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Agricultural Production and Marketing of Major Food Crops and Spices in West Bengal - Status and Strategies



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PREFACE

West Bengal is known to be a state primarily based on agriculture and has large contribution in producing several important crops in India. It is the largest producer of rice in the country contributing over 15% of country's total production, 74% of Jute & Mesta, 35% of potato and 18% of vegetables production of the country. In production side, the small-scale producers are reasonably efficient in production and the production systems were labour and input intensive, but their marketing efficiencies are poor. Alternative marketing systems or organized retail marketers are ready for entry into the agriculture retail marketing with large investment. Marketing efficiencies of organized marketing channels are expected to be high but they prefer to procure in bulk quantity, which marginal farmers cannot offer individually. Therefore, farmers' in the state needs to be organized through promotion of producers organisations. Opportunities like production of organic commodities and other high value crops in the state can be promoted through sustainable value chains. National level policy is essential for boosting the agricultural production and efficient marketing of the produce. At the same time, it is also important to make strategies at the state level too based on the differential capabilities, socio-economic conditions, opportunities and constraints inherent to the particular state. Possibly, such state level strategies can complement the national level policies which are more pertinent in the case of the agricultural sector, as it comes under the purview of state subjects. Alternatively, some of the state level measures can be useful for implementation at national scale also. For example, market intervention scheme in terms of minimum procurement price, based on real time state level cost of cultivation immediately after harvesting of potato in West Bengal was quite effective to check the steep downfall of open market price and safeguards the farmers' interest. Active procurement by the state government prompted private traders participation and reduce the possibilities of market price manipulation that often causes farmers' distress. Such quick response market intervention strategy by the state government was required by a particular state for a short period of time to ensure remunerative price to the farmers, therefore was also not a huge burden to the state's exchequer. It has been attempted to analyse effectiveness of such strategies in this document along with trend analysis on major food crops and spices in the state. This document might be useful for the academicians, entrepreneurs and policy makers engaged in agricultural marketing sector in the country.

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HIGHLIGHTS

- District wise agricultural performance of the West Bengal state has been analysed in terms of major food crops and spices production and marketing during 2004-05 to 2019-20.
- Agriculture in West Bengal, India has reached in stage in which there is a need of strategies to transform agricultural production to agribusiness – from supply push to demand pull.
- Agriculture production needs to be supported by secondary agriculture through value addition and product diversification to make the sector more vibrant and pushing to next level of growth trajectory.
- Farming in West Bengal needs to be made viable through sustainable access and efficient use of natural resources, providing single window system of service providers for extension services, reducing farm level agricultural risks and ensuring better price realization through direct marketing.

ABSTRACT

Agricultural production system in West Bengal (WB) is dominant by small-holder farmers who are producing a number of crops with reasonable production efficiency but severely constrained with marketing efficiency, leading to low agricultural income of farmers. The state has 5.20 million ha of net cropped area, 9.90 million ha of gross cropped area and the cropping intensity is 188%. The cropping pattern is dominated by foodgrains crops (68%), mainly paddy (55%), followed by other food crops such as potato (4.27%), pulses (3.45%), wheat (3.40%), maize (1.53%), spices and condiments (1.30%). During 2000-01 to 2015-16, the cropping pattern has changed to increase in area under maize, pulses, potato, spices and condiments but marginally decreased area under rice and wheat. The state has paddy area of 5.38 million ha followed by pulses (0.46 million ha), potato (0.42 million ha), maize (0.24 million ha), wheat (0.12 million ha) and spices (0.11 million ha). Average yields of these food crops, foodgrains (2.8 t ha^{-1}), paddy (2.9 t ha^{-1}), maize (3.1 t ha^{-1}), pulses (0.10 t ha^{-1}), potato (29 t ha^{-1}) and spices (2.8 t ha^{-1}) have been higher as compared to national average, except wheat (2.7 t ha^{-1}). Area, production and yield of maize has grown (during 2010-2018) by 14%, 17% and 3%, respectively followed by pulses (12%, 15% and 3% for area, production and yield, respectively) and spices (4%, 10% and 6% for area, production and yield, respectively), sign of positive crop diversification towards non-rice crops. Per capita (per year) consumption of rice, wheat, pulses, potato, maize and spices were estimated to be 89 kg, 23.82 kg, 6.57 kg, 44.47 kg, 0.14 kg and 4.48 kg, respectively. With current population (91.3 million), total requirement (consumption demand) for the state was computed as 8.13 million tonnes (t) for rice, 2.18 million t for wheat, 0.60 million t for pulses, 4.06 million t for potato, 0.01 million t for maize and 0.41 million t for spices. The state is surplus in terms of producing rice (surplus quantity is 6.84 t or 46%), potato (8.59 t or 68%) and maize (1.12 t or 99%), whereas deficit in production of wheat (1.86 t or 597%), pulses (0.16 t or 35%) and spices (0.07 t or 22%). Agriculture in West Bengal has reached in a stage from which there is a need of strategies to transform agricultural production to agribusiness – from supply push to demand pull. Agriculture production needs to be supported by secondary agriculture through value addition and product diversification to make the sector more vibrant and pushing to next level of growth trajectory. Realising the need, the West Bengal state agricultural marketing department has initiated several proactive policy reforms during last 6-7 years towards ensuring remunerative prices to farmers. Harnessing opportunities for small-holder farmers in the state through implementation new farm acts (2020) and some specific policy suggestions has been highlighted in this policy paper.

Key words: Agricultural production, food crops, growth, marketing strategy, price policy, West Bengal

ACRONYMS OF ABBREVIATION

Abbreviation	Full form
APEDA	Agricultural and Processed Food Products Export Development Authority
APY	Area, Production and Yield
APMC	Agricultural Produce Market Committee
CA	Commission Agent
CACP	Commission for Agricultural Costs and Prices
CAGR	Compound Annual Growth Rate
COC	Cost of Cultivation
COP	Cost of Production
CMR	Custom Milled Rice
CPC	Centralised Procurement Centers
CS	Co-operative Societies
CSR	Corporate Social Responsibility
CSSRI	Central Soil Salinity Research Institute
DPC	Direct Purchase Camps
e-NAM	Electronic National Agriculture Market
FAQ	Fair Average quality
FDI	Foreign Direct Investment
FHP	Farm Harvest Price
FPC	Farmer Producer Company
FPO	Farmer Producer Organisation
GCA	Gross Cropped Area
Govt.	Government
GSDP	Gross State Domestic Product
HH	Household
IBEF	India Brand Equity Foundation
ICAR	Indian Council of Agricultural Research
IVR	Interactive Voice Response
IRRI	International Rice Research Institute
KMS	Kharif Market season
MPP	Minimum Procurement Price
MIS	Market Intervention Scheme
MSP	Minimum Support Price
mt	Million Metric Tonne
NABARD	National Bank for Agriculture and Rural Development
NSA/NCA	Net Sown Area/Net Cropped Area
NSSO	National Sample Survey Organisation
NSDP	Net State Domestic Product
RMC	Regulated Market Committee
SFAC	Small Farmers' Agribusiness Consortium
SHG	Self Help Group
SFVC	Sustainable Food Value Chain Framework
t	Metric Tonne (1000 kg)
q	Quintal (100 kg)
WB	West Bengal
WBSEB	West Bengal State Agricultural Marketing Board

EXECUTIVE SUMMARY

- *West Bengal is a leading state in terms of agricultural production of major crops such as paddy (13 % of national production), potato (24%), jute and mesta (74%), fish (15%), vegetables (16%), fruits (4%), lentil (6%), rapeseed & mustard (7%), spices (4%) and flowers (12%). Agriculture, fisheries & forestry is contributing 18% of GSDP during 2017-18 (at constant prices of 2011-12) and providing livelihoods to over 7.1 million farmers. However, the income of agricultural households is one of the lowest in the country. Key impediment to increase the farmers' income is attributed to the small (14% with farm size of 1.59 ha) & marginal (82% with average farm size of 0.49 ha) land holdings, who are operating less than a hectare (0.77 ha).*
- *The total value of output from agriculture in West Bengal has increased by 8% (₹ 84543 crores to ₹ 91232 crores) with an annual growth rate of 1.87 % during 2011-12 to 2015-16 (at 2011-12 prices). The state contributed 7.85% of total value of output from agriculture in India (2015-16) with 14% of India's value of output from paddy, followed by potato (22%), spices and condiments (5%), maize (3%), pulses (2.4%) and wheat (0.9%).*
- *West Bengal has 5.2 million ha of net cropped area, 9.9 million ha of gross cropped area and the cropping intensity is 188%. The cropping pattern is dominated by foodgrains crops (68%), mainly paddy (55%), followed by other food crops such as potato (4.27%), pulses (3.45%), wheat (3.40%), maize (1.53%) and, spices and condiments (1.30%). During 2000-01 to 2015-16 period, the cropping pattern has changed to increase in area under maize, pulses, potato and, spices and condiments but slightly decreased for area under rice and wheat.*
- *Small and marginal farmers are producing agricultural crops with reasonable production efficiency but severely constrained with poor marketing efficiency. The system is operated by unorganized retailers under a vicious cycle like – large no of small producer - producing low marketable surplus – resulting low bargaining power and – low profit. Then these commodities pass to a large no of small traders who are handling these produces in a small scale subjected to high degree of post-harvest losses – ultimately resulting the whole marketing system a non-commercial venture.*
- *The agricultural marketing network in West Bengal is comprised of 23 Regulated Market Committees (RMCs), 4406 agricultural markets including primary, secondary, terminal and retail outlet, out of which 85% (3456) are privately managed. The government has set up 186 Krishak Bazaars to facilitate agricultural marketing particularly for ensuring better services to small and marginal farmers in the state.*
- *Per capita (per year) consumption for rice, wheat, pulses, potato, maize and spices have been estimated to be 89 kg, 23.82 kg, 6.57 kg, 44.47 kg, 0.14 kg and 4.48 kg, respectively. With current population (91.3 million), total requirement (consumption demand) for the state has been computed as 8.13 million t for rice, 2.18 million t for wheat, 0.60 million t for pulses, 4.06 million t for potato, 0.01 million t for maize and 0.41 million t for spices. The state is surplus in terms of producing rice (surplus quantity is 6.84 t or 46%), potato (8.59 t or 68%) and maize (1.12 t or 99%), whereas deficit in production of wheat (1.86 t or 597%), pulses (0.16 t or 35%) and spices (0.07 t or 22%).*
- *Comparing farm harvest price (FHP) and cost of production (COP in C2) data for West Bengal during 2004-05 to 2016-17, indicated that growing paddy was not so profitable in terms of market price received by the farmers. Also, the FHP was mostly below the MSP except during recent past (due to active procurement by State Govt.), indicating more or less non-effective MSP policy.*

However, paddy still remained as most preferred crop due to its greater value to the farmers, other than merely earning profit, such as its contribution to food security, adaptability to multiple stressed conditions and low production risk.

- Potato is the most profitable crop in the state in terms of profitability and most of the years FHP remained well above the COP. Besides, during fall in prices of potato at harvest time, Govt. of West Bengal also become active through announcing minimum procurement price (MPP) of potato to ensure remunerative price to the farmers. Such quick and short-term market intervention scheme initiative has been observed to be effective in potato marketing in the state. During 2011-2017, COP of potato increased by 7% (CAGR) and wholesale price increased by 15% (CAGR).
- Maize prices in the state have remained favourable for growing this crop with 5.39% increase in wholesale price during 2011-2017. Pulse (Lentil and Gram) production in the state has remained deficit in supply and therefore FHP mostly remained over the COP, providing good return to the farmers. As the market prices remained well above the MSP, there was no active procurement by the state Govt., so far.
- In West Bengal, as on February 2020, 89 (10% of the country) Farmer Producer Organisation (FPO) have been formed (83 registered and 6 under registration) and 90500 farmers (11 percent of the country) have been mobilised through the FPOs. Association with FPOs provided incentives to farmers through better market linkages and increased the confidence level in farmers to grow high value cash crops such as vegetables, flowers and fruits. Although some FPOs had established good market linkages with Sufal Bangla and other organized retailers, however, often it was seen that FPC farmers had to depend on the open market to dispose their marketable surplus as the farmers were not able to sell their entire volume of produce through the marketing channels developed/linked by the FPOs.
- In 2020-21, West Bengal had 21003 ha (0.48 percent) out of 43.40 lakh ha of area in India under organic cultivation and produced 17437 tonnes of organic commodities (0.53 percent of India). Around 37% of organic production from West Bengal is being exported to different countries through APEDA and rest (63%) is being consumed at domestic market. organic produce has good demand not only in the export market but the demand is also increasing in the domestic market. West Bengal has good potential to increase the organic production particularly pulses, non-basmati aromatic paddy, spices and vegetables.
- West Bengal has already taken significant steps towards reforming agricultural marketing policy for aligning agricultural marketing with clear vision of 'reduction of post-harvest crop-losses and maximising producers' share in consumers' price by way of establishing a globally competitive Agricultural Marketing Systems in the State. The APMC Act (1972) has been amended twice (2014 and 2017) and significant changes are, reduction in number of Regulated Market Committees (RMC); single license system to reduce trade barrier and facilitate easy trading; linking with eNAM and promoting e-auction facilitating better price discoveries of commodities.
- Some of the key strategies, suggested are, database creation on marketable surplus of crops, marketing research for price forecasting, potential market, market intelligence cell; Product diversification strategies; Quick response policy and remunerative price fund; E-auction for better price discovery; Corporate entry be allowed; Ideal marketing model through best price, insurance and technical know-how; Promoting production in clusters; Consolidation of farmers through FPOs; Agri-marketing be allowed to handle by professionals and allowing Foreign Direct Investment (FDI) in the State.

1. Economy and agriculture in West Bengal

The state of West Bengal comprised of 8875.2 million km² of geographical area, 23 administrative districts, and 91.3 million populations with population density of 1028 persons per km². The state is accounted for 2.7% of country's geographical area and 8% of country's population. West Bengal is the sixth largest state in India in terms of economic size. The State Gross Domestic Product (GSDP) valued at ₹ 10.49 trillion in 2018-19 (current prices) and expected to reach ₹ 14.40 trillion (USD 206.64 billion) by 2020-21 (IBEF, 2020). The state recorded highest growth (12.58%) during 2018-19 (Financial Express, 2019). Sectoral composition of GSDP indicated that primary sector (agriculture, forestry and Fisheries, mining and quarrying) contributed 20%, industry 24% and service sector 56% of state's income. Per capita income in terms of Net State Domestic Product (NSDP) was estimated as ₹ 98928 (current prices of 2017-18) and ₹ 67783 (constant prices of 2011-12). The average annual GSDP growth rate from 2011-12 to 2017-18 was about 11.88 % (Govt. of West Bengal, 2017-18).

West Bengal is a leading state in terms of agricultural production of major crops such as paddy (13 % of national production), potato (24%), jute and mesta (74%), fish (15%), vegetables (16%), fruits (4%), lentil (6%), rapeseed and mustard (7%), spices (4%) and flowers (12%). Despite high production, the income of agricultural households (HH) is one of the lowest in the country, ₹ 3980 as compared to national average of ₹ 6426 month⁻¹ households⁻¹ (NSSO, 2016). Recent estimates of NABARD indicated that the income of agricultural households has increased (₹ 7756 month⁻¹HH⁻¹) but far below than national average (₹ 8931 month⁻¹HH⁻¹) (NABARD, 2017). Key impediment to increase the farmers' income is attributed to the small (14%) and marginal (82%) land holdings, who are operating less than a hectare (0.77 ha). Out of total operational holdings (7.12 million), around 5.85 million farmers (82%) are operating with average farm size of 0.49 ha and operating 52% of total farm land (5.51 million ha). Small farmers group with average farm size of 1.59 ha are operating 28% of total farm land that constitutes 14% of the total holdings. Thus, together small and marginal farmers constituted 96% of operational holdings and operating over 80% of farm lands.

Small-holders are producing low marketable surplus, hence low return to their farming business. Also, it could be attributed to too many people (44% of total workers) depending on the primary sector either as cultivators (33%) or as agricultural labourers (67%), leading to disguised unemployment and low agricultural income. With these marginal land holdings, farmers were producing low volume of marketable surplus, hence low return to their farming business. The small and marginal holdings of operational area leading to low return to the farm investment and therefore, farmers were incapable to increase their investment in agriculture. Small and marginal farmers are producing agricultural crops with reasonable production efficiency but severely constrained with poor marketing efficiency. The system is operating under a vicious cycle, large no of small producer producing low marketable surplus, resulting low bargaining power and low profit. Then these commodities pass to large no. of small traders who are handling these produces in small scales subjected to high degree of post-

harvest losses – ultimately resulting the whole marketing system a non-commercial venture. Under these circumstances it is imperative to ensure remunerative return to agricultural production in the state through appropriate production and marketing strategies. This policy paper has specific focus on understanding current status of production and marketing of selected crops such as paddy, wheat, maize, pulses and spices. Finally, the policy paper also suggested some key strategic action may be taken by the state for creating enabling environment for efficient agricultural marketing and realising better prices to farmers.

2. Data sources and methodology

The data for this paper has been collected from both secondary and primary sources. Large number of secondary sources of data has been consulted such as (1) *Agricultural Statistics at a Glance* (various issues); (2) Database of Commission for Agricultural Costs and Prices/CACP (various years) for minimum support price (MSP) and cost of production (COP); (3) Farm harvest prices (FHP) of principal crops (various years) from Ministry of Agriculture and Farmers Welfare, Govt. of India (2004-2017); (4) Crop production statistics information systems for area, production and yield data from database of Directorate of Economics & Statistics, Ministry of Agriculture and Farmers Welfare, Govt. of India; (5) Spices data from Spice Board database; (6) potato data from National Horticulture database (various issues); (7) data on organic crop production from Agricultural and Processed Food Products Export Development Authority (APEDA), Govt. of India; (8) NSSO database on monthly per capita consumption of various commodities, Govt. of India; (9) Economic Review of West Bengal (various issue), Govt. of West Bengal; (10) Farmers income data from NSSO database and NABARD; (11) West Bengal State Agricultural Marketing Board (WBSAB); (12) Sufal Bangla, Govt. of West Bengal; (13) e-National Agriculture Market, Govt. of India; (14) Market arrival and prices of various commodities from AgMarket database, Directorate of Marketing & Inspection, Govt. of India ; (15) State wise and item wise estimates of value of output from agriculture and allied sectors (2018), Central Statistics Office, Ministry of Statistics and Programme Implementation, Govt. of India; (16) India Brand Equity Foundation (IBEF); and (17) Status of FPOs from Small Farmers' Agribusiness Consortium (SFAC), Dept. of Agriculture, Govt. of India; and various published research articles. Data for the pulses pertains to six crops, arhar, Bengal gram (chhola), lathyrus (khesari), lentil (masoor), green gram (moong) and black gram (urad).

Besides, some primary information was collected and used to understand the economics of production and marketing of potato (Bhattacharya, 2016) and functioning of farmers Producers Company in West Bengal (Das, 2018). The primary information was collected through various primary surveys during 2015-16 to 2017-18 at selected districts (Hooghly, South 24 Parganas and East Medinipur) in West Bengal. Compound annual growth rate of area, production and yield of various crops was calculated by using LOGEST function in MS-Excel. The consumption demand for food crops (rice, wheat, pulses, potato, maize and spices) and spices has been computed by using the per capita consumption of these crops in the state,

as per NSSO (68th round) data on household consumer expenditure in West Bengal 2011-12 (Govt. of West Bengal, 2015). Total population in the state (as per 2011 Census of India) and weighted average of rural (68%) and urban (32%) population have been considered to compute the total consumption requirement of these crops. After estimating the consumption demand, the surplus or deficit quantities of these crops have also been calculated.

3. Production of selected crops – status and performances

3.1. Net cropped area, gross cropped area and cropping intensity

West Bengal has 5.20 million ha of net cropped area, 9.90 million ha of gross cropped area and the cropping intensity is 188%, higher than national level (141%) (Table 1). Over the decades (2004-05 to 2018-19) the cropped area has remained almost static or slightly decelerated as evident from the growth rate of cropped area. West Bengal implemented the land ceiling acts in the state very successfully and most of the operational land was distributed to large number of landless farmers. This reduced the average operational holdings of the individual farmers and farmers continued cultivation intensively, therefore cropping intensity in the state (177-190%) remained higher than the national average (135-143%) over the years. Most of the arable land has been brought under cultivation and the scope for net area expansion is limited; therefore, the increase in production for crops through increasing cropping intensity is priority for the state. The cropping pattern (2015-16) is dominated by foodgrains crops (68%), mainly paddy (55%), followed by other food crops such as potato (4.27%), pulses (3.45%), wheat (3.40%), maize (1.53%), spices and condiments (1.30%) (Table 2). During 2000-01 to 2015-16 period the cropping pattern has changed to increased area under maize, pulses, potato, spices and condiments but slightly decreased for area under rice and wheat.

Overall, West Bengal has significant contribution to national production (2017-18), particularly for paddy (13%) and potato (24%) (Table 3). The State has also increased its area and production under other food crops such as maize, pulses and spices. However, wheat production in the state is becoming challenging possibly due to shortening of winter and also threat from pest and diseases attack in recent years (Mottaleb et al, 2019). The State has paddy area of 5.38 million ha followed by pulses (0.46 million ha), potato (0.42 million ha), maize (0.24 million ha), wheat (0.12 million ha) and spices (0.11 million ha). Average yield of these food crops, foodgrains (2.8 t ha⁻¹), paddy (2.9 t ha⁻¹), maize (3.1 t ha⁻¹), pulses (0.10 t ha⁻¹), potato (29 t ha⁻¹) and spices (2.8 t ha⁻¹) have been higher as compared to national average, except wheat (2.7 t ha⁻¹).

The compound annual growth rate (CAGR) of area, production and yield of total foodgrains, paddy and potato has remained low (<2%) during 2010-2018. At the same period, high growth has been recorded for area, production and yield of maize, pulses and spices (Table 4). Area, production and yield of maize has grown by 14%, 17% and 3%, respectively followed by pulses (12%, 15% and 3% for area, production and yield, respectively) and spices (4%, 10% and 6% for area, production and yield, respectively). Probably this is the sign of positive crop diversification towards non-rice crops that has been achieved due to active interventions (pulse mission) of the state for promoting these high value crops.

Table 1: Gross cropped area, net cropped area and cropping intensity

Year	Net cropped area (lakh ha)	Gross cropped area (lakh ha)	Cropping intensities (%)	% Gross irrigated area to gross cropped area
2004-05	53.74	95.23	177 (135)	56.1
2005-06	52.95	95.33	180 (137)	57.7
2006-07	52.96	96.35	182 (137)	57.9
2007-08	52.96	97.52	184 (138)	58.1
2008-09	52.94	98.02	185 (137)	57.7
2009-10	52.56	95.30	181 (136)	58.0
2010-11	49.81	88.32	177 (139)	59.7
2011-12	51.98	93.53	180 (139)	58.8
2012-13	52.05	94.59	182 (139)	58.9
2013-14	52.34	96.18	184 (143)	58.9
2014-15	52.38	96.90	185 (141)	59.1
2015-16	52.43	98.81	188 (141)	59.1
2016-17	52.46	96.18	183 (141)	
2017-18	52.47	99.45	189 (141)	
2018-19	52.48	99.60	190 (141)	
CAGR (%)	-0.11	0.24	0.31 (0.35)	0.37

Source: Compiled from *Agricultural Statistics at a Glance* (various issues) and Land Use Statistics Information System (<http://aps.dac.gov.in>). Figures in parentheses indicates cropping intensity at India level.

Table 2: Cropping pattern and importance of selected crops in West Bengal

Particular	Area (lakh ha)				% share to total cropped area			
	2000-01	2005-06	2010-11	2015-16	2000-01	2005-06	2010-11	2015-16
Paddy	54.35	57.83	49.44	55.24	59.61	60.66	55.98	55.91
Wheat	4.26	3.67	3.17	3.4	4.67	3.85	3.59	3.44
Maize	0.35	0.72	0.89	1.53	0.38	0.76	1.01	1.55
Pulses*	2.75	2.23	1.97	3.45	3.02	2.34	2.23	3.49
Foodgrains	61.71	64.45	55.47	63.77	67.69	67.61	62.81	64.54
Potato	3	3.54	4.06	4.27	3.29	3.71	4.60	4.32
Spices and condiments	0.13	0.94	1.27	1.3	0.14	0.99	1.44	1.32
Total Cropped area	91.17	95.33	88.32	98.81	100.00	100.00	100.00	100.00

Source: *Agricultural Statistics at a Glance* (various issues). Note: Pulses covers six crops, arhar, Bengal gram (chhola), lathyrus (khesari), lentil (masoor), green gram (moong) and black gram (urad)

Table 3: Area, production and yield of selected crops in West Bengal and contribution to India

Crops	Area (2017-18)		Production (2017-18)		State Yield	India Yield
	million ha	% share to India	million t	% share to India	Kg ha ⁻¹	Kg ha ⁻¹
Foodgrains	5.94	4.70	16.88	5.90	2839	2235
Paddy	5.38	11.7	14.68	13.30	2926	2576
Wheat	0.12	0.39	0.31	0.31	2667	3368
Maize	0.24	2.50	1.13	3.9	4805	3065
Pulses	0.46	1.54	0.44	1.75	969	853
Potato	0.42	18.92	12.65	24.00	29771	22422
Spices	0.11	3.02	0.33	3.98	2792	2120

Source: *Agricultural Statistics at a Glance 2017*, Govt. of India (<https://eands.dacnet.nic.in>).

Table 4: Trend in area, production and yield of crops in West Bengal

Crops	Compound Annual Growth Rate in % (2010-2018) ¹		
	Area	Production	Yield
Foodgrains	0.91	1.98	1.06
Paddy	0.38	1.59	1.21
Wheat*	0.83	0.71	-0.13
Maize	13.53	17.22	3.25
Pulses	11.66	14.72	2.74
Potato	1.42	-0.49	0.22
Spices	3.78	9.51	5.52

Note: Area, Production and Yield for wheat pertains to 2010-2017, 2017-18 data was not considered as growing wheat was restricted by Govt. due to fear of diseases, hence not a normal year.

¹Compound Annual Growth Rate (CAGR) is calculated by author.

4. District-wise area, production and yield of crops – status and performance

District wise area, production and yield of paddy, wheat, maize, potato and pulses for the top six districts in each crops (in terms of area) of West Bengal is reported in (Table 5). Details of area, production and yield for all districts have been reported in Annexure I. Also, district-wise performance of these crops (except pulses) during last 10 years has been assessed through estimating compound annual growth rate (CAGR). The major paddy producing (2017-18) districts in West Bengal are, *West Midinipur, Purba Bardhaman, Birbhum, East Medinipur, Bankura and South 24 Parganas*. The growth rate of paddy area during 2008-09 to 2017-18 period across these districts were mostly declining and production and yield growth was slow (2-4%). Wheat area, production and yield growth rates were also slow and decelerating during the same period (in 2017-18 growing wheat in certain areas adjoining to Bangladesh border was restricted by Govt. of West Bengal due to fear of disease outbreak, hence not taken into account). Maize showed good potential across the districts (*Dinajpur Uttar, Maldah, Alipurduar, Coochbehar and Murshidabad*) of West Bengal and the growth rate of area, production and yield was increasing during 2008-09 to 2017-18. Area, production and yield of potato across the districts (*Hooghly, West Medinipur, Purba Bardhaman, Coochbehar, Jalpaiguri and Bankura*) recorded good performance during 2008-09 to 2017-18. Major pulses producing districts in West Bengal are *Murshidabad, Nadia, South 24 Parganas, Birbhum, Dinajpur Dakshin and Maldah*. West Bengal has good potential to increase the area and production of pulses, particularly in post-*kharif* fallow land to increase farmers' income and also to contribute in the national basket of pulse production. West Bengal has good potential in spices production and currently has an area of 1.12 million ha, producing 3.35 lakh t of spices with average yield of 2.79 t ha⁻¹ (2017-18) (Table 6). Major spices grown in the state are large cardamom, chilli, ginger, turmeric, coriander seeds, fennel seeds and fenugreek seeds. Overall, West Bengal is accounted for contributing around 4% of production and 3% of area of spices in India.

Table 5: District-wise area, production, yield status and performance of major food crops

(top 6 districts in terms of area)

District	Year (2017-18)			CAGR % (2008-09 to 2017-18) ¹		
	Area (ha)	Production (t)	Yield (t ha ⁻¹)	Area	Production	Yield
Paddy						
West Medinipur	569920	1871328	3.28	-1.22	0.83	2.08
Purba Bardhaman	520613	1597429	3.07	-2.56	-1.50	1.09
Birbhum	423813	1376106	3.25	2.36	4.16	1.76
East Medinipur	401033	1130449	2.82	-0.53	1.42	1.96
Bankura	384614	1081485	2.81	1.92	2.33	0.41
South 24 PGS	380352	1000762	2.63	-0.58	1.39	1.98
Wheat						
Nadia	35258	113106	3.21	-0.73	2.72	3.48
Birbhum	35116	99698	2.84	-0.40	0.07	0.47
Dinajpur Dakshin	24585	91729	3.73	5.90	7.70	1.70
Dinajpur Uttar	19854	57501	2.90	-0.36	-0.47	-0.12
Maldah	9684	31463	3.25	-7.49	-6.65	0.91
Jalpaiguri	7594	29240	3.85	-7.15	-5.35	1.93
Maize						
Dinajpur Uttar	80602	636938	7.90	12.85	14.71	1.64
Maldah	36676	284529	7.76	14.04	25.36	9.92
Alipurduar	24457	141242	5.78	-	-	-
Coochbehar	24384	149619	6.14	13.46	13.91	0.40
Kalimpong	22459	41156	1.83	-	-	-
Murshidabad	13781	56344	4.09	16.46	16.22	-0.21
Potato						
Hooghly	103860	3629312	34.94	1.34	5.77	4.37
West Medinipur	70335	2434435	34.61	1.61	8.39	6.67
Purba Bardhaman	64074	2262632	35.31	2.77	8.00	5.09
Coochbehar	32328	1055533	32.65	3.55	9.39	5.65
Jalpaiguri	31607	1074789	34.00	1.77	7.18	5.31
Bankura	30801	1254730	40.74	0.41	7.18	6.75
Pulses						
Murshidabad	91927	98787	1.07	-	-	-
Nadia	58777	53240	0.91	-	-	-
South 24 PGS	55075	38705	0.70	-	-	-
Birbhum	35523	43871	1.24	-	-	-
Dinajpur Dakshin	23925	16546	0.69	-	-	-
Maldah	23829	23021	0.97	-	-	-

Source: Directorate of Economics and Statistics, Ministry of Agriculture and Farmers Welfare, Govt. of India (https://eands.dacnet.nic.in/APY_96_To_06.htm), Crop Production Statistics Information Systems, Govt. of India (https://aps.dac.gov.in/APY/Public_Report1.aspx), Potato data from National Horticulture Board Database – various years (www.nhb.gov.in). Data pertains to 2017-18 (Est.)¹Compound Annual Growth Rate (CAGR) is calculated by author.

Table 6: Area, production and yield of major spices in West Bengal

Spices	2015-16			2016-17			2017-18		
	A (ha)	P (t)	Y (tha ⁻¹)	A (ha)	P (t)	Y (t ha ⁻¹)	A (ha)	P (t)	Y (t ha ⁻¹)
Large cardamom	3305	850	0.26	3305	939	0.28	3305	1044	0.32
Chilli	65123	100338	1.54	65120	100340	1.54	65550	105750	1.61
Ginger	11893	129018	10.85	11990	130400	10.88	12250	133750	10.92
Turmeric	16710	42410	2.54	18000	45500	2.53	17450	44700	2.56
Coriander seed	11450	14520	1.27	11460	14560	1.27	11700	14950	1.28
Fennel seed	1020	1030	1.01	1020	1020	1.00	1030	1050	1.02
Fenugreek seed	2420	2640	1.09	2410	2600	1.08	2450	2750	1.12
All Spices (WB)	118170 (3.42)	329980 (4.78)	2.79	120010 (2.91)	334620 (3.21)	2.79	120540 (3.07)	343870 (3.58)	2.85
All Spices (India)	3457000	6901780	2.00	4122120	10422570	2.53	3927430	9599900	2.44

Source: Spice Board database (www.indianspices.com). Note: A, P & Y stands for area, production & yield. Figures in parentheses shows % share of West Bengal to India.

5. Value of output from agriculture in West Bengal

The total value of output from agriculture in west Bengal has increased by 8% (₹ 84543 crores to ₹ 91232 crores) with an annual growth rate of 1.87% during 2011-12 to 2015-16 (at 2011-12 prices). (Table 7). The state is contributing around 7.85% of total value of output from agriculture in India. The state is contributing 14% of India's value of output from paddy, followed by potato (22%), spices and condiments (5%), maize (3%), pulses (2.4%) and wheat (0.9%). Contribution of value of output from paddy within state was 26% followed by potato (6%), spices & condiments (2.6%), pulses (1.3%), wheat (1.1%) and maize (0.8%) in 2015-16.

Table 7: Value of output from agriculture for selected crops in West Bengal

Crops	Value of output (₹ crores in 2011-12 prices)					CAGR %	% share to total agr. in WB (2015-16)	% share to India (2015-16)
	2011-12	2012-13	2013-14	2014-15	2015-16			
Paddy	21892	22470	22926	21995	23818	1.48	26.11	14.18
Wheat	919	843	976	988	1010	3.55	1.11	0.88
Pulses total	611	616	905	863	1188	18.11	1.30	2.42
Potato	5365	6412	4993	7674	5366	1.82	5.88	22.21
Maize	356	408	511	649	699	19.89	0.77	2.89
Spices and Condiments	1925	1943	1969	1979	2378	4.51	2.61	4.63
Total cereals	23183	23842	24433	23652	25549	1.88	28.00	7.85
Total agriculture	84543	87517	87101	90468	91232	1.87	100	7.58

Source: State wise and item-wise estimates of value of output from agriculture and allied sectors (2011-12 to 2015-16), Ministry of Statistics and Programme Implementation, Govt. of India, 2018

6. Agricultural marketing in West Bengal

6.1. Current status

West Bengal, one of the eastern states of India has plenty of natural resources as well as diverse agro-eco-regions for increasing food production of the country. Besides, producing food grains, the region has great potential to produce several high value commodities for

augmenting farm income. For example, horticulture, livestock and fisheries sectors have all potential to pull the growth of agriculture sector of this region. One of the key impediments of fostering the agricultural growth in this region is the small and marginal production unit of the majority of the farmers. The small scale of production unit produces these high value commodities with high production efficiency but severely constraints with poor marketing efficiency. In the era of market-led growth the volume of trading must be increased to ensure greater share in the consumers' rupee to primary producers. For this establishment of market linkages and functioning of efficient marketing system is utmost important. Currently, the system is operating under a vicious cycle like – large no of small producer - producing low marketable surplus – resulting low bargaining power and – low profit. Then these commodities passes to large no of small traders who are handling these produce in a small scale subjected to high degree of post-harvest losses – ultimately resulting the whole marketing system a non-commercial venture. Besides this traditional agri-marketing system, the agricultural marketing environment throughout the country including this region is also undergoing the process of rapid transformation due to large-scale corporate entry into this marketing system. Corporate entry into retail agricultural marketing likely to attract more private investment into the agriculture sector, reduce the transaction costs, promotion of value addition and evolution of efficient agricultural marketing system. However, so far the share in total volume of retail through such marketing is very less. Existing market environment and marketing status of agro-products, particularly the un-processed commodities, availability of remunerative / reasonable prices are very crucial to change the cropping pattern towards high value crops and crop diversification. Market prices are the key drivers to change the farm economy, however the high price volatility of agricultural commodities adversely affect the up-scaling of the agro-technologies and production.

6.2. Wholesale and retail market infrastructure

The agricultural marketing network in West Bengal is comprised of 23 Regulated Market Committees (RMCs), 4406 agricultural markets including primary, secondary, terminal and

Table 8: Major market intermediaries and their key functions

Intermediaries	Primary Function
Producer	Primary grading, standardization, bring produce to the market.
Middlemen (fariah)	Collection of produce from farmers, grading, packing. Purchase produce either directly from producer or through commission agent (arahtdar). Also takes produce to wholesale market.
Commission agent	Arrange interaction between farmers and traders for auction/selling of produce.
Wholesaler	Purchase produce from middlemen and sell the produce to retailer through some person employed by him sells produce to consumer.
Retailer Contractor	Sometime wholesaler tie up with the contractor to bring the produce from far away / different market or sending the produce to faraway market depending on the demand for the produce in the market

Source: Mandal et al., 2011

retail outlet, out of which 85% (3456) are privately managed. The government has set up 186 *Krishak Bazaars* to facilitate agricultural marketing particularly for ensuring better services to small and marginal farmers in the state. Besides, the state agricultural marketing board has also created infrastructure such as link road/ approach road (143 nos.), auction platform (24 nos.), market complex (52 nos.), Godown (11 nos.), Development of Agricultural Farm and Research Station (20 nos.) and others (32 nos.) during 2013-14 to 2017-18.

6.3. Key market intermediaries and their functions

After harvesting of crops, the produce is brought in the market by farmers or the village level traders collect the produce and bring in the market. First interaction point between farmers and traders occurred at primary market or village level market. Various primary market or '*haat*' operates during specific time of the day or specific time in a week. Farmers sell their produce to the traders called '*fariah*' who are usually the first middlemen functioning in the market (Table 8). They collect the produce from different farmers through direct bargaining from the farmers. However, most commonly farmers used to bring their produce to the commission agent called '*arhatdar*' in the market and they arrange the auction for selling of the produce. After inspecting quality of produce traders (*fariah*) offer bidding price and based on the maximum bid the produce is sold. Commission agent charges for this function either through cash payment or keeping some quantity of produce. It has been estimated, in terms of value the commission agent charges around 5-7 percent of the total value of the produce sold. Key intermediate functionaries in the marketing include farmers, village traders (*fariah*)/ middlemen - wholesaler - retailer and consumer. Primary grading and standardization is done by farmers and second time the grading, standardization is made by the traders before the produce goes to wholesale market. Functions of various intermediaries are summarized in Table 8.

6.4. Consumption, requirement and surplus or deficit

Based on NSSO 68th round data from Household Consumer Expenditure in West Bengal, the per capita consumption of rice (weighted average of rural + urban population) in West Bengal has been estimated to be 7.42 kg month⁻¹ or 89 kg year⁻¹ (Table 9). Similarly per capita (per year) consumption for wheat, pulses, potato, maize and spices have been estimated to be 23.82 kg, 6.57 kg, 44.47 kg, 0.14 kg and 4.48 kg, respectively. With this rate of consumption, total requirement for the state has been computed as 8.13 million t (tonnes) for rice, 2.18 million t for wheat, 0.60 million t for pulses, 4.06 million t for potato, 0.01 million t for maize and 0.41 million t for spices. Further, based on this consumption requirement and available production in the state, surplus or deficit quantity of these crops has been estimated. The state is surplus in terms of producing rice (6.84 t or 46%), potato (8.59 t or 68%) and maize (1.12 t or 99%), whereas deficit in production of wheat (1.86 t or 597%), pulses (0.16 t or 35%) and spices (0.07 t or 22%). Therefore, state can focus on increasing production of deficit crops as per the suitability of growing in different districts or explore external (domestic or international) markets for disposal of the

surplus production. As per the agricultural statistics at a glance (2019), at state level, marketable surplus of rice was estimated as 69% and potato 83% (Table 10) in 2014-15.

Table 9: Consumption and production of major food crops in West Bengal

Commodities	Per capita per month cons. (kg)			Per capita per year (kg person ⁻¹)	WB total cons. (million kg)	WB total cons. req. (million t)	Production (2017-18) (million t)	Surplus /deficit (million t)	Surplus /deficit %
	Rural	Urban	Rural + Urban						
Rice	9.92	6.24	7.42	89.05	8134	8.13	14.97	+6.84	+46
Wheat	1.35	2.29	1.98	23.82	2176	2.18	0.31	-1.86	-597
Pulses	0.49	0.58	0.55	6.57	600	0.60	0.44	-0.16	-35
Potato	3.79	3.66	3.71	44.47	4062	4.06	12.65	+8.59	+68
Maize	0.01	0.02	0.01	0.14	13	0.01	1.14	+1.12	+99
Spices	0.36	0.38	0.37	4.48	409	0.41	0.34	-0.07	-22

Source: Per capita consumption data from Household Consumer Expenditure in West Bengal (2011-12) State Sample Results NSS 68th Round (July'2011-June'2012), Govt. of West Bengal 2015 (https://www.wbpspm.gov.in/SiteFiles/Publications/4_18052017123251.pdf). Download on 20/08/2019.

Note: Weight of rural & urban population are 0.68 & 0.32, respectively. Surplus/Deficit quantity of crops are calculated by author.

Table 10. Marketable surplus ratios of major food crops in West Bengal

Crops/commodities	Marketable surplus (%) West Bengal			Marketable surplus (%) India		
	2012-13	2013-14	2014-15	2012-13	2013-14	2014-15
Rice	67.48	68.02	68.98	81.51	82.00	84.35
Wheat	NA	NA	NA	77.49	73.11	73.78
Maize	NA	NA	NA	84.32	86.98	88.06
Potato	73.41	NA	83.38	86.17	93.74	89.54

Source: Agricultural Statistics at a Glance 2019, Govt. of India (<https://eands.dacnet.nic.in>).

7. Procurement and storage infrastructure in West Bengal

Procurement strategy of foodgrains in West Bengal is primarily rice based and around 5% (19.79 lakh t in 2018-19) of the country's paddy is procured in the state (Table 11). Currently the state is not engaged in procurement of other food crops. However, the state is active in procurement of other fresh vegetables and potato through the Govt. owned *Sufal Bangla* initiative. The state has storage capacity 18.64 lakh t for foodgrains and 59.41 lakh t of cold storage, mainly used for storage of potato (Table 12).

7.1. Strategy for procurement of paddy in West Bengal

To ensure the remunerative price to the farmers including the small and marginal farmers the Government of India announced the minimum support price (MSP) of common paddy of fair average quality (FAQ) at ₹ 1550 q⁻¹ (quintal or 100 kg) for the year kharif market season (KMS) 2017-18, increased to ₹ 1815 q⁻¹ in 2019-20 and ₹ 1868 q⁻¹ in 2020-21. Farmers in the state of West Bengal sell their produce at 325 centralised procurement centers (CPC) notified by the Food and Supplies Department at the Direct Purchase Camps (DPCs), at Co-operative

Table 11: Procurement of rice and Wheat in West Bengal

Year	West Bengal		All India	
	Rice (000 t)	Wheat (000 t)	Rice (000 t)	Wheat (000 t)
2006-07	642 (2.56)	-	25106	9226
2007-08	1249 (4.35)	-	28736	11128
2008-09	1743 (5.11)	-	34104	22689
2009-10	1240 (3.87)	-	32034	25382
2010-11	1310 (3.83)	9	34198	22514
2011-12	2036 (5.81)	-	35041	28335
2012-13	1766 (5.19)	2	34044	38148
2013-14	1359 (4.26)	2	31845	35092
2014-15	2032 (6.34)	-	32040	28023
2015-16	1568 (4.58)	-	34217	28088
2016-17	1923 (5.05)	-	38106	22962
2017-18	1673 (4.38)	-	38184	30824
2018-19	1979 (4.46)	-	44331	35795

Source: *Agricultural Statistics at a Glance 2019*.

Note: Figures in parentheses shows % share of West Bengal to all India procurement.

societies (CS) camps or at SHGs or FPOs camps organised by CMR agencies. The state government also declared incentives of ₹ 20 q¹ over and above MSP to the farmers who would sell their paddy at the notified CPCs from 1 November 2017 onwards. A farmer could sell up to 90 q of paddy during the KMS at the designated camps under the aegis of custom milled rice (CMR) agencies without producing any documents regarding ownership/possession of land. They were to provide photo identity and bank account details with IFSC for making direct payment through NEFT. Besides, providing details of land documents was essential if a farmer wanted to sell paddy beyond a quantity of 90 q. Paddy purchased at the Co-operative Societies, SHGs or FPOs was transported by the rice millers within 24 hours against challans for carrying the stock from purchase entries to rice mills. Paddy received at the rice mills jointly certified by the extension officers of block level placed at the rice mills and by the millers or his/her authorised representatives. The state procured over 20 million tonnes paddy directly from the farmers through its 325 CPCs during 2017-18. Such mechanisms were also needed for other crops like lentil, gram, rapeseed and mustard. Minimum support price is the most powerful price policy in India and cropping pattern can be altered through this policy along with effective implementation by the respective state governments and the farmers' income can be ensured and enhanced significantly.

7.2. Agricultural marketing Act and policy reforms in West Bengal

The vision of agricultural marketing of West Bengal is to 'reduction of post-harvest crop-losses and maximising producers' share in consumers' price by way of establishing a globally competitive Agricultural Marketing Systems in the State'. The mission is envisaged as (1) introduction of latest post-harvest management technologies and infrastructures with an aim to reduce post-harvest losses to below 10% by 2025; (2) creation of online marketing

Table 12: Storage capacity and infrastructure availability in West Bengal

Year	West Bengal		India	
	Capacity (lakh t)	Cold storage (lakh t)	Capacity (lakh t)	Cold storage (lakh t)
2013	19.68	NA	737.14	NA
2014	19.64	NA	741.83	NA
2015	14.68	59.12	714.43	327.29
2016	16.72	59.41	814.84	340.5
2017	18.64	59.41	775.38	346.74
2018	18.67	59.41	843.03	362.30
2019	19.44	59.35	855.68	367.71

Source: *Agricultural Statistics at a Glance 2019*, Govt. of India (<https://eands.dacnet.nic.in>).

Note: Storage capacity pertains to FCI, CWC and SWC. It includes Owned and Hired, Covered and Cap

system linked nationally and globally; (3) development of a tool for direct market intervention; (4) policy formation for encouraging private marketing and (5) accomplishment of all appropriate and necessary legal reforms.

Towards this vision and mission the state agricultural marketing department has initiated several proactive policy reforms during last 6-7 years. The marketing of agricultural produce in the state is guided by Agricultural Produce Market Committee (APMC) Act, 1972 and this act has been amended twice (2014 and 2017) in recent past to keep up the changing requirement of marketing systems (Bandyopadhaya, 2019). Such policy reforms have been beneficial for traders engaged in agricultural marketing in different ways. Key policy changes have been made are

- Reducing number of Regulated Market Committees (RMCs) from 42 to 23, one in each districts, which reduced the burden of acquiring multiple licenses in movement of agricultural produce;
- All fruits and vegetables that are perishable in nature have been removed from the schedule of the APMC Act which means that now there is no market fee levied on these commodities;
- There is a provision for establishment of Private Markets and Direct Marketing Facilities – any entrepreneur can set up an agricultural market by taking a license from the RMC. This has opened up scope for new investment in the marketing infrastructure in the state.
- There is now provision for e-trading in agricultural commodities to establish linkages with e-National Agriculture Market (e-NAM) that has facilitated trading of agricultural commodities from anywhere in the country. All the markets (currently 17 nos. are connected) in state will be linked with the e-NAM in future.
- Provisions have been introduced for Single Point Licensing of the market functionaries by WBSAMB for operating at more than one district in the State. Thus this initiative will facilitate large scale commodity trading by traders.

- The traders need to pay marketing levy at one point only at WBSAMB either in advance or through return system and permitted trading in entire state.

All these policy reforms in agricultural marketing are likely to facilitate 'ease of doing business' in the state and attracting private investment. Such reforms initiatives are likely to expand the markets availability for the agricultural production in the state and also to ensure the remunerative price to the framers.

7.3. West Bengal initiatives –Sufal Bangla and Primary Agri-marketing Corporation

Sufal Bangla is an initiative of Department of Agricultural Marketing, Government of West Bengal which aims to provide an easy interface between producers and consumers and benefit both the farmers and consumers. *Sufal Bangla Agri Price Information Service* is an important part of this initiative. In this service, using Mobile App and telephony Interactive Voice Response (IVR) system, farmers and consumers can easily get daily market price information of agricultural commodities available at *Sufal Bangla* collection centers and its outlets. With 105 mobile and static (permanent stall) retail outlets across the state, and mobilization of 61 vehicles for supply chain management *Sufal Bangla* has evolved this system over the years into a sustainable social business model. Its entire supply chain management process is geared up to ensure that the right produce is in the right place, at the right time and at the right price. It is operated by the FPC which is determined through bidding on this condition that a certain percentage of the sale proceeds would go to the government as royalty and the said percentage would be fixed during financial bidding.

Key objectives of *Sufal Bangla* are to develop a parallel business model of agricultural produce involving farmers in groups, enhancing competitiveness in agri-business, maximising producers' share in consumers' rupee, stabilising and ensuring stable consumers' price and bringing whole range of fresh fruits, vegetables, fish and animal products for the convenience of consumers. Currently (2018-19) *Sufal Bangla* is handling about 15-16 tonnes of agricultural produce daily, trade volume was around ₹4-5 lakh daily and serving around 80-90 thousand of consumers weekly. *Sufal Bangla* also providing direct employment to 200 people daily and creating 450 man-days additional employment indirectly. *Sufal Bangla* initiative is primarily benefiting FPOs in the state through better price discovery, particularly the perishable commodities, and also stabilising the prices, traded in the state.

In addition to *Sufal Bangla* initiative, *Paschimbanga Agri-Marketing Corporation* was established in 2011 to act as the Govt. owned procurement agency in the state for various commodities for price settlement. Establishment of this corporation was to provide remunerative price to the commodities and reducing the middlemen in trading. The corporation is currently handling the paddy procurement and *Sufal Bangla* programme. It has collaboration with *Bidhan Chandra Krishi Viswavidyalaya* (State Agricultural University) and promoting non-basmati aromatic rice (*gobindobhog*, *tulapanji* etc) production and marketing. The corporation is also engaged in brand building activities of agricultural produce (including organic produce) from West Bengal. The premium aromatic variety

gobindobhog rice is attracting more farmers in West Bengal and its demand also increasing within state as well as in other states.

7.4. Linking markets through e-National Agriculture Market (eNAM)

The National Agriculture Market (eNAM) is a national network of physical mandis which can be accessed online. It seeks to leverage the physical infrastructure of the mandis through an online trading portal, enabling buyers situated even outside the Mandi/State to participate in trading at the local level. The eNAM is a pan-India electronic trading (over 150 commodities) portal which networks the existing APMC mandis to create a unified national market for agricultural commodities. Small Farmers Agribusiness Consortium (SFAC) is the lead agency for implementing eNAM under the aegis of Ministry of Agriculture and Farmers' Welfare, Government of India. The vision of eNAM is to promote uniformity in agriculture marketing by streamlining of procedures across the integrated markets, removing information asymmetry between buyers and sellers and promoting real time price discovery based on actual demand and supply. The mission of eNAM is integration of APMCs across the country through a common online market platform to facilitate pan-India trade in agriculture commodities, providing better price discovery through transparent auction process based on quality of produce along with timely online payment. Key benefits to the farmers are expected through transparency in trade, better price discovery, access to more markets and buyers, real time information on prices and arrival in nearby mandis, quick payments and building a healthy financial profile. Linking with online portal eNAM facilitates better prices for a seller through transparent bidding, increased number of buyers from different markets, hence greater negotiation power via assaying and ensuring price in commensuration to the quality of produce to the seller. As on 31 July 2019, eNAM has covered 18 states, linked with 124805 traders, 69529 commission agents (CA), 818 FPOs and over 1.64 crores farmers. So far in West Bengal, eNAM linkages has been established with 1846 traders, 74 CAs, 76 FPOs and 13166 farmers (Table 13). During last one year (2018-19), cumulative produce worth ₹ 1.2 crore (₹ 61000 crores at national level) was transacted on the eNAM system in the 17 connected markets in West Bengal and the state is planning to expand its eNAM network to benefits more stakeholders (Business Standard, 2019).

Table 13: Status of stakeholders' registration with e-NAM in West Bengal

State	West Bengal	India	% Share of WB
Traders	1846	124805	1.48
Commission Agents (CAs)	74	69529	0.11
Service Provider	0	0	0.00
FPOs	76	818	9.29
Farmer	13166	16481634	0.08
Total	15162	16676786	0.09

Source: e-NAM (<https://enam.gov.in/web/dashboard/stakeholder-data>). Download on 25/08/2019

8. Ensuring remunerative price to farmers – strategies and effectiveness

Minimum support price (MSP) policy is recommended by Commission for Agricultural Costs and Prices (CACP) and announced by Govt. of India for 23 crops (including food crops and pulses) before sowing seasons and expected to ensure the remunerative price to the farmers. Effectiveness of this price support policy has been analysed through comparing farm harvest price (FHP in ₹ q⁻¹), minimum support price (MSP in ₹ q⁻¹) and cost of production (COP in ₹ q⁻¹) for paddy, wheat and pulses (lentil and gram). Maize was excluded from this comparative analysis as the COP data for maize with respect to West Bengal was not available from CACP. As MSP is not declared for potato, comparison of FHP and COP has been analysed for this crop. COP data pertains to cost C2 data, which includes all paid out cost plus imputed value of family labour.

Comparison of FHP and COP data for West Bengal during 2004-05 to 2016-17 indicated that growing paddy was not so profitable in terms of market price received (Table 14). Also the FHP was mostly below the MSP except during recent past (2017 onwards), indicating more or less non-effective MSP policy, primarily due to absence of active procurement in the state. During recent past (2017 onwards) Government of West Bengal became active in procurement of paddy at MSP and thus made the policy somewhat beneficial to the farmers. However, despite non-effective MSP, paddy still remained as most preferred crop due to its larger value to the farmers, other than merely earning profit such as its contribution to food security, adaptability to multiple stressed conditions and

Table 14: Effectiveness of price support policies and profitability of paddy

Year	Paddy				
	FHP	MSP	COP (C2)	FHP-COP	FHP-MSP
2004-05	534	560	582	-48	-26
2005-06	549	570	581	-32	-21
2006-07	608	580	626	-18	28
2007-08	695	645	670	25	50
2008-09	731	850	731	0	-119
2009-10	882	1000	865	17	-118
2010-11	1047	1000	1023	24	47
2011-12	990	1080	1086	-96	-90
2012-13	1164	1250	1236	-72	-86
2013-14	1500	1310	1367	133	190
2014-15	902	1360	1411	-509	-458
2015-16	1526	1410	1423	103	116
2016-17	1537	1470			67
CAGR (%)	9.42	9.61	10.17		

Note: 1. FHP, MSP and COP stands for Farm Harvest Price, Minimum Support Price and Cost of Production,

2. FHP of paddy was the average of three seasons (kharif, autumn and rabi) of paddy.

Sources: 1. FHP was taken from Farm Harvest Prices of Principal Crops in India for various years (2004 to 2017), Directorate of Economics & Statistics, Ministry of Agriculture and Farmers Welfare, Govt. of India (2004 to 2017).

2. MSP and COP data were taken from various reports of Commission for Agricultural Costs and Prices/CACP, Ministry of Agriculture & Farmers Welfare, Govt. of India 2018, downloaded from <http://cacp.dacnet.nic.in>.

Table 15: Effectiveness of price support policies and profitability of wheat

Year	Wheat				
	FHP	MSP	COP (C2)	FHP-COP	FHP-MSP
2004-05	678	640	NA	NA	38
2005-06	802	650	997	-195	152
2006-07	991	750	1000	-9	241
2007-08	1101	1000	987	114	101
2008-09	1186	1080	1205	-19	106
2009-10	1215	1100	1236	-21	115
2010-11	1231	1120	1217	14	111
2011-12	1052	1285	1326	-274	-233
2012-13	1404	1350	1382	22	54
2013-14	1504	1400	1414	90	104
2014-15	1627	1450	1593	34	177
2015-16	1690	1525	1977	-287	165
2016-17	1750	1625			125
CAGR (%)	7.13	8.06	6.29		

Sources: 1. FHP was taken from Farm Harvest Prices of Principal Crops in India for various years (2004 to 2017), Directorate of Economics & Statistics, Ministry of Agriculture and Farmers Welfare, Govt. of India (2004 to 2017).

2. MSP and COP data were taken from various reports of Commission for Agricultural Costs and Prices/CACP, Ministry of Agriculture & Farmers Welfare, Govt. of India 2018, downloaded from <http://cacp.dacnet.nic.in>.

Table 16: Farm harvest price, cost of production and profitability of potato and maize

Year	Potato			Maize		
	FHP	COP (C2)	FHP-COP	Wholesale price (₹ q ⁻¹)	MSP (₹ q ⁻¹)	Wholesale price (₹ q ⁻¹)
2004-05	300	242	58	-	525	-
2005-06	452	347	105	-	540	-
2006-07	456	471	-15	-	540	-
2007-08	459	356	103	-	620	-
2008-09	593	471	122	-	840	-
2009-10	426	319	107	-	840	-
2010-11	480	371	109	523	880	999
2011-12	519	424	95	544	980	1111
2012-13	643	473	170	981	1175	1312
2013-14	1121	747	374	876	1310	1318
2014-15	902	567	335	1421	1310	1235
2015-16	1296	641	655	690	1325	1351
2016-17	960		-	1412	1356	1461
CAGR (%)	10.40	7.10		14.64	9.67	5.39

Sources: 1. FHP was taken from Farm Harvest Prices of Principal Crops in India for various years (2004 to 2017), Directorate of Economics & Statistics, Ministry of Agriculture and Farmers Welfare, Govt. of India (2004 to 2017).

2. COP data were taken from various reports of Commission for Agricultural Costs and Prices/CACP, Ministry of Agriculture & Farmers Welfare, Govt. of India 2018, downloaded from <http://cacp.dacnet.nic.in>.

3. Wholesale price data calculated by author from monthly wholesale price data obtained from <https://agmarknet.gov.in>,

low production risk as compared to other crops. Comparison between FHP and COP for wheat indicated that it was not a profitable crop for the farmers to grow in the state (Table 15). As the FHP remained higher than the MSP over most of the years in the state,

Table 17: Effectiveness of price support policies and profitability of lentil and gram

Year	Lentil MSP	Gram COP (C2)	MSP- COP	Wholesale Price*	FHP	MSP	FHP-MSP
2010-11	2250	2496	-246		2864	2100	764
2011-12	2800	3025	-225		3359	2800	559
2012-13	2900	2680	220			3000	
2013-14	2950	3877	-927			3100	
2014-15	3075	2539	536	7709**		3175	
2015-16	3325	3621	-296	8689	5511	3425	2086
2016-17	3950			9413	5681	4000	1681
2017-18	4250			7905		4400	
CAGR (%)	7.75					9.19	

Note: *Price indicates average of 12 months (January-December) of respective year. **average of September-December 2014.

Source: MSP and CoP data from CACP, Govt. of India, Wholesale price data from https://agmarknet.gov.in/PriceTrends/SA_Pri_MonthRep.aspx

therefore wheat procurement in the estate was not needed, hence not active. Growing wheat in the state has cost disadvantage and mostly it is grown in small scale mainly for home consumption. Potato is the most profitable crop in the state in terms of profitability and most of years FHP remained well above the COP (Table 16). In addition, during fall in prices of potato at harvest time Government of West Bengal also became active through announcing minimum procurement price (MPP) of potato to ensure remunerative price to the farmers. Such quick and short term market intervention scheme initiative was observed to be effective in potato marketing in the estate. Maize prices in the state remained favourable for growing this crop with 5.39% increase in wholesale price during 2011-2017. Pulse (Lentil and Gram) production in the state has remained deficit to supply and therefore FHP mostly remained above the COP, providing good return to the farmers (Table 17). As the market prices remained well above the MSP, there was no active procurement by the state Govt., so far.

8.1. Impact of revised MSP on paddy procurement in West Bengal

The Government of India approved new minimum support price (MSP) on 4 July 2018 by adopting revised calculation method, taking into consideration of cost of cultivation as A2+FL cost multiplied by 1.5 times. This includes cost of seed, labour (human, animal and machine), fertiliser, manure, insecticides and other miscellaneous costs which is denoted as A2 and add to it the family labour (FL). The revised MSP became effective from the year 2018-19. Although Government claimed that the new calculation has been adopted following recommendations of Swaminathan Commission (1.5 times of the cost of production), however, different farmers' organisations demanded additional cost component to include, cost on imputed rent and interest on owned land to A2+FL for calculating the cost of cultivation. So the final cost of cultivation would be $C2 = A2 + FL + \text{cost imputed on rent and interest on owned land}$ and MSP be calculated as 1.5 times C2.

Table 18: Minimum support price and procurement of paddy in West Bengal during last five years

Year	MSP (₹ q-1)		Procurement (Lakh t) as per State website	Procurement (Lakh t) as per DoF&PD	Production (Lakh t)	% of State's Production
	Common Paddy	Grade A				
Before revision of MSP (C2)						
2015-16	1410	1450	38.59	15.68 (24.80)	159.54	9.83 (15.54)
2016-17	1470	1510	NA	19.23 (25.00)	153.03	12.57 (16.34)
2017-18	1550	1590	32.02	16.73 (27.00)	149.67	11.18 (18.04)
After revision of MSP (A2+FL)*1.5						
2018-19	1750	1770	38.97	19.79 (31.00)	162.42	12.18 (19.09)
2019-20	1815	1835	42.16	14.99 (26.00)*	156.75	9.56 (16.59)*

Source: 1. Procurement data from Govt. of West Bengal (<https://procurement.wbfood.in/>); and Dept. of Food and Public Distribution (DoF&PD), Govt. of India (<https://dfpd.gov.in/writereaddata/Portal/Magazine/procurementfiguresMay2020.pdf>), *pertains to data up to 21/05/2020), 2. Figure in parenthesis shows target quantity of procurement during 2019-20; 3. MSP data from Commission for Agricultural Costs and Prices (CACP) (<https://cacp.dacnet.nic.in/ViewContents.aspx?Input=1&PageId=36&KeyId=0>).

To analyse the effectiveness of the new MSP for rice (procurement was not active for other food crops) in West Bengal, the status on production and procurement of rice, before and after 2017-18, was compared (Table 18). The procurement by Department of Food and public Distribution indicated, there was gradual increase in procurement of rice in West Bengal, from 11.18 lakh t to 12.18 lakh t during 2017-18 to 2018-19. But in 2016-17 the state also procured 12.57 lakh t of rice. Information as per the website of West Bengal State clearly indicated steep increase in procurement of rice, from 32.02 lakh t in 2017-18 to 38.97 lakh t in 2018-19 and further increased to 42.16 lakh t in 2019-20. The state become very active in procurement during recent years (after 2017) and also more and more farmers (from 4.64 lakh farmers in 2017-18, 12.91 lakh farmers in 2018-19 and 13.55 lakh farmers in 2019-20) are being registered in the procurement process. This active participation of farmers in the rice procurement by the state was due to price incentive offered by the increased MSP (new MSP). However, fall in price of rice in the open market might have also induced the increased participation of farmers in rice procurement in the state. The procurement data provided by central and state sources were not well synchronised, calls for attention.

8.2. Reforms in agricultural marketing and likely implications

Agricultural policy reforms are integral part for ensuring overall economic development in the country. During past decades several key policy changes was implemented (Table 19), however there was a need to bring bigger reforms for attracting private investment in agricultural marketing, particularly in view of the taking advantages for the sector under economic liberalization. In 2020, Govt. of India has enacted three key reforms in agriculture and these were (1) The Essential Commodities (Amendment) Ordinance 2020; (2) The Farming Produce Trade and Commerce (Promotion and Facilitation) Ordinance, 2020 and (3) The Farmers (Empowerment and Protection) Agreement on Price Assurance and Farm Services Ordinance, 2020 (Govt. of India, 2020). The policy changes brought into these reforms were to removal of restrictions on hoardings of agricultural commodities unless

emergencies, promotion of free trade inter and intra state and providing enabling environment or legal framework for contract farming in the country. Key expectations from these bills are to create and promote agricultural marketing in the country as one India one market through free trading by removal of APMC monopoly and encouraging competition through multiple buyers for better price discovery of agricultural produce and finally increasing the farmers' income.

Although, the farm reform bills passed recently were long awaited for Indian farmers – since economic reforms initiated in 1991, however, it triggered intense debate and erupted nationwide protest from farmers across the country as soon as these were passed in the parliament. Key reasons for such protest as perceived by the farmers were mainly attributed to possible implications bills on discontinuation of government support prices for crops and non-functioning of APMC mandis in future. However, possibly in contrary to the apprehensions and ongoing criticism that functioning of APMC yard will be defunct in near future, the bill may actually activate the APMC mandi more with reduced charges and more private participation. Buyers might prefer to use the existing infrastructure than to create by them to avoid huge cost on infrastructure building. More volume of agricultural commodities could be handled through organized supply chain that would provide more revenue to respective state

Figure 19. Key policy reforms in agricultural marketing in India

Marketing Act/Initiatives	Time	Key purpose	Remarks
Agricultural Produce Marketing Committee (APMC) Act	1950	Fair price to farmers, reliable information, trust in stakeholders, reduce risk and uncertainties	Created kind of monopoly due to regulated market, hindered development of alternative competitive market
Model Agricultural Produce Marketing (Development & Regulation) Act	2003	Removal of multiple licensing, stock limits, movement restrictions, provision of private markets, direct marketing, contract farming	Adoption was not uniform across states, entry barrier for private investment still persists and lack competitiveness
National Agriculture Market (e-NAM)	2016	Creation of unified national market for free from barrier, FDI in food products and manufacturing	Infrastructural impediments like road connectivity, storage availability, capacity to handle large volume
Model Agricultural Produce & Livestock Marketing (Promotion & Facilitation) Act	2017	Setting up private wholesale and farmer consumer market yards, enhance competition among different markets and players for the farmer's produce	To replace APMC (Act) 2003. Still not free – only authorized trader and commission agents are allowed for procurement and distribution, multiple fees
The Farming Produce Trade and Commerce (Promotion and Facilitation)(Ordinance)	2020	Creation of 'One-Nation-One-Market', selling agri-produce outside the APMC yards or their districts, towards free market	Needs to be complemented by creation of enabling environment through infrastructure and logistics supports

Source: Compiled by authors from various government published sources

government. So, the role of the state government needs would be to facilitate easy trading and allowing more and more volume of agri-commodities to be traded by utilising the existing infrastructure already available. One way to do so is to rationalise the market fees. The state like West Bengal (having large number of small and marginal farmers) where direct purchase from farmers has been allowed since 2014, may get more advantages through increased participation of market players. Already created infrastructure can be utilised more efficiently as the hub for active trading which remains underutilized often. Successful implementation of these Acts is expected to address key profitability challenges in making Indian agriculture more remunerative and competitive (Srivastava and Saxena, 2021). Current bill would facilitate the trade in larger perspectives and not interfering into the power of state government as the trade and commerce was already included in the union list. Given the situation arise; the respective state governments can take their own decision related to agriculture sector to the best interest of the farmers.

One most important concern is articulated after implementation of these bills was possible monopolisation of agricultural market by few private market players. India is a country with 1.30 billion of consumers and consuming production from 200 million of producer (farmers) and agricultural marketing acts as almost perfect competition situation in which it is near impossible to control all producers by a few market players. The spread of production of any crop is so extensive and diverse, it is impossible to control the entire volume of production by a single firm. There will be always space for others and best interest of the farmers can be identified through the process – leading to better price discovery. Government has ensured minimum support price (MSP) will continue to remain as such. Several articles have already indicated that MSP is not so effective to enhance the farmers' income across the states for all crops (actually only 23 crops have MSP currently). For, example potato in West Bengal has no MSP but most remunerative crop when we compare over the year farm harvest price (FHP) and cost of production (COP). MSP on paddy and jute have mixed impact as we can see from the comparisons of FHP, COP and MSP over the years. MSP is needed to continue to ensure the floor prices of the agri-commodities whenever the price in open market will fall below MSP – this will be activated, and it will remain still active. In fact agri-market reforms need to go beyond MSP – covering more number of crops under such administered prices which might be activated for short period of time as and when need arise to ensure remunerative prices to the farmers. We need more policy towards like Minimum Procurement Price as Quick Response Policy from the Govt. institutions. These bills are few steps way forward but many things yet to be done. Agricultural marketing policy reforms are likely to connect all farmers (including small and marginal) and likely to facilitate investment in storage, processing and value addition of agricultural produce. Overall, these bills have the potential to create better/favourable marketing environment for farmers in the country.

9. Farmers distress? Case of potato marketing

Beginning of the year 2015, there was a series of shocking media reports on 'unnatural' death of farmers in Bengal (Banerjee, 2015; Acharya, 2015; Firstpost, 2015; and The Indian Express, 2017). Most of these incidents were assumed to be linked with falling potato price due to excess production and thereby distress selling of potato or no takers immediately after harvest. Although potato provides good return to the farmers, however, due to high price fluctuations the profitability was not always ensured. Very often the fallen price of potato during harvesting time failed to cover even the cost of cultivation and therefore, distress situation occurred in the potato marketing. As a result farmers are under acute pressure and many a times succumbed to the distress situation. Even though it is a quite debatable to understand the real cause, but one cannot undermine the fact that the farmers' were in distress and needed collective actions to avoid such incidents in future. In normal years, West Bengal produces around 100 lakh t of potato. Among which, nearly 55-60% could be stored in existing cold storages available in the state. The surplus production amount was around 40 to 45 lakh t (Mandal et al, 2018). During December - May, people in West Bengal consumed around 10-20% of total production in every year that were made available in the market directly from field (no storage required). Rest of the production either exported to neighboring states through roadways (2 points in South Bengal and 1 point in North Bengal) and also through railways. Keeping into consideration that an adult could consume 100g of potato/day, the requirement for West Bengal was around 30-35 lakh t year⁻¹ as table purpose. Besides, 5-6 lakh t were kept for seed purpose for growing in the next season. Although majority of the farmers preferred to buy seed potato from the open market before the growing season as the storage conditions were not good at households level. In many cases, farmers also preferred to sell the seed potato during later part of the year if the prevailing market price rose high. Therefore, remaining 60-65 lakh t of potato needed to export to other states of India or abroad countries to make the full utilisation of produced potato in a given year. It is evident that the flow of potato to outside market also affects the price of potato in West Bengal. The year in which there was good flow of potato to outside of West Bengal markets, price of potato in Bengal increases and farmers receive good return and vice versa. During some years, due to good production in the other states caused the drastic fall of the price and resulted the distress selling in Bengal because of the insufficient cold storage infrastructure in the state.

9.1. Causes of distress in potato marketing in West Bengal

- Existing marketing options have limited alternatives, manipulation by middlemen and lack strategies for wider market expansion, particularly during surplus production, made the potato cultivation in the state risky during high production years.
- Uncertainty in price be it less production due to pest and diseases attack or over production due to favourable weather condition.

- Escalating input prices coupled with high degree of instability of market prices; farmers failed to recover the cost of cultivation
- Contract farming though offered assured price but was not a complete alternative to mitigate the distress situation.
- Contracting organisations procured potato of specific qualities (size and shape) after suitable sorting and grading but farmers produced the same in varying quality and often needed to depend on open market for its disposal.
- Falling price of potato affected their livelihoods drastically and they were forced to avail loan from local moneylender in exchange their valuables or land mortgage.
- There was lack of market integration and imperfect market situation across different markets.
- Once potato stored in the cold storages, the stock was under the absolute control of cold-storage owner.

9.2. Interventions suggested for potato marketing management

- Need fair competition from market to market with well integration. Information on quantity available should be available to all traders and online system might be a good option for trading; Farmers needed to be educated to grow different varieties of potato as demands were varying by consumers when used table or processing purpose;
- Proper market supervision was required to check malpractices by the large traders because once the potato was in cold storage, the market was controlled by the storage owners;
- Farmers needed to encourage to avail the benefits of crop insurance schemes available;
- Contract farming although provided assured price but was not full-proof measure/alternative to manage the distress. There should be written or formal agreement for contract to make the system more transparent and fair;
- Transparency of potato price determination centralised information about market arrival was essential and promotion of e-auction would be more efficient way for price discovery.
- Potato to be remunerative needed farm gate price of 6kg⁻¹ and above at harvesting time and gradual increase up to 18-20 kg⁻¹ before next harvest to cover the cold storage cost, sustaining business for the traders and normal consumption demand.

9.3. Market Interventions Schemes for potato – minimum procurement price

The Market Intervention Scheme (MIS) is an ad-hoc price support mechanism that includes horticultural commodities and other perishable agricultural commodities normally not covered under the minimum price support scheme. In order to protect the growers of these

horticultural/agricultural commodities from making distress sale in the event of bumper crop during the peak arrival period when prices fall to very low level, state government implements such interventions (MIS). This quick market intervention schemes in potato marketing helped better marketing of potato in the state in terms of reducing the price shock to the farmers, reduced mal-practices by traders (cartel) during harvest season and also stabilization potato prices. Government interventions (during 2017) immediately had positive impact on market and potato prices could have been protected from free fall during harvesting time.

During 2017, in a bid to arrest the slide in potato prices, the West Bengal government had announced (March 14, 2017) a minimum procurement price (MPP) of 4.60 kg⁻¹ which was 30% higher than the prevailing open market price at that time. The state department targeted to procure 28000 t of potato in every subsequent month directly from the farmers and supplying those to state run mid-day meal schemes and anganwadi centers. The move was initiated to offset the downward movement of tuber prices in the state due to higher potato production. With favourable climatic conditions and higher yield, potato production in Bengal was expected to touch 110 lakh t in 2017-18. The implications of this MIS was immediately realised favourably for the farmers in terms of availability of increased farm-gate price of potato in the state. For example, after witnessing a prolonged period (since December 2016) of dip in price of the most dominant potato variety (Jyoti) in the state, was hovering around 3.30–3.60 kg⁻¹ at farm-gate and 4.20 kg⁻¹ at cold storage end. During a month back (mid-February) the same potato prices were hovering in much lower level between 2.60 and 2.80 kg⁻¹ at the farm-gate and 3.00 kg⁻¹ at the cold storage end. The state faced a similar situation last year also, with lower demand from neighbouring states and increased volume of stock. The government had then procured the tuber at 5.00 kg⁻¹ to address the downward movement of potato price (particularly during harvesting months) and the procurement was withdrawn as soon as potato price in the open market started rising. Such short term and quick response policy through MIS initiatives was effective to ensure better prices to the farmers. Meanwhile, the state government had also decided to facilitate farmers in case they look at transporting potato to other states (The Hindu, 2017).

Government of West Bengal also announced West Bengal Potato Procurement Scheme in 2019, due to high production of potatoes in the State that decreased the farm gate prices drastically. The farm gate prices were reported to be lesser than even the cost of production and it was apprehended that after peak harvesting in the month of March (2019), farm gate prices might further decline resulting in severe distress to the farmers. The MIS scheme was implemented only in the main potato growing districts of the State, viz. Howrah, Hooghly, Purbo Bardhaman, Paschim Medinipur, Bankura, Birbhum, Murshidabad, Coochbehar, Jalpaiguri, Alipurduar and Uttar Dinajpur Districts. Considering cost of cultivation of potato in 2018-19 crop season and a minimal premium to the farmers a price of 5.50 kg⁻¹ was declared as the minimum procurement price (MPP) to be paid to the farmers. The declared MPP was the price for ready to store potatoes from the farmers at cold storage gate,

following the operating procedure laid down by West Bengal State Marketing Board. The MPP included bags transportation cost up to the cold storage gate and other incidental costs incurred by the farmers. Maximum quantity of procurement was targeted to be 15% of total cold storage capacity (10 lakh t). The Director of Agricultural Marketing, Government of West Bengal was nodal official for guiding the procurement and sell of potato in the state through this scheme. Such intervention was found to be quite effective to reduce the distress selling of potato in the state at harvesting time, ensuring remunerative price to the farmers and also stabilising the open market prices.

10. Farmer Producer Company in West Bengal

10.1. Status of formation of FPCs in India vis-a-vis West Bengal

Small Farmers' Agribusiness Consortium (SFAC), a Society promoted by Dept. of Agriculture, Govt. of India, nominated by Ministry of Agriculture act as a nodal agency for promotion of farmer producer companies. SFAC coordinates with various State governments, civil society partners, private sector, financial institutions, resource persons and other stakeholders, help in the conduct of baseline studies, promote FPOs/ FPCs across the country and linking producer groups (both existing ones and newly formed institutions) to marketing opportunities. Main emphasis of the initiative was to collectivize farmers, especially small producers, at various levels across several states, to foster technology penetration, improve productivity, enable improved access to inputs and services and increase farmer incomes, thereby strengthening their sustainable agriculture based livelihoods. As of 28 February 2020, a total of 892 numbers of FPOs was registered with SFAC and 18 numbers of FPOs were under process of registration covering 29 states of India. Altogether 878656 farmers have been mobilised and 22751 farmers were under process of mobilisation.

In West Bengal, so far 89 FPOs (10 percent of the country) have been formed and 90500 farmers (11 percent of the country) have been mobilised through the FPOs (SFAC, 2020). The FPOs were formed in every state through the help of empanelled Resource Institutions (RIs) as identified by the SFAC. Formation of FPOs in West Bengal was still at nascent stage. Four RIs, Access Development Services (ADS), BASIX Krishi Samruddi Ltd, CTRAN Consulting Ltd and Indian Grameen Services (IGS) has been empanelled by the SFAC for promotion of FPOs in West Bengal. BASIX Krishi Samruddi Ltd has so far mobilised 21912 farmers, formed 20 FPOs and 4767400 has mobilised as share capital (Basixkrishi, 2018). Most of the FPOs (over 90 per cent) in West Bengal has been formed for the purpose of marketing of vegetables (potato, capsicum, chilli, cabbage, cauliflower, tomato, bitter gourd, leafy vegetables, brinjal, okra, cucumber, green banana, onion etc) and rest (10 percent) were handling commodities like paddy, wheat, jute, maize, pulses (moong, lentil, black gram etc), oilseeds (sesame, mustard, lentil, groundnut etc), spices (turmeric, ginger etc), sugarcane, water melon, tea, fish, lac and few animals (goat, pig etc). Uttar Dinajpur district was accounted for possession of maximum number (12) of FPOs among the districts of west

Bengal, followed by Birbhum (8), South 24 Parganas (8), Paschim Midnapur (6), Purulia (5), Bankura (4), Hooghly (4), Coochbehar (3), Murshidabad (3), Nadia (3), Purba Bardhaman (3), Howrah (2), North 24 Parganas (2), Darjeeling (1), Jalpaiguri (1), Malda (1), Purba Midnapur (1) and Kalimpong (1).

Bhangar Vegetables Producer Company Ltd, located at Bhangor-II block in South 24 Parganas district was one among the early FPOs formed on 28 September 2012 was continuing its business successfully since five years and became role model for other FPOs in the state. With 1750 members in the company, the initiative has turned farmers into entrepreneur. All farmers in the company were shareholders and the model was to buy the produce exclusively from the FPO-member farmers and selling through its own outlets in Kolkata as well as by state-run agencies like Sufal Bangla. A part of the produce was also exported through private agencies (Majumdar, 2017). After establishing successful market linkages, the company now turned to grow high value crops like broccoli, lettuce or banana by using high-tech technologies (e.g., poly-house) which was helping to protect their crops, producing quality vegetables as the export market demands. Such initiative has increased the farmers capability to invest more into their farming business, facilitates availing benefits of different govt. schemes (like subsidy), buying farm-implements and inputs. Peri-urban location (vicinity to Kolkata) of the company was one of the key driver of success for this initiative that facilitate easy market-linkages and easy disposal of the produce.

10.2. Challenges to functioning of Farmer Producer Companies

Association with FPCs provided incentives to farmers through better market linkages and increased the confidence level in farmers to grow high value cash crops such as vegetables, flowers and fruits. However, although FPCs had established good market linkages, some had successfully developed linkages with Sufal Bangla and other organized retailers, however very often it was seen that FPC farmers had to depend on the open market to dispose the marketable surplus as they were not able to sell the entire volume of their produce through the marketing channels developed/linked by the FPCs. In general, it was observed, FPCs successfully connected small and marginal farmers with the banks and others cooperative society (institutional sources of credit), as a result farmers were active in regular transaction of money with the banks. Common challenges of FPCs were time involvement to organise producers, keeping them actively interested through incentivizing the association with FPCs, increasing capacity of staffs and board members and providing extension services to the farmers with limited staffs. FPCs needed to be supported with financial capitals for developing infrastructure to collecting, processing, value addition and marketing of produce. Banking institutions, Govt. schemes or NABARD were ready to provide finance at a lower cost to FPCs but often the FPCs and members were incapable to develop suitable business plan to utilise these available resources. Overall, formation and functioning of FPCs has been more successful in establishing backward linkages, buying inputs, availing credit facilities from institutional sources etc., rather than making successful forward linkages like disposal of agricultural produce in large volume.

Formation of FPCs should be promoted in different parts of the state to enhance farmers' income; it has potential to include large number of small and marginal farmers and can bring grassroots level change in the society. In general, capital acquisition was a challenge for FPCs as their capital was not as large as that of a corporation and member contribution to paid-up capital was limited (Dey, 2018).

11. Production, marketing and exports of organic produce in West Bengal

India is home to 30 per cent of the total organic producers in the world, but accounts for just 2.59 per cent (1.5 million hectares) of the total organic cultivation area of 57.8 million hectares (Lernound and Willer, 2018). In 2019-20, the area under organic cultivation (certified organic plus in-conversion) in India was 2.30 million ha (3.67 million ha including area under wild harvest) and produced 2.71 million t of organic commodities (2.75 million t including wild harvest). In 2019-20, West Bengal had 6392 ha (0.17% of India) of area under organic cultivation and produced 18557 t of organic commodities (0.68% of India) (Table 20 & 21). During 2018, West Bengal contributed to cereals, millets and plantations crops (5.63 %) to the export of organic products from India (Table 22) and

Table 20: Area under organic cultivation in West Bengal

Year	Area under certified (wild harvest + cultivated)		
	West Bengal (ha)	India (ha)	% share of WB to India
2013-14	2096	4719816	0.04
2014-15	16267	4893851	0.33
2015-16	17890	5710384	0.31
2016-17	5176	4452987	0.12
2017-18	5811	3566538	0.16
2018-19	20990	3428639	0.61
2019-20	6392	3669801	0.17

Source: Agricultural and Processed Food Products Export Development Authority/APEDA (www.apeda.gov.in). Download on 05/04/2021.

Table 21: Area and production of organic crops in West Bengal

Types	Area (ha)			Production (t)		
	West Bengal	India	% Share of WB to India	West Bengal	India	% Share of WB to total
Organic farm (certified)	5255	1334531	0.39	18557	2672232	0.69
Organic farm (in conversion)	1137	964691	0.12	0	36887	0.00
Organic farm (certified + in conversion)	6392	2299222	0.28	18557	2709120	0.68
Wild harvest	0	1370597	0.00	0	36752	0.00
Total (certified+ in conversion+ wild harvest)	6392	3669819	0.17	18557	2745872	0.68

Source: Agricultural and Processed Food Products Export Development Authority/APEDA (www.apeda.gov.in). Download on 05/04/2021. Data pertains to the year 2019-20.

Table 22: Category wise production and value of exports of organic crops

Category	West Bengal	India	% Share of WB to India
Cereals & Millets (t)	1149	284315	0.40
Plantation Crops (t)	9056	43707	20.72
Total production (t)	10205	1664549	0.61
Export Quantity (t)	3740	458339	0.82
Share of export to production (%)	36.65	27.54	-
Export value (₹ lakh)	19429	345348	5.63

Source: Agricultural and Processed Food Products Export Development Authority/APEDA (www.apeda.gov.in). Download on 20/08/2019.

the state has potential to contribute in many other high value crops also including vegetables. Around 37% of organic production from West Bengal is exported to different countries through APEDA and rest (63%) is being consumed at domestic market. At national level 28% is exported to abroad and 72% is consumed at domestic market. This indicated organic produce has good demand not only in the export market but the demand is also increasing in the domestic market. West Bengal has good potential to increase the organic production particularly pulses, non-basmati aromatic rice, spices and vegetables. As the market for organic produce at global level is increasing rapidly, more area can be promoted under such production system in the state.

12. Organised retailer in West Bengal

The IBEF report highlighted that the “Indian retail industry is one of the fastest growing in the world. Retail industry, expected to reach ₹. 76.87 lakh crore (US\$ 1.1 trillion) by 2020 and India ranked 63 in the World Bank's Doing Business 2020 publication. India ranked 73 in the United Nations Conference on Trade and Development's Business-to-Consumer (B2C) E-commerce Index 2019. India's direct selling industry recorded sales of US\$ 2.47 billion in 2019, improving its rank to 15 from 19 a year before. Consumer spending in India increased to US\$ 245.16 billion in the third quarter of 2020 from US\$ 192.94 billion in the second quarter of 2020” (IBEF, 2020).

12.1. Corporate market players and functioning in West Bengal

Metro Cash and Carry, Food Bazaar (Future Group), Reliance retail and Spencer's retail market area the major organised retailer in the state. Following are the major observations on status and functioning of the organized retail marketing in West Bengal-

- Fruits and vegetables marketed through the organized retail chain accounts for less than 0.5 percent or even less. Thus, less likely to have any impact on the traditional agricultural marketing so far, particularly for fresh fruits and vegetables.
- In case of retail marketing for staple commodities such as pulses and branded rice, edible oil etc. are growing rapidly and accounted for nearly 10 percent of the total volume of transaction. The retail-marketing share of the processed and value added foods and staple foods are rapidly increasing. Increase in quantity of value added product through

establishing more number of food processing unit are essential to increase the marketing efficiency in the state. The organized retail marketing systems are ready for large scale investment in food processing and value addition in the state once the socio-political bottlenecks are sorted out.

- Currently fruits and vegetables are procured through various collection centers where farmers (or middlemen in disguise of farmers) used to bring their produce in every morning. Primary grading and standardization are done by the farmers (or middlemen in disguise of farmers), who are already informed about the preferred quality, size and shape of the commodities.
- The 'price discovery' depends on the present day market price. Farmers were informed the 'best' price (actually prevailing wholesale market prices) of their commodities on satisfaction of the quality of produce.
- Price determination may also be done based on the cost-price model or minimum base price model subject to availability of adequate information of cost of cultivation of crops. Organised retailers are ready to pay minimum remunerative price to the farmers based on the actual cost of cultivation as government may fix. The minimum price of the commodities (through Market Intervention Scheme) may be prescribed and organized retail marketers are ready to accept the price to make the marketing a win-win-win situation for all i.e., farmers-retailer-consumer.
- Profit margins retained for fruits and vegetables commodities depend on degree of perishability. More is the perishability more is the profit margin kept. For example, higher margins are kept for leafy vegetables rather than potato as the leafy vegetables are more perishable than potato.
- Average margin kept for fruits and vegetables was around 20-25 percent implying that if the retailers are allowed to procure vegetables freely from farmers (or if they can procure) more margins can be transferred to the farmers.
- For leafy vegetables margins are over 30 percent
- For staple food margins are around 10 percent
- Successful marketing model should offer *Best Price, Insurance Cover, Making availability of technical know how*
- Major problem/bottleneck of the organized retail business was non-implementation of APMC Act uniformly across the states. Presently separate license was required for every district for procurement of fruits and vegetables. And also very often they find it difficult to procure commodities from open market freely. Free and fair access to these commodities would likely to make retailing business more competitive and efficient.
- The biggest problem is the price discovery or price determination of the fresh fruits and

vegetables in the market. Usually they rely on the previous days prices are offered for procuring these commodities.

- Organised retail marketers accept only the certain quality produce. Once farmers or middlemen are aware of the quality they do not bring the inferior quality of produce. But rest of the production must be sold in other markets therefore; farmers have to visit multiple markets in same day – which is a constraint for them.
- Farmers himself cannot come to the collection centers everyday as they are producing very small quantity – therefore they need to depend on the middleman/ fariah again.

12.2. Possible implications and issues of corporate entry into agri-retailing

Organized retail marketing channels are more efficient particularly in terms of post-harvest handling of produce as compared to the traditional marketing system. The organized retailers were offering better quality of commodities to the consumer almost at same price as other retailers are offering. Under the traditional marketing system, the traders often added (on dipped produce into) artificial colour or additives to the commodities to increase keeping quality and make it attractive, glossy to fetch higher retail price. But these additives were very often not safe for health and also become barrier for exports. This calls for enforcement of stringent regulation in food safety and food quality in the state. Organised retailers were handling these produce in a better way through the cool-chain system and the quality of the produce were expected to be more safe and healthy. The expectation from corporate retailers was to provide quality produce at competitive price and also to provide better prices to farmers. But these marketing channels were likely to have some implications on all levels of market functionaries, which need to be looked into carefully, such as -

- Organised retail marketers are sourcing the produce from various collection centers. Mostly traders/ middleman bring the produce at this collection centers. Farmers who are producing commodities at a small-scale hardly can take advantage to sell directly to these retailers. Therefore, middlemen on disguise of farmers sell the produce to the retailer and enjoy the margin as like in traditional marketing system. Unless the retail marketers will be allowed to purchase directly from the farmers (presently not happening due to various interferences) or farmers are organized (e.g., farmer producer organization) and made capable of selling their produce at larger volume to these organized retailer, the producers price on consumer rupee would not be improved significantly.
- In West Bengal almost all the producers are small-scale producer and fragmented. In one hand the retail marketers are becoming consolidated and looking for the bulk procurement but the producers are becoming further fragmented, making the non-level playing situation. Thus it is apprehended that as the investment in these organized retail chain would be increasing, they would have more control on agricultural trading. The small-scale producers might further lose their bargaining power or the marginal producers might be excluded from the advantage derived from the organized retail

marketing system.

- Entry of organized retailer in large scale would likely to displace large number of traders and retailers. Under West Bengal condition, large amount of unemployed persons are involved in this unorganized employment sector. Alternative employment opportunities must be created for this large number of displaced people to avoid social tension. In presence of these active middlemen and burgeoning retail investment in the agricultural commodity there may not be any real benefit to the producers' particularly.
- The biggest advantage (as argued) of organized retail marketing is likely to be the reduction of large number of middlemen and reducing the marketing margins so to provide lower price to consumer and better price to farmers. However, the most important issue is whether the benefit of elimination of middlemen would be passed on to the producers proportionately or only the retailer would enjoy the larger share of benefit. To ensure the distribution of benefits, besides providing free and fair business environment to organized retailers, also strong regulation needs to be enforced to safeguard interest of all key stakeholders. Most importantly more number of agri-retailers has to be operative in the market so that market control should not be in the hands of only few organized retailers.
- Organised retailers procure the commodities of specific qualities after suitable sorting and grading but farmers produce same commodity in varying quality. Therefore, they need to depend on other marketing channels to dispose their rest amount of produce. Also, retailers would have special interest on purchasing in bulk quantity, favouring the large producers or from some other collectors (or middlemen).
- Corporate retail of agricultural marketing might be best suitable for large farmers, farmers with large investment capacity and endowed with adequate capital adequacy. But the marginal farmers are constrained with all types of resources including financial capital, thus unless their production capacity increases through creation of producer organisations/ farmers' group, they might be again left out.
- Organised retailer might offer predatory pricing (setting unusually low price to eliminate competitors for certain period of time) to attract the consumer to eliminate the competitions or other small-scale retailers from the market. Once the market control is established the cost of predatory pricing may be passed on to the producers and they may offer below-cost pricing to the producer. For this there is again need of strong regulation and implementation of market intervention schemes as and when needed by the government to eliminate exploitation.
- Organised retail marketing would be successful model with win-win-win situation for all (producer-retailer-consumer) if free and fair marketing system is promoted through implementation of amended APMC Act or with suitable regulation by the government. Possibly recent (2020) agricultural market reforms acts enacted by the government might

have possible way out to address these issues. Besides, investment capacity of the marginal farmers needed to be increased through increased access to financial resources and reducing input cost of production facilitating bulk purchase by farmers' groups. To facilitate small and marginal farmers in the state, the farmers or growers association must be formed to take advantage from these organized retail marketing and to reduce the functioning of middlemen.

13. Climate change issues and adaptations challenges

Changing distribution pattern of rainfall and rising temperature are likely to be the major climate change factor affecting the agricultural production systems in West Bengal. Studies revealed, spatial and temporal climate change especially 1990 onward showing increase in percentage of dry years in Gangetic West Bengal (75% to 97%) despite increase in rainfall during 2001 - 2016. Even southern districts of Sub-Himalayan West Bengal showed increase in dry year's percentage (69% to 84%). This is serious condition from agricultural as well as water resources planning point of view (Nandargi and Barman, 2018). Overall the state is likely to suffer from increasing trend in temperature and mixed trend in rainfall precipitation. The distribution and amount of June-September rainfall might vary significantly across the districts in West Bengal. Besides, extreme event like '*kaal baishakhi*', increase in pre-monsoon rainfall and also the number of draught events could be more in the coming decades. Bhattacharya and Panda (2013) analysed rainfall and temperature data (1977-2007) and revealed that the rice grain yield increased an average of 0.35 kg ha⁻¹ with one millimeter increase in rainfall and decreased by 156 kg ha⁻¹ for a degree of rise in temperature in part of West Bengal.

Weather variation rather than climate change impact are likely to be more affecting to the agricultural productions systems. Change in cropping pattern and adoption of multiple stresses (cold, heat or submergence) tolerant crop varieties for rice, wheat, maize, pulses and potato will be needed for adaptations to the climate change. For example, potato production system in West Bengal is dominated mainly by three varieties, *kufri jyoti* (59 % area), *kufri pukhraj* (19% area) and *kufri chandramukhi* (8% area), which have medium to high draught tolerance but sensitive to heat (Pradel *et al.*, 2019). Depending on the change scenarios, West Bengal may need to focus on early maturity, heat and drought tolerant potato varieties in future. There is a need for further research on climate change impact on all food crops grown in the state to enable decision making on suitable adaptation measures to be undertaken.

14. Transforming agriculture to agribusiness in West Bengal

Agriculture in West Bengal is primarily characterised with supply push nature of production. There was a need to transform the smallholder farming operation to self-reliant framing business through promotion and development of sustainable value chain for agricultural commodities. As per FAO (FAO 2013) there are many definitions of the value chain concept in the literature. Two main types of definitions can be distinguished,

depending on whether the author is using a descriptive/structural approach (what a value chain is) or a normative/strategic approach (how a value chain should be). Strategic definition corresponds best to the central question of the practitioner: which policy/project/program strategies needed to be adopted in order to develop a particular value chain in a particular country/region? In other words, beyond its analytical use in providing a detailed description, the value chain as a strategic concept. Based on a review of the literature, which generated over 30 different definitions of the value chain concept, a sustainable food value chain is defined as, “the full range of farms and firms and their successive coordinated value-adding activities that produce particular raw agricultural materials and transform them into particular food products that are sold to final consumers and disposed after use, in a manner that is profitable throughout, has broad-based benefits for society, and does not permanently deplete natural resources”.

Traditional marketing chain analysis is different from the sustainable food value chain analysis in many aspects. For example, in traditional analysis information sharing is very little or none whereas in value chain analysis, it is quite extensive. Primary focus under traditional analysis is cost/prices but value/quality in case of sustainable food value chain analysis (Table 23). Value chain analysis is demand-pull as the consumers demand for differentiated products and various actors in the entire chain is interdependent. The value chain analysis encompasses the role and function of different key players in the entire chain such as consumers, distributors, processors, farmers and finally environment from which the products are being produced. Sustainability of the chain is dependent on each one of the actors and adding value to the products. Supply chain is known as the integration of all the activities, persons, and business through which a product is transferred from one place to another but value chain refers to a chain of activities that engaged in adding value to the product in every single step till it reaches the final consumer. The supply chain is operational management, whereas value chain is a business management. Supply chain activities are transfer of material from one place to another, whereas value chains add value for price to product or service. The order of supply chain begins with product request and ends when it reaches the customer, unlike value chain, which begins with the customer's request and ends with the product. The major objective of the supply chain is to gain complete customer satisfaction which is not with the case of the value chain ([https:// keydifferences.com](https://keydifferences.com)).

The sustainable food value chain framework (SFVC) is built around the core value chain which relates to the value chain actors, i.e., those who produce or procure from the upstream level, add value to the product, and then sell it on to the next level. Value chain actors are mostly private sector enterprises, but can include public sector organizations such as institutional buyers (e.g., food reserve agencies, emergency food buyers such as the World Food Program, the military). Actors at a given level of the chain are heterogeneous, with types of actors that are distinct in terms of size, technology, goals, etc., linking through different channels to a variety of end-markets. The SFVC development is based on ten key principles covering the broad areas of measuring, understanding and improving the

performance of the business on particular commodity. These ten principles on which SFVC framework revolves are (1) Economically sustainable (profitable), (2) Socially sustainable (inclusive), (3) Environmentally sustainable (green), (4) Dynamic systems-based, (5) Governance-centered, (6) End-market driven, (7) Targeted, (8) Upgrading focused, (9) Scalable and (10) Multilateral. The concept can be useful for preparing future strategies on some specific high value commodities for business or enabling strategic decision making for commercialization of the agricultural production systems. Some of the areas need to be focused, like the market demand, niche market and marketing channel analysis of non-basmati aromatic rice, organic produce (cereals, pulses or spices) that have consumer demand. Food value chain analysis on such products might be helpful to understand/quantify the consumers' surplus and might explore the possible ways of value addition by each actor involved in the business and making suggestions to make the entire business model sustainable.

Table 23: Comparison of traditional and value chain business relationships

Parameter	Traditional	Value chain
Information sharing	Little or none	Extensive
Primary focus	Cost/price	Value/quality
Orientation	Commodity	Differentiated product
Power relationship	Supply push	Demand pull
Organisation structure	Independent	Interdependent
Philosophy	Self optimisation	Chain optimisation

Source: Demont, 2013 (IRRI Workshop on 'Food Value Chain Analysis: Tools and Applications,' Bangkok, Thailand, 4-8 December 2013)

15. Way forward strategies and policy needs

Agriculture in West Bengal has reached in a stage from which there is a need of transformation of the agricultural production to agribusiness. Agriculture production needs to be supported by secondary agriculture through value addition and product diversification to make the sector more vibrant and pushing to next level of growth trajectory. Key strategies are suggested below towards achieving this goal-

- **Database creation, marketing research for price forecasting, potential market, market intelligence cell:** There is a need to establish a market intelligence cell in the state, may be under West Bengal State Agricultural Marketing Board. The key functions of this unit will be to identify the potential market in domestic and abroad, price forecasting analysis based on real time data, value chain analysis and supply chain management of crops grown in the state.
- **Product diversification strategies:** The state has reached at a stage of production that often market glut situation may arise (particularly for food crops like paddy and potato), in which ensuring remunerative price focusing through production strategy would not

be sufficient to safeguard farmers interest. There is a need to shift from primary to secondary agricultural system such as value addition, product diversification and food processing by attracting private investment.

- **Quick response policy and remunerative price fund:** As the minimum support price is less likely to ensure remunerative price to crops, unless active procurement strategies by the public procurement, short period market interventions schemes would be helpful to better price realisation to farmers. Fixing minimum floor prices for crops based on actual cost of production and quick market interventions would be good option to safeguard farmers' interest particularly during harvest season. Such interventions might be needed only for a short period of time to stop downfall of open market price (e.g., at harvesting time), hence would not create a burden to the government exchequer also. The state govt. may also establish a remunerative price fund for implementing this policy.
- **E-auction for better price discovery:** E-auction for agricultural produce is always beneficial for farmers as the process ensures better price discovery. Online linking of all the markets would facilitate higher market integration, easy sharing of market price information and reduce the mal-practices by the traders. However, to realise higher benefits there is a need to increase the linking roads for easy transportation of produce and storage infrastructure in the state.
- **Corporate entry into agri-retail be allowed:** Corporate entry into the agricultural marketing is inevitable and the issues can be sorted out by shouldering the responsibility by Government as well as corporate sector. Government needs to reform present marketing act in favour of free and fair implementation of Agricultural Produce and Marketing Committee (APMC) Act and simultaneously infusion of Corporate Social Responsibility (CSR) by the private players would improve the marketing conditions of the state as well as would ensure fair price to the farmers. New farm bills enacted in 2020 would facilitate creation of such ecosystem in the agricultural marketing sector in the state.
- **Promotion of ideal marketing model:** A Successful marketing model should have three components like offering best price, insurance coverage and making availability of technical know-how. Government may even propose kind of base-price or floor pricing model for important cash crops for selling of the agri-commodities through market intervention scheme.
- **Promoting production in clusters:** There is a need to delineate the clusters of districts/areas which have favourable resources, climate and socio-economic conditions for growing each of these high value commodities and differentiated strategies can be formulated for triggering the development of the sector. Farmers need to be guided and promoted for selection of specific crops for production.
- **Consolidation of farmers through farmers organisation:** On one hand corporate retailers are consolidating rapidly asking for bulk purchase of agri-commodities, and on

other hand producers are becoming more and more fragmented and producing small quantity of marketable surplus. So farmers needed to be organised to increase their volume of trading which in turn will increase their bargaining power to take advantage of these marketing systems. The development strategy for these sectors, horticulture, livestock and fisheries should encompass focus on improving the production and productivity through technological backstopping from different research institutions and then to be complemented through effective policy changes to ensure better return to the primary producers particularly to the small and marginal holders.

- **Agri-marketing be allowed to handle by professionals:** Developing agri-marketing infrastructure calls for large-scale investment both from public and private players. Public investment is continuing and many have been initiated recently by the Govt. of West Bengal like *Krishak Bazaar*, needs to be complemented by the private investment. Allowing Foreign Direct Investment (FDI) would be a good option towards this. As the markets are being de-regulated across the states and also in the country, larger corporate participation is inevitable – sooner or later. Commodity preference across the varied income groups of people is creating different 'niche' markets and the corporate retailers can meet the demand and expectations of such growing consumers.

Agriculture in West Bengal, India has reached in stage from which there is need of strategies to transform agricultural production to agribusiness – from supply push to demand pull. Agriculture production needs to be supported by secondary agriculture through value addition, food processing and product diversification to make the sector more vibrant and pushing to next level of growth trajectory. Farming in West Bengal needs to be made viable through increasing access to natural resources (land and water) with greater efficiencies; providing single window system of service providers for extension services (technology dissemination, credit, insurance, price etc); reducing farm level agricultural risks (technology, crop diversification, insurance); ensuring better price realization (direct marketing, promotion of highvalue crops, creation of value chain); increased linkages with off-farm income (farm investment linked with non-farm earning) and transforming agriculture to agribusiness through shifting from primary production to secondary agriculture (food processing and value addition). Key expectations from the recently initiated agricultural marketing policy reforms are to create and promote agricultural marketing in the country as one-India-one-market through free trading by removal of APMC monopoly and encouraging competition through multiple buyers for better price discovery of agricultural produce and finally increasing the farmers' income across all states including West Bengal.

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Annexures

Table A1: District-wise area, production, yield status and performance of paddy

Districts	Paddy (2017-18)			CAGR % (2008-09 to 2017-18)		
	Area (ha)	Production (t)	Yield (t ha ⁻¹)	A	P	Y
West Medinipur	569920	1871328	3.28	-1.22	0.83	2.08
Purba Bardhaman	520613	1597429	3.07	-2.56	-1.50	1.09
Birbhum	423813	1376106	3.25	2.36	4.16	1.76
East Medinipur	401033	1130449	2.82	-0.53	1.42	1.96
Bankura	384614	1081485	2.81	1.92	2.33	0.41
South 24 PGS	380352	1000762	2.63	-0.58	1.39	1.98
Murshidabad	367542	1178186	3.21	0.35	2.65	2.29
Purulia	273173	751468	2.75	1.49	2.02	0.52
Coochbehar	273053	745203	2.73	-0.78	3.89	4.70
Hooghly	260371	839674	3.22	-1.49	-0.34	1.17
Nadia	242660	804303	3.31	-0.99	1.00	2.01
Dinajpur Uttar	229129	524008	2.29	-2.19	-1.14	1.06
North 24 PGS	225789	689928	3.06	-1.13	0.29	1.44
Maldah	213933	629947	2.94	-0.55	0.80	1.36
Dinajpur Dakshin	188841	558149	2.96	-0.73	1.41	2.15
Jhargram	184281	517864	2.81			
Jalpaiguri	134337	336412	2.50	-5.24	-1.39	4.06
Howrah	110375	300666	2.72	-0.09	3.66	3.75
Alipurduar	79891	177850	2.23			
Paschima Bardhaman	40617	129826	3.20			
Darjeeling	28270	65583	2.32	-1.41	-1.26	0.15
Kalimpong	4824	9296	1.93			

Source: Directorate of Economics and Statistics, Ministry of Agriculture and Farmers Welfare, Govt. of India (https://eands.dacnet.nic.in/APY_96_To_06.htm) and Crop Production Statistics Information Systems, Govt. of India (https://aps.dac.gov.in/APY/Public_Report1.aspx).

Note: CAGR is calculated by Author.

Table A2: District-wise area, production, yield status and performance of wheat

Districts	Wheat (2017-18)			CAGR% (2008-09 to 2017-18)		
	Area (ha)	Production (t)	Yield (t ha ⁻¹)	A	P	Y
Nadia	35258	113106	3.21	-0.73	2.72	3.48
Birbhum	35116	99698	2.84	-0.40	0.07	0.47
Dinajpur Dakshin	24585	91729	3.73	5.90	7.70	1.70
Dinajpur Uttar	19854	57501	2.90	-0.36	-0.47	-0.12
Maldah	9684	31463	3.25	-7.49	-6.65	0.91
Jalpaiguri	7594	29240	3.85	-7.15	-5.35	1.93
Coochbehar	7400	22285	3.01	-4.37	-1.71	2.78
Purba Bardhaman	3417	9118	2.67	3.69	4.63	0.91
Alipurduar	3156	6201	1.96			
South 24 PGS	1582	3158	2.00	-14.81	-12.46	2.76
Bankura	1170	3023	2.58	-5.50	-3.97	1.62
Purulia	1052	2145	2.04	-2.67	-3.85	-1.21
Paschima Bardhaman	1045	2741	2.62			
Hooghly	463	1119	2.42	-21.21	-21.31	-0.12
Darjeeling	430	1295	3.01	-7.90	-5.45	2.66
Kalimpong	216	650	3.01			
West Medinipur	180	486	2.70	-15.75	-14.77	1.16
Howrah	163	281	1.72	-7.04	-7.25	-0.23
North 24 PGS	102	204	2.00	-22.69	-23.21	-0.67
Jhargram	84	206	2.45			
Murshidabad	62	189	3.05	-32.54	-33.05	-0.76
East Medinipur	5	12	2.40	-22.76	-22.89	-0.16

Source: Directorate of Economics and Statistics, Ministry of Agriculture and Farmers Welfare, Govt. of India (https://eands.dacnet.nic.in/APY_96_To_06.htm) and Crop Production Statistics Information Systems, Govt. of India (https://aps.dac.gov.in/APY/Public_Report1.aspx).

Note: CAGR is calculated by Author.

Table A3: District-wise area, production, yield status and performance of maize

Districts	Maize (2017-18)			CAGR % (2004-5 to 2017-18)		
	Area (ha)	Production (t)	Yield (t ha ⁻¹)	A	P	Y
Dinajpur Uttar	80602	636938	7.90	12.85	14.71	1.64
Maldah	36676	284529	7.76	14.04	25.36	9.92
Alipurduar	24457	141242	5.78			
Coochbehar	24384	149619	6.14	13.46	13.91	0.40
Kalimpong	22459	41156	1.83			
Murshidabad	13781	56344	4.09	16.46	16.22	-0.21
Darjeeling	12652	30080	2.38	-4.39	-5.36	-1.01
Purulia	10463	17292	1.65	2.80	7.12	4.20
Jalpaiguri	6514	19186	2.95	-2.62	-0.20	2.49
Nadia	5997	23039	3.84	8.74	11.85	2.87
Dinajpur Dakshin	2362	11737	4.97	28.63	33.27	3.61
Birbhum	1181	2623	2.22	7.68	13.47	5.38
West Medinipur	986	3059	3.10	4.36	6.84	2.37
Bankura	727	1827	2.51	8.69	15.43	6.20
Paschima Bardhaman	567	1282	2.26			
Hooghly	528	1329	2.52	3.58	4.08	0.49
North 24 PGS	408	1085	2.66	13.56	11.79	-1.56
East Medinipur	120	193	1.61	1.63	1.36	-0.27
Howrah	119	387	3.25	2.11	9.44	7.18
Purba Bardhaman	118	256	2.17	-3.80	-3.97	-0.18
Jhargram	72	115	1.60			
South 24 PGS	55	99	1.80	-10.23	-7.66	2.86

Source: Directorate of Economics and Statistics, Ministry of Agriculture and Farmers Welfare, Govt. of India (https://eands.dacnet.nic.in/APY_96_To_06.htm) and Crop Production Statistics Information Systems, Govt. of India (https://aps.dac.gov.in/APY/Public_Report1.aspx).

Note: CAGR is calculated by Author.

Table A4: District-wise area, production, yield status and performance of potato

Districts	Potato (2017-18)			CAGR % (2004-5 to 2017-18)		
	Area (ha)	Production (t)	Yield (tha ⁻¹)	A	P	Y
Hooghly	103860	3629312	34.94	1.34	5.77	4.37
West Medinipur	70335	2434435	34.61	1.61	8.39	6.67
Purba Bardhaman	64074	2262632	35.31	2.77	8.00	5.09
Coochbehar	32328	1055533	32.65	3.55	9.39	5.65
Jalpaiguri	31607	1074789	34.00	1.77	7.18	5.31
Bankura	30801	1254730	40.74	0.41	7.18	6.75
Birbhum	15423	534819	34.68	-1.96	6.20	8.33
Alipurduar	14262	456352	32.00			
Murshidabad	11930	420724	35.27	-0.92	5.95	6.93
Dinajpur Uttar	11290	353936	31.35	-0.02	1.97	1.99
Maldah	8941	390671	43.69	6.68	14.15	7.01
North 24 PGS	8072	271245	33.60	2.22	6.40	4.09
Howrah	5824	157967	27.12	-0.59	4.00	4.62
Dinajpur Dakshin	5269	171245	32.50	-0.54	1.13	1.67
Nadia	4496	171083	38.05	-2.12	2.67	4.90
Darjeeling	3910	76776	19.64	-5.11	-5.95	-0.89
East Medinipur	2880	61010	21.18	-6.36	-9.81	-3.67
South 24 PGS	2443	57890	23.70	-4.50	-3.36	1.19
Jhargram	1876	59080	31.49			
Purulia	1452	23085	15.90	0.22	-1.18	-1.39
Paschima Bardhaman	340	12186	35.84			
Kalimpong	332	3138	9.45			

Source: Directorate of Economics and Statistics, Ministry of Agriculture and Farmers Welfare, Govt. of India (https://eands.dacnet.nic.in/APY_96_To_06.htm) and Crop Production Statistics Information Systems, Govt. of India (https://aps.dac.gov.in/APY/Public_Report1.aspx). Note: CAGR is calculated by Author.

Table A5: District-wise area, production and yield status of major pulses in West Bengal (2017-18)

Districts	Area (ha)	Production (t)	Yield (t ha ⁻¹)
Murshidabad	91927	98787	1.07
Nadia	58777	53240	0.91
South 24 PGS	55075	38705	0.70
Birbhum	35523	43871	1.24
Dinajpur Dakshin	23925	16546	0.69
Maldah	23829	23021	0.97
Purulia	22915	10669	0.47
North 24 PGS	16184	12743	0.79
East Medinipur	14563	16754	1.15
Purba Bardhaman	13542	14823	1.09
Alipurduar	9784	7345	0.75
Dinajpur Uttar	7868	6149	0.78
Coochbehar	7387	5146	0.70
West Medinipur	6733	7208	1.07
Jalpaiguri	5748	4271	0.74
Bankura	5500	6197	1.13
Hooghly	5037	5786	1.15
Jhargram	4580	3774	0.82
Howrah	3362	3567	1.06
Paschima Bardhaman	1792	1882	1.05
Darjeeling	1172	770	0.66
Kalimpong	-	-	-

Source: Directorate of Economics and Statistics, Ministry of Agriculture and Farmers Welfare, Govt. of India (https://eands.dacnet.nic.in/APY_96_To_06.htm) and Crop Production Statistics Information Systems, Govt. of India (https://aps.dac.gov.in/APY/Public_Report1.aspx).

Note: Six major pulses are Arhar, Gram, Khesari, Masoor, Moong and Urad

Table A6: District-wise area, production & yield of arhar, gram and lathyrus in West Bengal (2017-18)

Districts	Arhar			Gram			Lathyrus		
	Area (ha)	Production (t)	Yield (t ha ⁻¹)	Area (ha)	Production (t)	Yield (t ha ⁻¹)	Area (ha)	Production (t)	Yield (t ha ⁻¹)
North 24 PGS	26	43	1.65	210	261	1.24	2312	2162	0.94
South 24 PGS	18	30	1.67	30	37	1.23	20742	18148	0.87
Alipurduar	135	223	1.65	31	44	1.42	4465	4338	0.97
Bankura	72	116	1.61	691	913	1.32	1430	1713	1.20
Birbhum	850	1403	1.65	12363	18319	1.48	2369	2298	0.97
Coochbehar							2432	2363	0.97
Darjeeling	29	48	1.66	16	23	1.44	55	53	0.96
Dinajpur Dakshin				318	468	1.47	7753	6960	0.90
Dinajpur Uttar				422	621	1.47	1148	1031	0.90
Hooghly	104	129	1.24	110	158	1.44	403	391	0.97
Howrah				11	14	1.27	1708	2039	1.19
Jalpaiguri	175	289	1.65	93	132	1.42	2045	1987	0.97
Jhargram	1088	1310	1.20	244	324	1.33	372	426	1.15
Maldah				548	532	0.97	3687	3891	1.06
East Medinipur						12647	15303	1.21	
West Medinipur	415	500	1.20	91	121	1.33	905	1036	1.14
Murshidabad	209	449	2.15	8940	13685	1.53	15404	13878	0.90
Nadia	225	371	1.65	3459	4181	1.21	1905	1781	0.93
Paschima Bardhaman	12	20	1.67	172	247	1.44	230	223	0.97
Purba Bardhaman	108	178	1.65	1327	1718	1.29	1107	1074	0.97
Purulia	271	310	1.14	527	607	1.15	2515	2091	0.83

Source: Directorate of Economics and Statistics, Ministry of Agriculture and Farmers Welfare, Govt. of India (https://eands.dacnet.nic.in/APY_96_To_06.htm) and Crop Production Statistics Information Systems, Govt. of India (https://aps.dac.gov.in/APY/Public_Report1.aspx).

Table A7: District-wise area, production and yield of lentil, moong & urad in West Bengal (2017-18)

Districts	Lentil			Green gram			Black gram		
	Area (ha)	Production (t)	Yield (t ha ⁻¹)	Area (ha)	Production (t)	Yield (t ha ⁻¹)	Area (ha)	Production (t)	Yield (t ha ⁻¹)
North 24 PGS	8462	6953	0.82	875	531	0.61	4299	2793	0.65
South 24 PGS	484	478	0.99	33194	19618	0.59	607	394	0.65
Alipurduar	2632	1354	0.51	793	495	0.62	1728	891	0.52
Bankura	2120	1729	0.82	1091	1680	1.54	96	46	0.48
Birbhum	17162	16840	0.98	2428	4806	1.98	351	205	0.58
Coochbehar	2755	1336	0.48	547	362	0.66	1653	1085	0.66
Darjeeling	72	38	0.53	251	173	0.69	749	435	0.58
Dinajpur Dakshin	15042	8516	0.57	67	73	1.09	745	529	0.71
Dinajpur Uttar	2450	1545	0.63	1368	1347	0.98	2480	1605	0.65
Hooghly	3206	3215	1.00	1160	1831	1.58	54	62	1.15
Howrah	81	90	1.11	1558	1421	0.91	4	3	0.75
Jalpaiguri	1116	616	0.55	1347	782	0.58	972	465	0.48
Jhargram	1659	1099	0.66	1086	567	0.52	131	48	0.37
Maldah	6866	6290	0.92	2043	907	0.44	10685	11401	1.07
East Medinipur	508	443	0.87	960	845	0.88	448	163	0.36
West Medinipur	2406	3264	1.36	2649	2095	0.79	267	192	0.72
Murshidabad	40409	48601	1.20	4538	5230	1.15	22427	16944	0.76
Nadia	34422	33338	0.97	3473	2136	0.62	15293	11433	0.75
Paschima Bardhaman	1161	1056	0.91	217	336	1.55			
Purba Bardhaman	9338	10712	1.15	1090	742	0.68	572	399	0.70
Purulia	3467	855	0.25	1728	952	0.55	14407	5854	0.41
Kalimpong							38	22	0.58

Source: Directorate of Economics and Statistics, Ministry of Agriculture and Farmers Welfare, Govt. of India (https://eands.dacnet.nic.in/APY_96_To_06.htm) and Crop Production Statistics Information Systems, Govt. of India (https://aps.dac.gov.in/APY/Public_Report1.aspx).

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- Initial research work and background information for this policy paper was collected and discussed in a network research project led by ICAR-NIAP, New Delhi on 'Estimation of Marketing Efficiency of Horticultural Commodities under Different Supply Chains' in India during 2009-11. The project partners were 9 Agricultural Economists from different collaborating institutions across Indian States including West Bengal. The reports with respect to West Bengal agricultural marketing was presented by Dr. Subhasis Mandal (PS, Agricultural Economics) and discussed among the agricultural economists during project meetings.
- Part of the report was published in peer reviewed research journal and the full reference of the paper is Mandal, Subhasis, Sarangi, S.K., Burman, D., Bandyopadhyay, B. K., Maji, B., Singh, S.B., Dastagiri, M.B., Kumar, Ganesh and Datta, K. K. (2011) Agricultural Marketing Efficiency of Major Vegetables Crops in Coastal Districts of West Bengal – Current Status and Way Forward, *Journal of Indian Society of Coastal Agricultural Research*, 29 (1):93-98.
- Part of the report was published in peer reviewed research journal and the full reference of the paper is Dastagiri, M.B. Ganesh Kumar, Hanumanthaiah, C.V., Paramsivam, P., Sidhu, R.S, Sudha, M., Mandal, Subhasis, Singh, Basantha and Chand, Khem (2012) Marketing efficiency of india's horticultural commodities under different supply chains, *Outlook on Agriculture*, 41(4), pp. 271-278.
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through Quality and Reliability at Vivekananda Institute of Biotechnology, Nimpith, West Bengal during November 10-11, 2016.

- The research output was presented and discussed in a paper on 'Implementing Minimum Support Price Scheme in West Bengal – Effectiveness and Policy Needs' during Policy Dialogue on Innovations in Ensuring Remunerative Prices (MSP) to Farmers: Challenges and Strategies organised by IFPRI-NAAS-ICAR-NIAP on 23rd March 2018 at NAAS Complex, New Delhi.
- The synthesis of the research output related to this policy paper was presented and discussed during one-day Seminar on 'Production and Marketing Strategies of Major Food Crops, Spices, Potato and Fish in West Bengal' on 9th August, 2019 at the ICAR-National Institute of Natural Fibre Engineering and Technology, Kolkata, organized by S N Bose Society for Sustainable Development, Kolkata. More than 40 ICAR Scientists, Economist, Jt. Secretary Agricultural Marketing Department, Govt. of West Bengal and CEO West Bengal State Marketing Board & Special Secretary to Govt. of west Bengal were present.



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