to produce 1 kg of output. Historically, bamboo was used for raw structural elements, but modern technology allows for very hardy composite materials and bio-polymers for various industrial uses.

The above food and non-food examples constitute only an illustration, as there are various other

Camel Milk Factoids



- A Composition that is closer to human milk than cow milk; slightly sharp & salty... may need an ‘acquired taste’.
- Compared to cow’s milk, is 3 times as rich in Vitamin-C and about 10 times richer in iron and comprises far more unsaturated fatty acids and ‘B vitamins’.
- Contains immunoglobulins, other protective proteins and enzymes; which help to fight diseases like cancer, HIV/Aids, Autism, Alzheimer’s and Hepatitis B.
- Globally, camel milk is fast gathering superfood status.
- Camel milk is a natural source of Alpha-Hydroxy acids with anti-aging, antioxidant benefits. Queen Cleopatra was a big fan of camel milk & is said to regularly bathe in it.
- Camel milk soap is sold in many parts of the world as a beauty and anti-ageing option.
- In Bikaner a litre is sold for ₹ 350 and in California, a pint bottle of camel milk costs \$16 to \$18 (or ₹ 2200 a litre).

agricultural produce whose multiple uses & there potential remain unfortunately untapped.

12.5. Influencing demand, from the consumers plate to farm

Food marketing is normally undertaken by commercial producers, with the aim to capture a larger market share, as a matter of course for business growth, when competing with other products, or on introducing a new product. Commercial marketing inevitably focuses on capturing value for the individual business, and is therefore a value adding activity in the value chain of the commercial entity. Marketing is designed to create a fascination in the consumer, focused on building brands and sales for the commercially specific food product, domestic and foreign, and may not necessarily be relevant in its messaging.

The Access to Nutrition Index (ATNI) engaged with and evaluated the ten largest food & beverage companies in India for the first India Spotlight Index 2016. As part of the study, the nutritional quality of product sold and marketed were reviewed. The product quality review used an established nutrient profiling system and corporate profiling was carried out against international and national guidelines and norms of accepted good practices, as well with guidance of a panel of nutrition experts.

The findings report that of the food products being sold, only 16 per cent were estimated to be of high nutritional quality and only 12 per cent of the beverages sold met these quality standards. Just 7 per cent of the foods and 8 per cent of the beverages were reported suitable to be marketed to children. The report stated that most of the companies do not seem to consider the importance of ensuring, that healthy products are affordable and accessible, and do not appear to have developed any commitment or policy in this regard.

Among many surveys and studies, the recent ATNI report²⁰ on India, shows a dismal picture on the nutrient profile and marketing focus of the top food marketing companies in India. The report recommended urgent need for widespread reformulation of many of the packaged foods by cutting sugar, salt and saturated fats. Another recommendation was to redirect marketing towards healthier food products and that for unhealthy 'indulgent' products, the messaging should be for limiting consumption to small portion at very few occasions.

The consumers are easily influenced in their purchase by the marketing propaganda, and can tend to ignore other more ideal options for their needs. From this perspective, there is a case for brand agnostic publicity, as an impartial public service, to market the qualities of indigenously produced food items.

Public service through such marketing should be target to build awareness about the nutritional value of produce that is traditionally cultivated in India. The messaging should be trusted

²⁰ ATNI - India Spotlight Index 2016, by Access to Nutrition Foundation

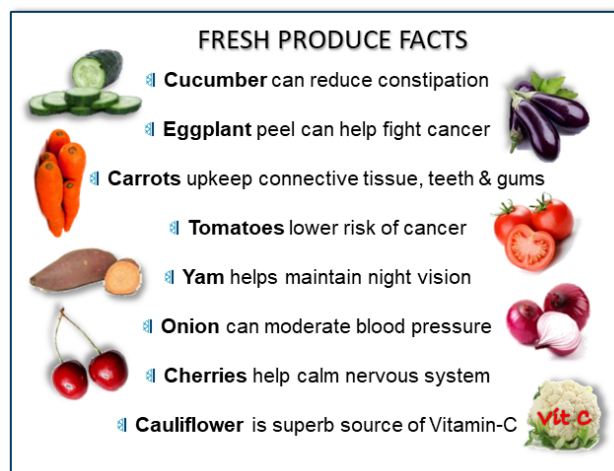
information, that is shared in an easily accessible manner, to bring about an accelerated change in the already prevalent shift towards more healthy foods. Such marketing should not just be about a clever advertising campaign, a discounted price, or a convenience package of pre-cut ready to cook vegetables. In the context of nutrition, marketing will be about multifarious and broad based efforts to encourage and enable people to eat more nutritiously.

Further, in context of doubling farmers' income, the process would also need to include identifying and sharing validated science on the high nutrition food that is readily produced, and is ecologically in alignment with sustainable production practices.

Marketing as a public service, would not be about advertising a product to the consumer, but about educating the consumer about their choices, and to help make the right decisions on why and what they could eat. These decisions can include awareness on the ecological footprint of the produce, the inherent nutritional value of the food, the impact on the farmers and the various options to enhance their experience, such as traditional recipes that suit the domestic palate.

This can also take the form of knowledge based mass media programs, and is envisaged in the form of knowledge marketing, as a public service, to disseminate information that with aims to influence the consumers to add high nutrition variety of indigenously produced foods to their daily plate.

The publicity of the nutritional value of such farm produce could also involve educational campaigns targeted at the school level. The recommendations made are also intended to generate systemic demand for often ignored food items that were traditionally available in the country. Inclusion of such produce in the food distribution programs at state level will also be beneficial in creating awareness and demand.



Traditional foods remain in demand, but at times the consumption is limited to specific regions, to periods of cultural festivities or religious activities. This practice appears more like pulling out a carefully packed museum piece to be displayed on the pedestal for demonstrating one's cultural moorings. The apathy to local crops is such, that many are referred to as "orphan crops". Orphan crops are those that are not traded internationally, and therefore tend to get less attention in terms of agricultural research, training and extension.

Given the attention that nutri-rich cereals & other agri-produce deserve, of agricultural science, it is possible to create miracle seeds, a la the current staple crops, namely wheat & paddy. Success in upgrading their yield while retaining their nutritional value and acclimatisation to

rainfed systems, will enable them to, compete favourably in inter-crop comparison. This is the need of the hour, considering India's vast tracts of rainfed areas & climate change implications. Simultaneously, these crops are well designed to alleviate the nutrition-deficiency syndrome of the country's population.

In a few cases, a variety of high quality traditional foods are also ignored due to sophistry that associates them with past inequities. Social perceptions that label a food for the poor man, ignores the king sized benefits. Such misconceived & misrepresented ideas will require to be corrected by robust knowledge dissemination among the consumers, supported by opinion makers & public figures as integral to marketing strategies.

Further to educating on the food value of produce, marketing efforts by the government should also include campaigns to explain the tribulations and the costs that go into producing food. Consumers, tend to raise undue alarm to established expected seasonal spikes in fresh food prices. However, relatively the cost of manufactured food products such as ice cream, beverages, canned foods, juices, etc. is correlated to the indulgence or service provided.

Consumers need to be educated that the service provided by farmers, is subject to multiple variables and expectations of steady state pricing like in case of consumer goods, is not consistent with reasonable logic. The consumers too, need to appreciate, that the farmers are biological manufacturers of food, and that their magic is practiced under inclement weather and uncharitable systems

An appreciation of the agricultural value system is missing among the consumers, and it is therefore, invariably treated as a public sector undertaking. The understanding that farming is actually a competitive commercial venture and farmers have a right to just returns, is important and needs proper publicity. That the role of the government, is in regulating and alleviating monopolistic practices, so as to protect the interests of both the consumers and farmers, and that there is a price to good food also needs publicising.

The consumer's plate, directly influences demand for food and this can be communicated through the marketing network to farms. **In effect, the plate impacts the demand for inputs at farms. The DFI Committee feels there is need to emphasise on nutrient led marketing as well as promoting appreciation of the farming system.**

12.6. Interventions to educate on food choices

The food supply chain is primarily a private-sector activity, even in the world's poorest communities. In India, the public sector also plays a large role through the public distribution system and in influencing the value system through various schemes that regulate and benefit agricultural sectors.

It is thanks to PDS, that rice and wheat have steadily substituted other cereals as staple food on the consumer's plates across the length & breadth of the nation. It works more as a Hobson's

choice, but simultaneously suggests the scope for diversifying the diet, by broad basing the PDS channel.

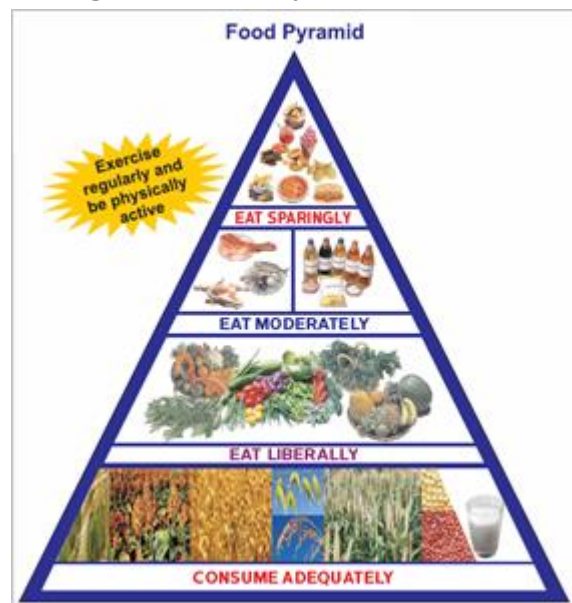
The private sector comprises multiple actors, from multinational and national food businesses, medium & small-scale processors of staple foods, traders, logistics providers to smallholder farmers. All of them function to extract value from the end-consumer, either targeting the existing demand, or through influencing the consumers to aspire for specific products.

As a section of the country becomes more health-aware and naturally migrates towards fresh foods, and subsequently to organically grown foods, this shift can be encouraged by enhancing nutrition knowledge, attitudes and practices. Interventions should be designed to allow consumers to make educated choices linked to health and nutrition practices to address both over and under-nutrition, through foods that are optimally produced in India. It is said, that for a consumer the food that is produced in a radius of 100 kms of his residence is nutritionally best suited. Of course with high degree of mobility this may not always hold good.

The government, through publications on dietary information, also informs to influence the consumers' intake. An example is the Dietary Guidelines for Indians²¹ (DGI), and many other documents under guidance of the Ministry of Health & Family Welfare.

These however, are largely perused by academics, nutritionists and health professionals, and none require to be communicated effectively with the public. The DGI needs to be decoded into aspirational messages for the consumers and as an actionable guidance to policy makers linked to production.

Figure 12.5 Food Pyramid for Indians



Source: National Institute for Nutrition - DGI

The broad based dietary guidelines and the food pyramid, can be rendered into usable information on specific produce and a permutation of traditional food preparations. The line ministries such as Agriculture and Health, could coordinate to generate the nutrition profile of oft ignored traditional crops. The well-researched & documented books on millet cuisine published by Indian Institute of Millet Research (IIMR), Hyderabad can serve as examples for others to follow.

The target produce could identified from those that are easily cultivated in under-irrigated areas, and are climate resilient and hence, ecologically friendly for Indian agriculture and farmers. Another category can be those crops, that are more efficient to be grown by the small

²¹ Dietary Guidelines for Indians, first published in 1998. The second edition was published in 2011 by the National Institute for Nutrition, under the aegis of Indian Council of Medical Research (ICMR), Ministry of Health & Family Welfare.

& marginal farmers, of short cultivation cycles not requiring intense mechanisation.

The National Food Security Act (NFSA), 2004 does provide for including cereals other than rice & wheat too, which can be utilized to build alternate models of procurement & public distribution. The specific nutrient requirements, assessed for each malnutrition zone, may be translated into a supply mix of preferred produce, for the PDS in those States. The per capita requirement for the PDS, or Mid-day meal, or ICDS etc. programs, can be estimated into quantities and demand frequencies, which can then guide the local production, procurement and distribution targets.

This will create a differentiated demand from each of the state food systems, for the items that are nutritional, yet are currently left off the consumers' plate. For example, millets can be included in the PDS based on regional production and consumption. Likewise, many select crops can be included in the menus of various food-based welfare schemes, implemented at state level. As an illustration, the mid day meal scheme in Brazil, allows the local schools to procure any foods, that is locally produced. It includes cereals, fruit, vegetables, egg, meat etc., there are also domestic examples, as in Odisha where egg is added to the school's MDM and milk in Karnataka. Such innovations generate demand for locally produced & differentiated food items.

Nutritional promotion will need trustworthy messaging, and aspirational enough to influence changes in consumption behaviour. Public perception of food hierarchy as superior or inferior on the basis of cost needs to be amended. The concept of health food need not be interpreted to mean uninteresting food. Quality of food need not be linked to its price but to the inherent values and health benefits.

Mass media can help to influence behavioural changes and create increased demand for such food items. A variety of interventions can be developed to increase consumer aspiration and awareness on nutritional food choices. The home makers are nutritional gate keepers and are vested with decision making for the health of their home. Campaigns should, therefore, particularly target home-maker awareness through chef promotions, digital marketing including food blogging networks, mass media out-reach, etc.

Most are acquainted with the fact that fruit is healthier than sugar confection, that vegetables are better for them than salted chips, and that artificial preservatives and flavours are unhealthy. Despite this awareness, food habits tend towards convenience and indulgence.

The government can also adapt food and nutrient profiling models to dietary norms, and use the system to guide and track the nutritional value of product portfolios of packaged food companies.

Student awareness, consumer engagement and social marketing through aspirational figures from the world of sports, music, film, arts, politics and other arena, are other marketing

activities to be considered. The agenda would be best served for the diversified produce of India, by undertaking regular and frequent consumer interaction.

Recovering the lost demand for certain traditional crops that are original to specific geographies, over which farmers have a right, or other indigenous produce will generate greater value, not just in terms of returns to farmers, but also in relation to the people's nutrition, health and wellbeing.

12.7. Annotation

Marketing of food products is largely guided by growth strategies of the organised private sector. These strategies aim to build brands and leverage factors such as consumers' aspirations, convenience, socio-economic status, and type of knowledge on nutrition, to eventually influence the mix on a consumer's plate. Review of various nutrition studies will indicate that only a small percentage of food products marketed by large companies are suitable for the nutritional needs of children and other general consumers.

The informal sector, a large section of the agricultural value system, relies on existing habitual demand from consumers. The traditional learning about the value of many food types, is fading from urban consumers, to the detriment of the country's agricultural system.

A knowledge based marketing campaign, to share compelling information on the nutritional profile of agricultural produce of India, the resulting health benefits from such consumption and the value addition to sustainable living is recommended. As a public service, such information sharing will seek to induce a change in food attitudes, to counter misconceptions that link quality to indulgent aspirations and prices, and to help the consumer realise that 'less can equal more'.

Outreach campaigns may specifically target long-term eating patterns, to incorporate the national dietary guidelines into mainstream diets. A sharing of good food habits, across regions within the country, will also generate mutually beneficial demand and associated trade between and among the states. This knowledge dissemination will need to be driven as a public service and also as a farmers' income enhancing activity.

The public marketing strategy can also focus on making the consumer realise the real value of the food they procure, rather than quick reactions on the short term fluctuations in cost. Accordingly, the value contributed by farmers to the quality of life, needs to also be marketed. The NFSA provisions and government's public distribution system can influence consumption patterns, and sequel demand and production patterns in a major way.

Nutrition knowledge does not necessarily translate into changed food habits. Nutrition led marketing would require to involve aspirational figures who can influence long term change in food habits of the youth.

Consumers' preference is already showing a shift towards natural produce and high nutrition food items, the rate of change depending on their exposure to trustworthy information. The government can accelerate this change that aspires to better health, through improved food intake, by adopting a marketing strategy around functional foods. The strategy can include leveraging scientific food profiling, traditional beliefs, ease of production, sustainability of production, and value to farmers.

The newest Nobel laureate in Economics, Richard Thaler has caught the imagination of the world through his advocacy of behavioural economics. It is not rules & regulations that matter. People make choices based on what appeals to their mind & other sensitivities, irrespective of what such a decision means on their wallets. For the nutrition-led marketing to succeed, it is Thaler's 'nudge' that needs to be rolled out for its full display.

Key Extracts

- Most marketing is focused on specific products and brand promotion by commercial entities. There is little marketing of non-branded, yet nutritional, produce of India.
- Consumer awareness of large variety of indigenously produced foods, with high nutrition profile, is fading under onslaught of commercial marketing of food products.
- The marketing of foods indigenous to India, will promote demand for the right kind of consumption, and bring greater value to a farmers who are ecologically restricted to the crops they can cultivate.
- Nutrition led marketing to reinvigorate demand for the '*parampargat*' produce, traditionally cultivated and sustainable in India, can be taken up for public service.

Chapter 13

Recommendations

This chapter highlights the key recommendations that relate to agricultural marketing, and highlight the necessary reforms in the marketing support system, relook at the market architecture, and brings in a value system approach with participation from the private sector.

13.1. Synopsis

Growth in farmers' income is directly related to their capacity to market the produce across time and form at location of choice. This capacity is related to the system of marketing, the network of markets, the inter-connectivity between these markets and the intelligence to guide the activities. The recommendations that follow are from the discussions in this volume, are in affirmation of the fact that the scope of agriculture is getting redefined as per contemporary and emerging needs.

As demand driven production of agricultural produce, rather than production propelled marketing is the need of the time, the Committee reiterates that agricultural marketing has the function to guide the flow of produce from farm-to-fork, through the flow of information from fork-to-farm. This should be so as to supply the demand, in a way that results in optimised costs and maximises value realisation.

13.2. Recommendations

- i. States must adopt the Model APLM Act, 2017, and promptly facilitate the provisions for establishing of a range of markets of different models (eg. wholesale, retail, direct markets, etc.) under a wide variety of ownerships (public and private) - see section 3.9.2.
- ii. DACFW must forthwith roll out the Model APLM Rules so that the States can make the Model Act operational.
- iii. As estimated, the country needs about 10,000 wholesale and 20,000 rural retail markets to achieve the desired market density and network them into a pan-India system. The state governments may convert the existing principal and sub-market yards into full-fledged and independent markets, in order to achieve the desired market density. Any remaining requirement may be met by promoting private markets under the provisions of the Model APLM Act. Also, as per provisions of this Act, existing warehouses, silos, etc., may be upgraded and notified as markets.
- iv. As per the new market architecture suggested in chapter 5, the effectiveness of an efficient marketing system can be gained by upgrading the existing more than 20,000 rural periodical markets as Primary Rural (*grameen*) Agricultural Markets (PRAMs).
- v. The Centre and the States should work concertedly to achieve a truly unified national agricultural market (NAM) within a period of three years (ie. 2019-20). This can be achieved by increasing the coverage of markets under e-NAM to a cumulative of 1000, and promoting alternate online platforms in the public sector by the states, as well in the private sector, besides joint venture platforms.

- vi. In order to facilitate this Government of India's e-NAM platform may serve as a common platform with inter-operable architecture, so that all other platforms can be integrated centrally, and with one-another. The Ministry would need to adopt open source software at the earliest, and lay down the IT system standards and specifications to be adhered to.
- vii. Both the Centre and the States/UTs may set up special purpose vehicles (SPV) to own and operate the national agricultural market (NAM). To realise this, the DACFW may appoint an expert to give specialist advice on the transactions involved.
- viii. DACFW may constitute an inter-ministerial committee to study and suggest ways to harmonise the various product standards and grading parameters adopted by different agencies (BIS, APEDA, FSSAI, Agmark, etc.). This is a pre-requisite to creation of a NAM which works on the online platform.
- ix. As discussed in chapter 7, the small and marginal farmers will benefit from an efficient marketing system, only if they are imparted withholding capacity, by offering them pledge finance (post-harvest loan against produce as collateral). This can be facilitated by taking measures to upgrade the storage godowns including cold-storages, to standards as defined by WDRA, to issue NWRs. DACFW may develop comprehensive guidelines to promote warehouse based post-harvest loans and eNWR based trading.
- x. Further, the availability of post-harvest loans against NWRs, should be popularised amongst farmers, and financial institutions oriented to participate in the pledge loan system. The government may revisit the guidelines/eligibility criteria relating to post-harvest sub-vented loans, so as to make it available to small and marginal farmers, even when they may not have availed themselves of a crop loan.
- xi. State governments may prepare a District and State storage plan and identify gaps before taking up new constructions. The gaps may exist in the existing available infrastructure, in the form of design, technology used and/or crop specificity.
- xii. For integrating small and marginal farmers into the marketing system, besides improving their external market interface, mobilising them into a large number of farmer producer and village producer organisations (FPO/VPO) is critical. It is suggested that a minimum target of 7,000 FPO/VPO be adopted. Each such organisation may cover 1000 farmers and/or 1000 hectares.
- xiii. In order to scale up the FPO/VPO it is suggested to liberalise, by amending the Companies Act, to facilitate private sector shareholding in FPOs which may be allowed upto 26 per cent. They may also be incentivised by treating at par with Cooperatives.
- xiv. The FPOs/VPOs may be organically linked to the proposed national level value system partnership platform - see chapter 8.
- xv. To promote value led production system, the DACFW may develop guidelines and launch an Agriculture Value System Partnership Platform which will function through an organisational structure that comprises national level, state level and district level platforms. The DACFW may identify interested stakeholder organisations with expertise

- and experience in various production and post-production activities, who are willing to partner with the District level value system platforms and mentor the farmer's enterprise.
- xvi. The doubling of farmers' income strategy involves productivity gains across sub-sectors, which will result in a higher output, and this will need to be connected with new markets, including exports. An aggressive agricultural trade policy is recommended, to at least double the volume of commodities in agricultural exports and achieve a value target of USD 100 billion, by 2022-23. Further the basket of commodities exported should be broad-based and reach beyond cereals and meat, which currently account for the bulk of the exports. Export of both, value added products and primary agricultural produce of farmers, should be equally promoted.
- xvii. In order to adopt a track and trace system for exports, the DACFW and APEDA should work together and partner with the state governments and promote cluster based production and export marketing. The focus should be on fresh produce like fruits and vegetables, which have great potential in production gains but are already facing constraints in marketing. The initial 10 clusters, already identified, may be made operational on priority, and in parallel, identify another 10 by the end of 2017-18 to be operationalised in the following year. This initiative should be scaled up by linking organically with the value system platform and FPOs/VPOs.
- xviii. Indian embassy/high commission system should include the post of Advisor (Agri-trade) to be filled by domain experts/experienced development administrators/policy makers in agriculture and allied areas, of suitable seniority. These trade experts would be tasked to monitor the market conditions in their host countries, interact with traders & exporters in India and assist in resolving their market access issues.
- xix. Both domestic and export markets are effected by the trade regime. It is suggested that a long term perspective of 5-10 years be adopted, such that there are no knee-jerk reactions that disable the associated trade relationships. Further, a permanent inter-ministerial committee including those of commerce, consumer affairs and agriculture may be constituted with the mandate to monitor closely the domestic and global price situation for different commodities, and recommend interventions to government, keeping in mind conflicting interests of both producers and consumers.
- xx. The above referred committee may be supported by DMI (Directorate of Marketing & Inspection) as its secretariat. The DMI may collect and collate data from different sources to analyse and provide inputs to the Committee.
- xxi. It is also suggested that DACFW may undertake the restructuring of DMI into the Directorate of Marketing & Intelligence so that it is able to advise the government on market prices as related to the farmer-producer. DMI for this purpose, may adopt a suitable price forecasting model as discussed in chapter 9. However, this forecasting may be initially shared with caution until its eventual robustness is verified and demonstrated.
- xxii. Export promotion agencies of the govt. require restructuring with a market research and analytics cell, so as to develop pull-based exports, and not merely to push products and

- brands, tentatively into unstudied markets. Monitoring of market share with feedback to make producers responsive and remain competitive in export markets should be included.
- xxiii. States may also nominate agri-trade representatives in other states to promote demand driven inter-state agri-trade, to take advantage of a unified national agricultural market.
- xxiv. Government should broad base and strengthen procurement operations to cover as many crops as possible (other than wheat & paddy) and be secular across the production regions. It is suggested that the procurement operations be conducted with view to stabilising market prices and not as income transfers. This will require the government to adopt a procurement threshold level of 15, 10, 5 per cents, of the marketed surpluses for pulses oilseeds and other cereals, respectively.
- xxv. The bouquet of procurement instruments can be strengthened and made more broad-based by adopting new initiatives like the market assurance scheme and the private stockist scheme – see chapter 6.
- xxvi. All paid out costs, incurred by farmers in cash or kind, including imputed value of family labour, when combined with assured procurement is a good income intervention in favour of farmer. So far, notwithstanding increase in MSP year on year, no assured procurement is observed. From perspective of equitability, a universal coverage in terms of geography and all MSP notified crops, needs to be considered.
- xxvii. The buffer stocks of pulses, built under PSF, may be linked to procurements undertaken under PSS, MAS and private stockists. This will enable the procurements undertaken at MSP to be off-loaded into the PSF buffer for stabilising the consumer markets.
- xxviii. DACFW may re-designate the existing Marketing Division into Agri-logistics and Marketing Division. This will bring dedicated focus on the empowering aspects of agriculture, i.e. agri-logistics, agricultural markets and agricultural marketing. For this purpose all agri-logistics and market related functions dispersed across different divisions may be consolidated in the re-organised division.
- xxix. Marketing of Livestock and Fisheries produce needs to be upgraded. See Chapter 11.
- xxx. While market signals help farmers to take informed decision on their production, the latter should not be in violent departure from the local agro-ecological and climatic demands. This implies, that certain crops become inevitable under certain conditions of ecology, even when available markets may not favour them. In such a situation, monetisation of the farmers produce can be triggered by promoting demand for such produce. A cafeteria of such commodities would include hardy crops like millets, organically grown produce, indigenous animal breeds, and certain other traditional crops that are original to specific geographies, over which farmers have a right. These commodities should be encouraged, by analysing and authenticating their inherent nutritional values and unique characteristics; creating awareness through aggressive marketing promotion; and, linking them to organised retail including portal based retail.

References

- Agricultural and Processed Food Products Export Development Authority (APEDA)
- Basic Animal Husbandry and Fisheries Statistics 2017, AHS series 18, Department of Animal Husbandry, Dairying & Fisheries (DAHDF)
- FSSAI - Food Safety and Hygiene in Unorganised Meat Sector, May 12, 2017 by Dr. Firdaus Jahan
- National Action Plan for Egg & Poultry-2022 (for Doubling Farmers' Income by 2022) – DAHDF
- National Centre for Cold-chain Development (NCCD) – P. Kohli, various reports
- National Fibre Policy 2010-11, Ministry of Textiles
- Note on Wool and Woollen Textiles Sector, 2017, Ministry of Textiles
- OECD (2018), Meat consumption (indicator). doi: 10.1787/fa290fd0-en
- UNCTAD, Non-Tariff Measures to Trade: Economic and Policy Issues for Developing Countries

Annexures

Main features of PPPIAD

At its conception, the following were the main features under PPPIAD:

- Corporates to propose integrated agricultural development projects across the spectrum of agriculture and allied sectors, taking responsibility for delivering all the interventions through a single window. Each project to target at least 5000 farmers, spread over the project life.
- Complete flexibility in design, but ensuring an integrated value chain approach, covering all aspects from production to marketing. Projects can span 3-5 years.
- Average investment per farmer during project must be quantified, though an average of Rs. 1.00 lakh per farmer will be a desirable benchmark. Government support will be restricted to 50% of the overall per farmer investment proposed, with a ceiling of Rs. 50,000 per farmer through the project cycle. The remaining investment will be arranged by the corporate through institutional financing and its own and farmer contributions. All subsidies will be directly routed to farmers or reimbursed to project leaders after verification of asset distribution to farmers.
- Key interventions which must feature in each project are: a) mobilizing farmers into producer groups and registering them in an appropriate legal form or creating informal groups as may be appropriate to the area and Project (joint stock or producer companies, cooperatives, self-help group federations etc.); b) technology infusion; c) value addition; d) marketing solutions; e) project management.
- Financial assistance will be provided by State Governments directly to corporates through the RKVY window after the project has been approved by SLSC, subject to a ceiling of Rs. 50,000 per farmer or 50% of the proposed investment per farmer, whichever is lower. Subsidy to farmer for availing drip/sprinkler irrigation/mechanization/grading/shade nets etc. could be considered separately as it is a large investment. Therefore, subsidy availed by farmers for drip/sprinkler/mechanization/grading/shade nets, etc. under NMMI would not be considered as a part of this Rs. 50,000 ceiling.
- Projects can also be proposed by corporates to State Governments through Small Farmers' Agri-business Consortium (SFAC). This institution has been designated as a National Level Agency for this purpose by Dept. of Agriculture and Cooperation, Govt. of India. SFAC will act as a facilitator to link the project promoter to the concerned State Government. The role of SFAC will be to examine the proposal from a technical viewpoint and thereafter propose it for funding to the concerned State. SFAC will be restricted to being a support agency to facilitate the process of technical appraisal, coordination and facilitation; it will not be involved in implementation directly or handling funds.
- An independent monitoring agency (like NABARD or other a suitably qualified consultancy firm with no conflict of interest with the particular project it is to monitor) will be appointed by the State Government to closely track the performance of the project and report to all relevant stakeholders in the State and Central government.

Objectives

Main objectives of scheme are:

Augmenting the current government efforts in agricultural development by leveraging the capabilities of the private sector by:

- Addressing all concerns related to production and post-harvest management in agriculture/horticulture and agriculture allied sectors.
- Enhancing production and productivity, improve nutritional security and income support to farmers.

- Promote, developing and disseminating technologies for enhancing production and productivity.
- Assisting states in addressing the entire value chain, right from the stage of pre-production to the consumers table through appropriate interventions.
- Creating employment generation opportunities for skilled and unskilled persons, especially unemployed youth.
- Improving value addition and ensuring farmer's profitability increases.
- Making farming a viable business proposition.
- Improving the delivery and monitoring mechanism under RKVY funded projects.

Strategy

To achieve the above objectives, the scheme will adopt the following strategies:

- Companies to submit a Detailed Project Report (DPR), to States directly or SFAC for consideration of SLSC.
- Organise growers into Farmers Association/Groups in every project.
- Identify/select aggregators and enable tie-up with farmers/associations/groups.
- Coordinate with ICAR/SAUs/Private Sector to provide improved varieties of seeds/seedlings and to introduce innovative technologies as required.
- Addressing issues in the credit supply chain with support from NABARD.
- Measures for production and productivity enhancement by adopting improved cultivars, production technologies using precision farming techniques, protected cultivation, micro irrigation etc.
- Primary processing, sorting, grading, washing, packaging and value addition clusters.
- Logistics from farm to market including:
 - Post Harvest Management, Storage and Transport infrastructure.
 - Aggregators for suitable tie ups in the supply-chain.
- Support to these groups to develop warehouses, cold chains, Controlled Atmosphere (CA).

Strategy and Roadmap

Companies will identify the regions they wish to take up in 2012-13 and develop the project for integrated agriculture development. The strategy & road map formulated by companies should invariably contain information on geography & climate, potential of agriculture development, availability of land, SWOT analysis, and strategy for development and plan of action proposed to be taken to achieve goals in the identified region.

The document should focus on adoption of cluster approach for production and linking with available infrastructure, or to be created, for post-harvest management, processing, marketing and export. Growers/farmers would also be entitled for assistance under all schemes of DAC/other departments of Government of India so that these schemes can ensure appropriate synergy and convergence for maximum benefit in the field. Each DPR will also provide a Results Framework Document (RFD), giving clearly verifiable indicators for tracking the progress of the project during its life cycle.

Implementing Agencies

1. Small Farmers Agri-Business Consortium (SFAC).
2. State Government (Agriculture Department)/State level agencies.

3. Private sector partner.

Proposals can be either submitted directly to States or to SFAC at the national level. In either case, the NLA or State Government will examine the project proposal from the viewpoint of suitability to priorities and objectives of the State and the general framework of RKVY. If found suitable, the proposal will be forwarded to the SLSC chaired by Chief Secretary for consideration. Based on the approval of the SLSC, the project will be rolled out after an agreement has been signed between the State Government and Project Promoter. A standard format of agreement for PPPIAD under RKVY will be circulated for the guidance of States. They will be free to adapt this format to their specific needs.

All fund releases will be made directly by the State Government to the concerned private sector Project Promoter, based on satisfactory progress reports. Funding will be in the form of reimbursement of expenditures incurred by the Project Promoter on various approved budget heads, after these have been duly verified by the independent monitoring agency.

A baseline survey to determine the entry level situation and end-of-project survey will also be conducted by the independent monitoring agency to assess the impact of the project intervention. It will further furnish monthly, quarterly and annual progress reports to DAC and the State and operationalize Information Communication Technology (ICT) enabled Management Information System (MIS) up to grass root level and if need be develop and host its own website.

Scheme Components and Pattern of Assistance

The Scheme will cover all project components in all agriculture and allied sector areas. All farmer related services (i.e. not inputs or hardware) and other interventions leading to productivity enhancement will be supported fully. There will be a 50% limit on items (like farm machinery and irrigation infrastructure) which are to be provided on subsidy to farmers. However, there will be flexibility as far as the community based projects are concerned. For instance, 100 per cent subsidy can be obtained by FPOs for developing warehousing infrastructure under Rural Godown Scheme.

The scheme will be demand and need based in each segment. Technology will play an important role in different interventions. The interventions envisaged for achieving desired goals would be varied and regionally differentiated with focus on potential vegetable crops to be developed in clusters by deploying modern and hi-tech interventions and duly ensuring backward and forward linkages.

Performance based overhead costs will be given to the companies for meeting administrative expenses for executing the projects. The companies would have to submit Results Framework Document (RFD) for getting the project approved. If the company's performance is excellent, it can be entitled to maximum overheads of 8 per cent, similarly, if it is average, it would be entitled to overheads of 5 per cent. If the company's performance is poor, it would be only entitled to overheads of 2 per cent.

The release of funds would be done in a phased manner as per the approved project proposal. The entire project would be divided into five phases with a specific financial allocation for each phase. Amount pertaining each phase would be released during the beginning of each phase. For availing funds of the subsequent phase, the company would have to submit a detailed utilization certificate from the company auditor and interim project report of that phase.

Auto Regressive Moving Average (ARMA) Models

These are class of models widely used these days to forecast complex data series. It basically consists of two parts an **Auto Regressive** part denoted as AR and a **Moving Average** part, MA. Mathematically, AR is captured by $P_t = b_1 P_{t-1}$ and the MA by $P_t = c_1 e_{t-1}$, where P_t is the series under study, e_t is the error term, calculated as $P_t - E_t$, and E_t is the ARMA estimated value of the series, P_t . b_1 and c_1 are the parameters to be estimated. When the model is fitted to empirical data an ARIMA, which is a combination of AR and MA is fitted for purposes of parsimony. The popularity of ARIMA model is due to its statistical properties as well as use of well-known Box-Jenkins methodology in the model building process.

- a) The model is checked for stationary, a condition of absence of a trend and if a trend is observed it is removed by differencing the series appropriately till the trend is removed. The order of the auto regressive and moving average processes is critical for the success of the model building process. The order is determined by computing the auto correlation and partial auto correlation function of the stationary series. The tentatively identified model is then specified and the parameters are estimated. The errors of the fitted model are checked for their randomness and if found adequate the model is used for forecasting the series. The forecasted series is again checked for their forecasting accuracy using measures like Root Mean Square Error (RMSE), Mean Absolute Percent Error (MAPE), etc. The stages of fitting an ARIMA model includes model identification, diagrammatic depiction of the GARCH forecasts, actual forecasting, validating the model, neural networks and modelling volatility (Engle 1982 and Bollerslev 1986).
- b) **Neural network** is essentially a machine learning technique. Neural network architectures can be trained to forecast the future values of the dependent variables, after it studies past behaviour of the series. It is a multi-layer feed-forward neural network approach consists of an input layer, one or several hidden layers and an output layer. Another approach is known as the partially recurrent neural network that can learn sequences as time evolves and responds to the same input pattern differently at different times, depending on the previous input patterns. However, an additional dampened feedback, that possesses the characteristics of a dynamic memory, will improve the performance of forecasts.

C) Artificial Neural Networks (ANN): These are composed of multiple nodes, which imitate biological neurons of human brain. The neurons are connected by links and they interact with each other. The nodes can take input data and perform simple operations on the data. The result of these operations is passed to other neurons. The output at each node is called its activation or node value.

- 1) Each link is associated with weight. ANNs are capable of learning, which takes place by altering weight values. The fig. ANN-1. shows a simple ANN.

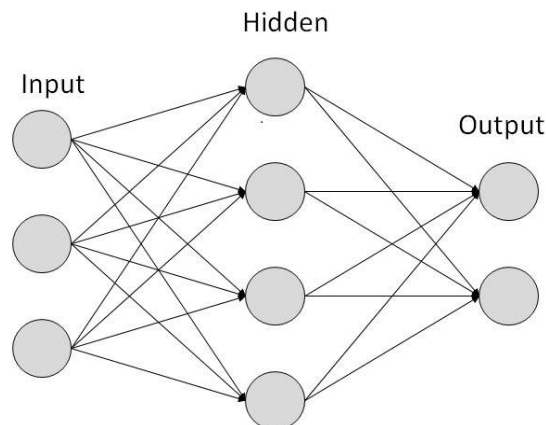


Fig. ANN-1. Simple ANN

2) Every linkage calculation in an Artificial Neural Network (ANN) is similar. In general, a sigmoid relationship is assumed between the input variables and the activation rate of hidden nodes or between the hidden nodes and the activation rate of output nodes.

3) For each observation, ANN does multiple re-calibrations for each linkage weights. Hence, the time taken by the algorithm rises much faster than other traditional algorithm for the same increase in data volume. ANN technique is an iterative process as shown in Fig. ANN-2.

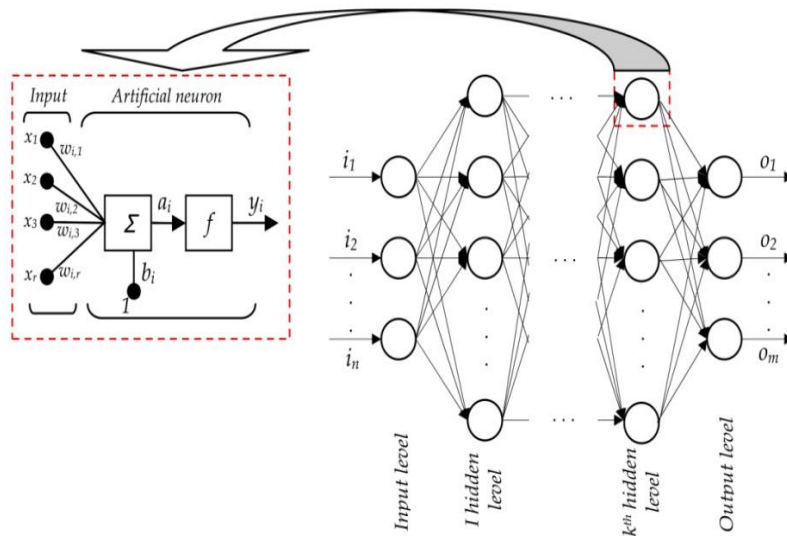


Fig. ANN-2. ANN Process

4) ANN is generally used in cases where the data in past is repeated almost exactly in same way and useful when used as the learning model for commodity price projection (Zhang et. al. 1998)

d) Volatility is a serious problem affecting agricultural commodities as it introduces uncertainty into the system. A number of models have been developed in empirical finance literature to investigate volatility across different regions and countries. The most commonly applied models to estimate exchange rate volatility are the autoregressive conditional heteroscedastic (ARCH) model introduced by Engle (1982) and the generalized (GARCH) models developed independently by Bollerslev (1986).

Details of wholesale, Rural Primary and Regulated Markets in Different States/UTs
(As on 31.03.2015) and number of markets per lakh gross cropped area

States/UTs	Number of Markets				Regulated Markets			
	Whole-sale	Rural Primary Retail	Total	Total markets per lakh gross cropped area	Principal markets	Sub Market Yards	Total	Regulated markets per lakh gross cropped area
Andhra Pradesh	190	157	347	4.3	190	157	347	4.3
Bihar	325	1469	1794	23.7	-	-	-	-
Chhattisgarh	2	1132	1134	19.9	69	118	187	3.3
Goa	4	24	28	17.7	1	7	8	5.1
Gujarat	205	129	334	2.7	213	187	400	3.2
Haryana	281	195	476	7.4	107	174	281	4.3
Himachal Pradesh	42	35	77	8.2	10	44	54	5.7
Jammu & Kashmir	0	8	8	0.7	11	0	11	1.0
Jharkhand	201	602	803	48.0	28	173	201	12.0
Karnataka	315	730	1243	10.1	157	356	513	4.2
Kerala	348	1014	1362	52.1	-	-	-	-
Madhya Pradesh	0	0	0	0.0	254	284	538	2.2
Maharashtra	881	3500	4381	18.8	305	603	908	3.9
Odisha	398	1150	1548	30.0	54	382	436	8.4
Punjab	424	1390	1814	23.1	150	274	424	5.4
Rajasthan	446	312	758	2.9	134	312	446	1.7
Tamil Nadu	0	0	0	0.0	277	6	283	4.8
Telangana	150	110	260	4.1	150	110	260	4.1
Uttar Pradesh	584	3464	4048	15.6	250	365	615	2.4
Uttarakhand	36	30	66	6.0	26	32	58	5.3
West Bengal	279	3250	3529	36.7	20	464	484	5.0
N.E States								
Assam	405	735	1140	27.8	20	206	226	5.5
Arunachal Pradesh	5	66	71	24.0	0	0	0	0.0
Manipur	24	95	119	31.6	-	-	-	-
Meghalaya	35	85	120	35.0	2	0	2	0.6
Mizoram	7	218	225	197.6	-	-	-	-
Nagaland	19	174	193	38.7	18	0	18	3.6
Sikkim	7	12	19	12.9	-	-	-	-
Tripura	84	470	554	-	21	0	21	-
Union Territories								
A & N Islands	0	28	28	115.3	-	-	-	-
Chandigarh	1	0	1	51.2	1	0	1	51.2
D & N Haveli	0	0	0	0.0	-	-	-	-
Daman & Diu	0	0	0	0.0	-	-	-	-
Delhi	30	0	30	84.9	7	8	15	42.5
Lakshadweep	0	0	0	0.0	-	-	-	-
Puducherry	4	5	9	35.6	4	5	9	35.6

Note: - Based on Information received from various States/UTs Authorities

Marketed Surplus Ratio (MSR) and Production Growth of Important Agricultural Commodities in India

	Production growth (2004-05 to 2013-14)	Marketed Surplus Ratio		
		1999-00	2004-05	2014-15
I. Foodgrains : Cereals				
Rice	2.0	60.32	71.37	84.35
Wheat	4.3	54.48	63.33	73.78
Maize	6.4	62.79	76.22	88.06
Jowar	-3.8	46.83	53.44	66.64
Bajra	1.6	65.22	69.39	68.42
Ragi	-2.8	41.15	57.74	47.60
II. Pulses				
Arhar	1.1	62.93	79.52	88.21
Gram	6.5	65.63	93.76	91.10
Urad	4.4	80.91	85.76	85.56
Moong	4.6	70.13	76.79	90.65
Lentil	1.7	59.87	85.86	94.38
III. Oilseeds				
Groundnut	0.5	63.34	88.75	91.63
Rapeseed & Mustard	-1.1	71.57	89.66	90.94
Soybean	8.0	94.95	94.99	71.00
Sunflower	-12.3	99.30	98.32	89.14
Sesamum	1.3	84.45	87.38	93.80
Safflower	-26.5	86.80	91.34	100.0-
IV. Other Commercial Crops				
Sugarcane	3.7	82.5	98.23	18.94
Cotton	10.3	94.58	94.94	98.79
Jute	1.0	97.5	90.72	98.59
V. Vegetables				
Onion	12.9	-	82.91	91.29
Potato	10.6	45.90	85.00	71.51

Source: DACNET & Agricultural Statistics at a Glance

There is a steady increase in the ratio between the output-marketed to output-produced over the years. However, the marketed surplus may not be finding optimal value and is monetised at nearby markets which may not have sufficient demand from its consumer catchment.

**Production & Market Arrivals of Major Foodgrains,
Oilseeds & Vegetables**

Commodity	Production during 2016-17 (in tons)	Agmarknet Arrivals 01/07/2016-30/06/2017 (in tons)	Agmarknet Mandi Arrivals wrt Production (%)
PULSES			
TUR	45,98,800	18,98,077	41
URAD	29,26,400	9,60,298	33
MOONG	20,69,600	8,55,729	41
CHANA	90,75,100	19,69,567	22
Sub Total	186,69,900	56,83,671	30
CEREALS			
PADDY	10,91,50,000	3,88,28,247	36
WHEAT	9,74,40,000	2,98,48,947	31
MAIZE	2,61,40,000	51,64,929	20
BAJRA	98,55,700	12,81,247	13
JOWAR	47,40,300	3,84,457	8
RAGI	14,30,300	1,28,832	9
BARLEY	25,80,000	3,72,266	14
Sub Total	25,13,36,300	7,60,08,925	30
MAJOR OILSEEDS			
GROUNDNUT	76,50,200	12,11,256	16
MUSTARD	79,76,600	25,47,868	32
SOYBEAN	1,40,08,000	54,99,918	39
SUNFLOWER	2,32,300	54,142	23
SAFFLOWER	63,800	3,014	5
NIGER	85,400	7,167	8
Sub Total	3,00,16,300	93,23,365	31
MAJOR VEGETABLES			
ONION	216,00,000	129,03,835	60
POTATO	466,00,000	117,94,079	25
TOMATO	197,00,000	36,52,258	19
Sub Total	879,00,000	283,50,172	32

Source: Production of Major Food grains & Oilseeds as per DES 3rd AE 2016-17 and Production of Major Vegetables as per DAC&FW Hort Stat Division 2nd AE 2016-17

Table A1: Number of In-Milk Animals during 2015-16 & 2016-17 (In 000 nos.)

States/UTs		Cattle							
		Exotic 2015-16	Exotic 2016-17	Crossbred 2015-16	Crossbred 2016-17	Indigenous 2015-16	Indigenous 2016-17	Non- Descript 2015-16	Non- Descript 2016-17
1	Andhra Pradesh	2.4	3.0	913.5	1,038.0	118.8	131.2	727.7	801.2
2	Arunachal Pradesh	-	0.6	7.1	7.0	65.2	69.0	-	-
3	Assam	-	-	163.5	154.9	-	-	1,309.4	1,155.0
4	Bihar	-	-	1,104.0	1,162.6	1,941.2	1,976.1	-	-
5	Chhattisgarh	4.2	4.4	46.0	47.6	416.4	418.9	759.9	780.5
6	Goa	-	-	10.3	9.8	-	-	8.8	8.3
7	Gujarat	-	-	806.5	877.3	1,286.3	1,319.0	560.1	581.2
8	Haryana	38.9	40.9	364.9	383.1	127.0	133.0	53.5	55.9
9	Himachal Pradesh	7.7	8.1	404.7	431.0	2.7	3.3	217.4	215.5
10	Jammu & Kashmir	-	-	505.0	526.4	-	-	275.2	281.7
11	Jharkhand	12.5	13.3	147.7	195.4	192.0	224.9	1,179.0	1,259.0
12	Karnataka	-	-	1,391.1	1,370.7	924.3	886.7	598.9	732.6
13	Kerala	0.4	-	668.1	630.5	2.6	2.0	21.3	19.2
14	Madhya Pradesh	18.4	21.0	428.1	483.1	635.4	700.3	4,218.4	4,363.5
15	Maharashtra	11.9	12.4	1,536.2	1,491.9	332.9	364.8	1,325.1	1,339.4
16	Manipur	1.0	1.0	14.6	14.8	-	-	44.7	45.5
17	Meghalaya	-	-	15.2	15.0	116.7	121.7	-	-
18	Mizoram	-	-	7.6	8.1	-	-	3.5	3.9
19	Nagaland	-	-	28.9	30.3	-	-	18.6	17.8
20	Odisha	-	-	368.1	384.0	193.8	129.5	1,402.4	1,640.9
21	Punjab	114.4	115.8	505.0	513.6	74.7	76.9	22.1	21.4
22	Rajasthan *	-	-	785.0	721.3	1,445.9	1,710.1	1,592.7	1,868.2
23	Sikkim	-	29.4	32.5	0.1	0.8	-	-	-
24	Tamil Nadu	19.4	29.3	2,424.6	2,587.1	621.5	126.8	-	463.0
25	Telangana	12.0	11.9	192.3	204.7	86.1	90.2	894.9	878.2
26	Tripura	-	-	30.1	30.4	-	-	136.5	141.3
27	Uttar Pradesh	123.6	140.8	1,103.2	1,162.9	3,040.7	3,181.6	1,682.3	1,735.4
28	Uttarakhand	5.8	6.5	215.5	227.8	34.0	35.7	333.7	319.4
29	West Bengal	-	-	768.5	786.1	2,680.4	2,730.0	-	-
30	A&N Islands	2.9	2.8	1.4	1.4	3.3	1.4	3.7	2.4
31	Chandigarh	-	-	3.4	3.9	-	-	0.4	1.2
32	D.& N. Haveli	-	-	-	-	-	-	-	-
33	Daman & Diu	-	-	0.2	0.0	-	0.1	-	0.1
34	Delhi	-	-	22.1	-	23.1	-	-	-
35	Lakshadweep	-	-	0.2	0.2	-	-	0.3	0.4
36	Puducherry	-	-	20.9	21.0	-	-	0.6	0.6
	All India	375.53	441.05	15036.09	15521.59	14365.58	14432.93	17391.11	18732.7

Continued...

Table A2: Number of In-Milk Animals during 2015-16 & 2016-17 (In 000 nos.)

	States/UTs	Buffalo				Goat 2015-16	Goat 2016-17
		Indigenous Buffalo 2015-16	Indigenous Buffalo 2016-17	Non- Descript Buffalo 2015-16	Non- Descript Buffalo 2016-17		
1	Andhra Pradesh	2,101.7	2,326.1	1,591.4	1,100.6	7 0.33	73.8
2	Arunachal Pradesh	0.4	0.5	-	-	0.00	-
3	Assam	96.1	86.4	-	-	497.0	344.7
4	Bihar	2058.97	2,138.5	-	-	3,220.8	3,287.4
5	Chhattisgarh	52.9	59.0	136.8	137.7	612.2	630.7
6	Goa	-	-	12.6	11.4	3.17	2.7
7	Gujarat	2,781.5	2,793.6	839.4	907.6	1,776.8	1,844.4
8	Haryana	1,900.8	2,000.9	358.5	372.6	140.6	133.8
9	Himachal Pradesh	141.9	147.5	145.3	133.4	234.4	251.9
10	Jammu & Kashmir	50.9	54.7	187.6	190.8	491.2	515.1
11	Jharkhand	73.2	89.2	187.5	191.1	1,684.5	1,685.3
12	Karnataka	988.0	853.9	710.6	749.0	1513.80	1,348.4
13	Kerala	4.7	5.0	2.3	1.5	508.4	503.7
14	Madhya Pradesh	824.0	893.7	2,879.1	3,048.9	2,786.2	3,176.8
15	Maharashtra	928.6	932.96	1,268.7	1,218.2	2,727.0	2,658.0
16	Manipur	-	-	11.5	11.7	-	-
17	Meghalaya	2.5	2.0	-	-	-	-
18	Mizoram	-	-	-	-	-	-
19	Nagaland	-	-	4.2	4.9	19.5	21.9
20	Odisha	29.9	30.7	144.6	149.5	98.2	103.11
21	Punjab	1,874.5	1,878.9	810.0	811.9	115.2	116.5
22	Rajasthan *	2,766.8	2,899.9	1,818.5	2,040.3	7,513.8	7,404.3
23	Sikkim	-	-	-	-	-	-
24	Tamil Nadu	168.0	157.5	96.0	106.6	2,681.8	2,681.9
25	Telangana	779.9	818.1	1,036.2	1,034.8	154.4	155.4
26	Tripura	-	-	1.8	1.8	125.2	127.9
27	Uttar Pradesh	8,249.2	8,521.3	2,387.0	2,405.1	4580.00	4,686.0
28	Uttarakhand	204.6	213.4	251.6	243.0	347.9	357.5
29	West Bengal	120.5	123.5	-	-	2,332.1	2,377.4
30	A&N Islands	0.8	1.1	-	-	11.5	11.3
31	Chandigarh	12.4	7.3	-	0.0	0.2	0.1
32	D.& N. Haveli	-	-	-	-	-	-
33	Daman & Diu	-	0.0	0.3	0.0	0.6	0.1
34	Delhi	95.2	-	-	-	-	-
35	Lakshadweep	-	-	-	-	13.35	13.3
36	Puducherry	-	-	0.9	1.1	-	-
	All India	26307.89	27035.39	14882.19	15534.07	34259.99	34513.15

Source: State/UT Animal Husbandry Departments

"- " not received/not available

*estimates are projected on the basis of existing growth rates and previous year estimates due to non-availability of data Note: estimated number of animal of rural and urban area are taken together

Table A3: Milk Production during 2012-13 to 2016-17 (numbers in '000 tonnes)

SN	States/UTs	2012-13	2013-14	2014-15	2015-16	2016-17
1	Andhra Pradesh#	12761.7	13007.1	9656.2	10817.0	12177.9
2	Arunachal Pradesh	22.7	43.4	46.1	50.1	52.5
3	Assam	799.7	814.5	829.5	843.5	861.3
4	Bihar	6844.8	7197.1	7774.9	8288.4	8711.1
5	Chattisgarh	1164.1	1208.6	1231.6	1277.3	1373.6
6	Goa	61.2	67.8	66.6	54.3	51.4
7	Gujarat	10314.6	11112.2	11690.6	12262.4	12784.1
8	Haryana	7040.2	7441.7	7901.4	8381.3	8974.8
9	Himachal Pradesh	1138.6	1150.8	1172.2	1282.9	1329.1
10	Jammu & Kashmir	1630.6	1614.7	1950.9	2273.4	2376.1
11	Jharkhand	1679.0	1699.8	1733.7	1812.4	1893.8
12	Karnataka	5718.2	5997.0	6120.9	6344.0	6562.2
13	Kerala	2790.6	2654.7	2711.1	2649.8	2520.3
14	Madhya Pradesh	8837.8	9599.2	10779.1	12148.4	13445.3
15	Maharashtra	8733.7	9089.0	9542.3	10152.6	10402.2
16	Manipur	80.0	81.7	82.2	79.0	78.8
17	Meghalaya	80.5	82.2	83.0	84.0	84.0
18	Mizoram	13.6	15.3	20.5	22.0	24.2
19	Nagaland	78.7	80.6	75.7	77.0	79.4
20	Odisha	1724.4	1861.2	1903.1	1930.5	2003.4
21	Punjab	9724.3	10011.1	10351.4	10774.2	11282.1
22	Rajasthan *	13945.9	14573.1	16934.3	18500.1	20849.6
23	Sikkim	42.2	46.0	50.0	66.7	54.4
24	Tamil Nadu	7004.7	7049.2	7132.5	7243.5	7556.4
25	Telengana			4207.3	4442.5	4681.1
26	Tripura	118.0	129.7	141.2	152.2	159.6
27	Uttar Pradesh	23329.6	24193.9	25198.4	26386.8	27769.7
28	Uttarakhand	1478.4	1550.2	1565.4	1655.8	1692.4
29	West Bengal	4859.2	4906.2	4961.0	5038.5	5182.6
30	A&N Islands	21.5	14.2	15.6	15.4	16.1
31	Chandigarh	44.0	44.4	44.0	43.2	36.4
32	D.& N. Haveli*	11.0	11.0	8.5	8.5	7.5
33	Daman & Diu	1.0	0.8	0.8	0.8	0.6
34	Delhi*	286.6	284.3	280.1	280.8	279.1
35	Lakshadweep	2.2	6.1	4.2	3.3	3.2
36	Puducherry	47.2	47.3	47.6	48.0	48.3
	All India	132430.59	137685.89	146313.55	155490.51	165404.38

Source: State/UT Animal Husbandry Departments

"- " not received/not available

*estimates are projected on the basis of existing growth rates and previous year estimates due to non-availability of data Note: estimated number of animal of rural and urban area are taken together

Table A4: Estimates of Egg Production during 2012-13 to 2016-17 (numbers in lakh)

SN	States/UTs	2012-13	2013-14	2014-15	2015-16	2016-17
1	A&N Islands	741.32	1193.12	861.18	989.10	1032.27
2	Andhra Pradesh #	222973.83	227874.76	130958.24	141743.16	158274.36
3	Arunachal Pradesh	438.69	400.02	417.26	427.31	495.21
4	Assam	4709.58	4717.34	4727.94	4740.48	4770.75
5	Bihar	8371.86	9308.19	9844.95	10021.04	11116.68
6	Chandigarh	170.27	172.69	169.28	166.66	154.12
7	Chhattisgarh	13704.06	14330.30	14731.73	15028.45	16637.69
8	D.& N. Haveli *	73.00	72.99	72.99	72.99	72.99
9	Daman & Diu	20.00	12.98	19.46	17.83	17.83
10	Delhi *	-	-	-	0.00	0.00
11	Goa	457.87	59.67	74.52	352.09	292.19
12	Gujarat	14558.39	15550.74	16564.99	17215.92	17940.34
13	Haryana	42342.66	43590.99	45789.80	49133.39	52139.05
14	Himachal Pradesh	1069.39	1075.48	1084.34	811.67	958.99
15	Jammu & Kashmir	6715.41	6649.19	4957.63	2309.47	2305.29
16	Jharkhand	4238.95	4444.99	4663.17	4832.84	5103.37
17	Karnataka	36773.33	41300.99	43968.40	47660.42	50671.45
18	Kerala	22375.28	24768.77	25036.11	24424.82	23443.83
19	Lakshadweep	139.99	129.27	125.53	143.91	146.88
20	Madhya Pradesh	8710.78	9671.00	11775.55	14414.28	16939.63
21	Maharashtra	45661.07	48314.57	50792.31	52858.26	54774.17
22	Manipur	1162.19	1163.81	1129.37	1037.40	992.00
23	Meghalaya	1028.18	1049.36	1056.99	1063.66	1063.90
24	Mizoram	352.02	362.31	377.33	391.13	408.07
25	Nagaland	617.98	223.34	352.77	464.52	397.35
26	Odisha	23229.84	23609.35	19245.00	19273.00	19744.74
27	Puducherry	112.89	112.95	113.32	113.50	116.34
28	Punjab	37911.01	43375.57	42642.21	44218.23	47825.57
29	Rajasthan	10334.90	11902.98	13202.01	13852.98	13632.52
30	Sikkim	146.00	99.35	57.53	101.57	68.49
31	Tamil Nadu	119333.55	141235.38	159253.15	161251.99	166823.99
32	Telangana			106185.33	112058.23	118186.35
33	Tripura	1565.17	1794.28	1979.49	2160.84	2294.26
34	Uttar Pradesh	17073.67	18122.15	20775.69	21928.52	22889.49
35	Uttarakhand	3079.14	3369.74	3697.42	3906.51	4119.12
36	West Bengal	47114.91	47460.12	48135.68	60108.19	65536.49
	All India	697307.2	747518.8	784838.7	829294.4	881385.8

Source: State/UT Animal Husbandry Departments

Includes Telangana till 2013-14

"- " not received/not available

*estimates on basis of existing growth rates / previous year estimates due to non-availability of data.

Table A5: Estimated Egg Production from Commercial Poultry Farms (numbers in lakh)

SN	States/UTs	Desi Fowls 2015-16	Desi Fowls 2016-17	Improved Fowls 2015-16	Improved Fowls 2016-17	Desi Ducks 2015-16	Desi Ducks 2016-17	Improved Ducks 2015-16	Improved Ducks 2016-17
1	Andhra Pradesh	-	-	1,33,098.5	1,49,168.0	-	-	-	-
2	A&N Islands	6.4	11.6	250.8	254.0	-	-	14.9	18.6
3	Arunachal Pradesh	-	-	-	-	-	-	-	-
4	Assam	-	-	-	-	-	-	-	-
5	Bihar	-	-	220.5	607.0	-	-	-	-
6	Chandigarh	-	-	163.5	151.5	-	-	-	-
7	Chhattisgarh	-	-	12,680.7	14,222.9	-	-	-	-
8	D.& N. Haveli	-	-	-	-	-	-	-	-
9	Daman & Diu	-	-	-	-	-	-	-	-
10	Delhi	-	-	-	-	-	-	-	-
11	Goa	-	-	285.4	247.0	-	-	-	-
12	Gujarat	-	-	14,804.1	15,666.7	-	-	-	-
13	Haryana	-	-	48,996.9	51,994.9	-	-	-	-
14	Himachal Pradesh	-	-	226.0	384.3	-	-	-	-
15	Jammu & Kashmir	-	-	126.4	123.2	-	-	-	-
16	Jharkhand	-	-	2.6	17.8	-	-	1.2	6.1
17	Karnataka	-	-	43,193.8	45,877.3	-	-	-	-
18	Kerala	-	-	28.0	38.4	3.8	4.6	-	-
19	Lakshadweep	-	-	16.7	17.1	-	-	-	-
20	Madhya Pradesh	-	-	9,931.3	11,829.9	-	-	0.8	0.9
21	Maharashtra	-	-	40,806.5	43,603.1	-	-	0.3	0.6
22	Manipur	-	-	-	-	-	-	-	-
23	Meghalaya	-	-	-	-	-	-	-	-
24	Mizoram	-	-	9.5	10.2	-	-	-	-
25	Nagaland	-	-	1.2	0.3	0.4	0.1	0.7	0.1
26	Odisha	-	-	16,614.4	17,042.1	-	-	-	-
27	Puducherry	-	2.8	-	2.8	-	-	-	-
28	Punjab	172.8	-	29,357.6	47,264.4	-	-	-	-
29	Rajasthan	-	-	9,247.9	11,138.1	-	-	-	-
30	Sikkim	-	-	9.8	7.9	-	-	-	-
31	Tamil Nadu	-	-	1,55,693.6	1,60,767.8	-	-	-	-
32	Telangana	-	-	1,04,835.2	1,10,899.9	-	-	79.0	81.8
33	Tripura	-	-	12.0	8.7	-	-	1.5	0.6
34	Uttar Pradesh	-	-	14,751.6	16,021.3	-	-	-	-
35	Uttarakhand	-	-	3,139.4	3,290.9	-	-	-	-
36	West Bengal	-	-	12,421.5	16,328.3	-	-	-	-
	All India	179.2	14.4	650925.2	716985.7	4.15	4.73	98.29	108.73

Source: State/UT Animal Husbandry Departments

Note : estimated production of egg from rural and urban area are taken together

Table A6: Estimated Egg Production from Backyard Poultry Farms (numbers in lakh)

SN	States/UTs	Desi Fowls 2015-16	Desi Fowls 2016-17	Improved Fowls 2015-16	Improved Fowls 2016-17	Desi Ducks 2015-16	Desi Ducks 2016-17	Improved Ducks 2015-16	Improved Ducks 2016-17
1	West Bengal	29494.9	30353.2	12971.1	13480.7	4742.0	4872.3	478.7	502.1
2	Kerala	8077.2	6017.1	15046.6	16128.1	696.6	693.5	572.7	562.1
3	Maharashtra	10620.8	9784.3	1430.6	1386.1	-	-	-	-
4	Bihar	6780.7	7191.1	2466.2	2714.8	404.7	440.4	149.0	163.3
5	Andhra Pradesh	6442.7	6730.1	1517.0	1663.7	204.0	210.1	480.9	502.5
6	Telangana	5998.8	6001.7	1134.4	1170.3	10.9	11.9	0.0	20.8
7	Uttar Pradesh	3737.3	3699.7	3310.9	3038.9	86.3	90.3	42.5	39.4
8	Tamil Nadu	5558.4	5980.7	-	-	-	75.5	-	-
9	Madhya Pradesh	3703.4	4188.3	778.1	918.1	0.7	2.3	-	-
10	Jharkhand	3671.2	3927.6	871.3	868.0	237.5	235.7	49.1	48.1
11	Karnataka	3094.8	3231.5	1371.8	1562.7	-	-	-	-
12	Assam	3278.9	3411.9	136.4	176.8	1204.4	1035.5	120.9	146.6
13	Odisha	2204.8	2238.4	363.1	371.7	87.0	88.7	3.6	3.9
14	Rajasthan	3079.2	2031.9	540.0	462.6	-	-	-	-
15	Chhattisgarh	1788.0	1882.5	498.7	471.6	57.3	57.2	3.6	3.6
16	Tripura	898.1	975.6	768.2	804.7	364.2	382.5	116.9	122.2
17	Gujarat	2411.9	2273.6	-	-	-	-	-	-
18	Jammu & Kashmir	1693.1	1681.6	449.8	439.5	40.2	60.4	-	0.7
19	Meghalaya	863.7	895.5	175.9	155.7	23.2	12.4	0.9	0.3
20	Manipur	309.8	287.3	475.0	458.6	95.1	91.2	157.5	155.0
21	Uttarakhand	234.1	245.4	533.1	582.9	-	-	-	-
22	A&N Islands	439.0	374.9	178.3	249.2	75.9	69.9	23.9	54.2
23	Himachal Pradesh	275.0	285.8	310.7	288.9	-	-	-	-
24	Punjab	346.2	561.2	14341.7	-	-	-	-	-
25	Arunachal Pradesh	283.6	380.0	143.7	115.2	-	-	-	-
26	Mizoram	260.6	265.7	121.1	132.2	-	-	-	-
27	Nagaland	263.4	214.9	159.7	158.0	16.9	14.6	22.4	9.2
28	Haryana	102.6	107.0	33.9	37.2	-	-	-	-
29	Lakshadweep	16.6	16.9	100.3	103.9	2.3	2.1	8.0	7.0
30	Puducherry	57.0	57.0	56.6	53.8	-	-	-	-
31	Sikkim	65.7	60.6	26.1	-	-	-	-	-
32	Goa	51.2	34.9	15.5	10.3	-	-	-	-
33	Chandigarh	3.2	2.6	-	-	-	-	-	-
34	Daman & Diu	-	-	17.8	-	-	-	-	-
35	D.& N. Haveli	-	-	-	-	-	-	-	-
36	Delhi	-	-	-	-	-	-	-	-
	All India	106105.6	105390.3	60343.2	48003.9	8349.1	8446.4	2230.7	2340.9

Source: State/UT Animal Husbandry Departments

Table A7: Estimates of Meat Production (in 000 tons)

SN	States/ UTs	Cattle 2015-16	Cattle 2016-17	Buffalo 2015-16	Buffalo 2016-17	Sheep 2015-16	Sheep 2016-17
1	Andhra Pradesh	-	-	79.83	87.12	139.26	177.94
2	Arunachal Pradesh	9.48	10.15	1.84	1.66	0.53	0.38
3	Assam	3.16	3.20	0.10	0.11	1.47	1.53
4	Bihar	34.54	32.02	68.31	74.29	1.65	1.87
5	Chhattisgarh	-	-	-	-	1.20	1.49
6	Goa	0.04	0.09	-	-	-	-
7	Gujarat	-	-	1.19	1.33	0.56	0.50
8	Haryana	-	-	-	-	6.87	6.63
9	Himachal Pradesh	-	-	-	-	0.93	0.99
10	Jammu & Kashmir	-	-	6.05	6.06	17.19	19.59
11	Jharkhand	-	-	3.19	2.99	1.32	1.36
12	Karnataka	27.93	41.34	14.94	9.52	28.55	22.59
13	Kerala	146.73	146.05	110.16	106.07	-	-
14	Madhya Pradesh	-	-	23.54	25.78	0.73	0.81
15	Maharashtra	1.82	-	139.86	165.43	11.32	14.97
16	Manipur	8.54	8.65	4.23	4.52	0.10	0.11
17	Meghalaya	23.63	22.63	0.61	0.56	-	-
18	Mizoram	4.01	5.07	0.12	0.20	-	-
19	Nagaland	11.51	8.50	5.58	4.41	-	-
20	Odisha	-	-	-	-	16.18	15.52
21	Punjab	-	-	130.96	124.49	2.84	3.12
22	Rajasthan	-	-	22.48	24.83	46.03	57.32
23	Sikkim	0.84	1.55	0.71	0.29	-	-
24	Tamil Nadu	43.70	43.16	0.99	2.57	36.48	45.23
25	Telangana	-	-	87.68	96.03	135.36	145.53
26	Tripura	-	-	-	-	-	-
27	Uttar Pradesh	-	-	846.19	694.64	15.77	17.32
28	Uttarakhand	-	-	4.05	4.01	2.16	2.22
29	West Bengal	11.56	13.97	16.88	13.94	17.59	17.94
30	A&N Islands	0.09	0.08	0.06	0.05	-	-
31	Chandigarh	-	-	-	-	0.24	0.21
32	D.& N. Haveli	-	-	-	-	-	-
33	Daman & Diu	0.16	0.17	-	-	0.36	0.39
34	Delhi	-	-	41.36	-	-	-
35	Lakshadweep	0.04	0.04	-	-	-	-
36	Puducherry	1.55	1.26	0.10	0.09	0.83	0.89
	All India	329.34	337.91	1611.01	1450.98	485.52	556.44

Source: State/UT Animal Husbandry Departments

"- " not received/not available

Note: estimated production of meat from rural and urban area are taken together Source: State/UT Animal Husbandry Departments

Table A8: Estimates of Meat Production (in 000 tons) Contd..

SN	States/ UTs	Goat 2015-16	Goat 2016-17	Pig 2015-16	Pig 2016-17	Poultry 2015-16	Poultry 2016-17
1	Andhra Pradesh	43.16	47.57	2.57	2.08	301.47	317.80
2	Arunachal Pradesh	2.23	2.40	4.87	5.33	0.42	0.57
3	Assam	14.54	14.60	17.49	18.72	8.00	8.69
4	Bihar	77.74	85.38	72.48	79.38	47.02	53.32
5	Chhattisgarh	9.14	10.86	1.65	2.10	29.39	34.71
6	Goa	3.40	3.33	0.91	0.85	3.53	2.93
7	Gujarat	1.16	1.01	0.23	0.09	30.80	30.41
8	Haryana	6.35	6.24	7.13	6.86	382.45	407.75
9	Himachal Pradesh	2.37	2.25	0.12	0.11	0.58	1.05
10	Jammu & Kashmir	12.10	14.74	-	-	39.74	44.71
11	Jharkhand	17.87	18.71	17.62	19.00	10.71	12.67
12	Karnataka	19.51	28.65	22.13	19.85	83.54	87.12
13	Kerala	19.72	21.17	14.41	6.80	175.02	188.76
14	Madhya Pradesh	21.28	23.96	1.50	1.67	22.78	26.41
15	Maharashtra	54.98	102.50	17.02	44.66	450.11	517.45
16	Manipur	0.25	0.28	6.61	6.85	6.55	7.06
17	Meghalaya	1.33	1.37	11.39	13.84	4.17	2.61
18	Mizoram	0.09	0.13	7.50	7.37	1.84	2.03
19	Nagaland	0.76	0.67	17.14	17.01	0.94	0.78
20	Odisha	65.01	69.48	8.74	9.14	74.83	82.37
21	Punjab	7.18	8.00	0.86	0.96	108.08	112.07
22	Rajasthan	75.63	73.98	12.87	15.57	22.92	8.40
23	Sikkim	0.08	0.18	0.27	1.01	3.95	1.36
24	Tamil Nadu	48.26	52.24	2.88	2.11	412.15	427.53
25	Telangana	53.98	58.30	2.98	3.17	262.06	288.00
26	Tripura	1.65	1.77	11.23	12.43	24.48	25.48
27	Uttar Pradesh	130.78	143.60	90.91	137.06	334.23	353.49
28	Uttarakhand	9.67	10.15	3.13	3.16	8.58	8.86
29	West Bengal	226.24	232.09	30.26	30.78	383.80	397.16
30	A&N Islands	0.10	0.12	0.37	0.48	4.28	4.32
31	Chandigarh	0.45	0.40	0.30	0.33	-	-
32	D.& N. Haveli	-	-	-	-	-	-
33	Daman & Diu	-	-	-	-	-	-
34	Delhi	11.08	-	-	-	17.37	-
35	Lakshadweep	0.06	0.06	-	-	0.68	0.32
36	Puducherry	4.78	4.94	-	0.01	7.35	7.43
All India		942.91	1041.11	387.55	468.80	3263.81	3463.65

Source: State/UT Animal Husbandry Departments

"- " not received/not available

Note: 1. Meat production from young and adult animals has been considered separately during 2015-16

2. estimated production of meat from rural and urban area are taken together

Table A9: Estimates of Wool Production during 2012-13 to 2016-17 (in 000 kg.)

SN	States/UTs	2012-13	2013-14	2014-15	2015-16	2016-17
1	Andhra Pradesh#	5030.50	5036.83	778.23	788.63	791.62
2	Arunachal Pradesh	17.78	21.55	24.23	35.70	58.25
3	Bihar	267.45	270.60	278.42	240.16	280.87
4	Chhattisgarh	106.61	105.95	115.53	90.15	87.29
5	Gujarat	2663.96	2578.06	2577.41	2282.65	2267.32
6	Haryana	1369.96	1390.41	1428.69	702.17	691.22
7	Himachal Pradesh	1649.33	1654.99	1663.07	1408.87	1475.00
8	Jammu & Kashmir	7680.61	8709.70	8371.01	6865.65	7265.51
9	Jharkhand	158.89	156.13	160.76	165.82	177.65
10	Karnataka	8019.89	7754.53	8821.44	8191.42	6588.25
11	Madhya Pradesh	442.23	466.34	483.83	442.39	406.22
12	Maharashtra	1502.61	1538.62	1385.78	1389.89	1406.65
13	Punjab	557.73	557.73	460.89	472.69	489.64
14	Rajasthan	14007.18	15026.77	14463.36	13414.61	14321.27
15	Sikkim	1.00	1.00	-	-	-
16	Tamil Nadu	1.09	1.83	1.20	1.36	2.08
17	Telangana			4422.97	4562.41	4658.11
18	Uttar Pradesh	1456.10	1472.55	1493.71	1264.98	1286.10
19	Uttarakhand	399.89	440.14	468.93	513.33	538.24
20	West Bengal	722.08	725.17	740.40	748.47	753.07
All India		46054.87	47908.88	48139.88	43581.34	43544.37

Source: State/UT Animal Husbandry Departments

Includes Telangana till 2013-14

"-" not received/not available

Source: State/UT Animal Husbandry Departments

Annexure A10

Enforcement of Quality Standards right at Cluster level: Learnings from Global Players

Case example: Thailand

In Thailand, several farm-level accreditation schemes have been in operation. The “Pesticide Safe” vegetable program, run by the Department of Agriculture, involved inspection and crop testing. Farmers could still use pesticides and mineral fertilizers but products had to contain pesticide residues lower than the maximum level set by Codex Alimentarius. The “Hygienic Vegetables” programme is promoted by the Medical Sciences Department. This places responsibility on the packer for sourcing vegetables with safe pesticide residue levels. Thailand has now developed the “Q Mark” with the objective of consolidating the various codes that presently exist. The system of Q standards covers different steps of the supply chain. Q GAP is for farm-level certification; Q-GMP is for packing plants; while QFood Safety (Q-GAP plus Q-GMP) is for packers sourcing only from farmers who are QGAP certified

Case example: Malaysia

Malaysia has introduced a commodity branding programme called “Malaysia’s Best.” This is an umbrella brand for the country’s horticultural products that guarantees quality and safety in accordance with Malaysian Standards and the Malaysian Good Agricultural Practice System. It was initiated for carambola, papaya, pineapple, mango and watermelon, but is targeted to be extended to all other commodities. All farmers can apply to be certified, although initially, most certified farmers are contracted to the Federal Agricultural Marketing Authority (FAMA) for delivery to supermarkets.

Case example: Indonesia

In Indonesia, the Government has also responded to a lack of quality incentives in the marketing system by introducing commodity and location-specific certification systems. Prima III is the lowest standard, with produce required to meet MRLs. Prima II incorporates Prima III and quality attributes. Prima I broadly complies with Eurep GAP standards.

Case example: New Zealand

The detection of spray residues on New Zealand kiwifruit, was essentially being used as a trade barrier in some European markets. The New Zealand Kiwifruit Marketing Board (NZKMB) responded in 1991 by developing a pest management strategy that would enable the production of fruit with no detectable residues. This IPM program, called ‘KiwiGreen’ focused on pest management and agrochemical issues, was launched in 1992. KiwiGreen’ is an example of the successful development and implementation of an IPM program across an entire fruit industry. ‘KiwiGreen’ consists of a documented and audited program of pest control measures that can only be applied in response to a demonstrable need. It was an important precursor to later developments when this program was broadened to encompass all the principles of IFP that became a major component within a broader GAP program called the ZESPRI™ System.

Building Export Competiveness

i. Developing Geographical Indication (GI) products in a cluster based model

Geographical Indication (GI) is a sign used on products, that have a specific geographical origin and possess qualities or a reputation that are due to that origin. In order to function as a GI, a sign must identify a product as originating in a given place. In addition, the qualities, characteristics or reputation of the product should be essentially due to the place of origin.

Since the qualities depend on the geographical place of production, there is a clear link between the product and its original place of production.

The unique blue cheese from France is aged in natural caves around the Roquefort-sur-Soulzon region and protected using geographical indications. Geographical indications have helped the ancient Georgian wine industry to unlock its potential. The Pinggu district north of Beijing, China, bills itself as the biggest peach farm in the world, providing employment to over 150,000 people. GI applies also to agricultural and extractive industries and to all manufactured or natural products, such as “wines, grain, tobacco leaf, fruit, cattle, minerals, mineral waters, beer, flowers and flour. Since GI applies to products originating from a typical geographical zone bearing homogenous attributes, farm production at the cluster level would facilitate the development of new GI products across farm clusters.

ii. Developing clusters with focus on super foods

A super food can essentially be classified as any food item, that contains an extremely dense concentration of vital nutrients, vitamins and/or minerals, as well as anti-oxidants, good fats, healthy enzymes, or other healthy properties that help to treat, lower the risk of or prevent specific diseases and maladies. It has been witnessed that farmers' income can easily be enhanced if the production focus is shifted from traditional products to new emerging concepts of super foods. Hence, it is suggested that a team may be constituted to identify the import demands of super foods globally and the same may be mapped with the relevant agro zones towards promoting professional production at large scale, processing, marketing and branding of the same along with the possibilities of GIs attached to super foods produced in these clusters. Some of the examples of the super foods include quinoa seeds, drumstick seeds, moringa powder etc. which are in great demand in the developed country markets.

Suggested modus operandi for implementation

State governments identify a specific agricultural product whose export is to be promoted. The production of this good or set of related goods would have to be based in a particular area (ranging in size from a single block to a group of districts) that would become the Agri- Export Zone (AEZ). The export of the good would then be promoted in a comprehensive fashion by looking at and assisting all the different processes within the value chain, as well as the links between them. Assistance on different elements of the cluster can include fiscal incentives as well as financial assistance for activities such as training, research and development (R&D) and infrastructure development.

Towards the process of identifying product clusters, ‘**one-village-one-product**’ similar to the model used in Japan may be adopted for promoting regional development. Villages or local areas will be encouraged to concentrate on one value-added and local product, with product development and marketing assistance being provided. The products will then be sold nationally and internationally. Thailand, for example, now has a “One-Tumbon-One-Product” scheme. Spice export villages in Sri Lanka are another example of agglomeration and provision

of facilities in specific locations.

Once the product clusters are identified, FPOs can be formed. These FPOs will be a voluntary alliance of firms with the objective of promoting the goods and services of its members abroad, and facilitating the export of agricultural products through joint actions. Members of the FPOs would retain their financial, legal, managerial and commercial autonomy but cooperate to promote their exports through schemes such as joint marketing, R&D and, in some cases, sales. They will work as formal institutions and the farmers involved in them will not necessarily share geographical proximity.

These clusters need to be developed in partnership with private exporters who will have a natural incentive to promote such clusters. This will be key to ensure surplus produce with standard physical and quality parameters which meet export demands. The possibility of developing agri-export SEZs may also be explored, mainly aimed at producing agricultural commodities for certain countries which are largely dependent on import of agricultural products. The interest of some countries having substantial gap in domestic availability of grains, vegetables, fruits etc can be explored for bringing in foreign direct investments into agri-export SEZ in order to ensure food and nutrition security of the country. There can be complete buyback arrangements by the countries which are bringing in FDI, thus providing stable market for Indian exports.

There is increasing demand for organic produce. India too is building credibility in this space in the global markets. Government may consider policy initiatives for promoting export of organic produce by keeping them outside the domain of export restrictions such as minimum export price (MEP) etc.

Annexure A11

Tariffs: Bound rates and Applied rate in India

HS No	Item	Trade Policy		Bound Rate	Applied Rate
		Export	Import		
Pulses					
071310	Peas*			50	0'
071320	Chickpeas			100	0'
071331	Moong & Urad			100	0'
071340	Lentils*			100	0'
071360	Pigeon Pea*			100	10'
Cereals					
1001	Wheat			80	10
1006	Rice			80	80
Oilseed					
1201	Soya Beans			100	30
1202	Ground Nuts Shelled			100	30
1205	Rape/mustard Seeds			100	30
1206	Sunflower Seeds			100	10
120740	Sesamum Seeds			100	30
120750	Mustard Seeds			100	30
Edible Oil					
1507	Soyabean oil			45	12.5-20
1508	Ground nut oil			300	12.5-20
151110	Palm Oil			300	7.5
151411	Rapeseed/Mustard Oil			75	12.5
170111	Cane Sugar			150	40

*import for value addition & subsequent export under Advance Authorisation Scheme allowed since 14/11/2013

Source: IIFT

	Prohibited		Free		Imports allowed through State Trading Enterprise
--	-------------------	--	-------------	--	---

The import duty or applied rates (AR) are quite insignificant for many of the commodities. Also in situations where AR had been raised, there were incidences of under-invoicing done by the importers. To resolve this issue, duty rates on volume (specific rate of duty) instead of on value (ad-valorem duty), is used and also bring in transparency in trade. This is applied on some dried fruits. Other major commodities like apples, pulses and oilseeds can also come in the ambit. The government can evaluate the duty rate annually, depending on global prices of the commodity. This eliminates managing of the product import and valuation process and lets the trade compete against each other purely on the basis of product quality and marketing abilities. To stop related corruption, such a measure is also adopted in countries like South Korea for sesame seeds and USA for cheese and in EU which has fixed duty on rice imports at Euro 175 per tonne.

--- X ---