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Linking farmers to futures market in India

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Abstract

Farmers, especially small and marginal, do not directly trade in agri-futures market in India. Their small size, lack of trust and understanding of futures market and dependence on middlemen, are some of the main deterrents. The role of Farmer Producer Organizations (FPOs) is crucial in this context since they can procure commodities, aggregate them and ensure that size and quality standards required for agri-futures trade are met. In her Budget speech for Union Budget of FY20, the Union Finance Minister has set a target of creating 10,000 FPOs in the next five years (by 2024). NABARD has already been in this process of creating FPOs for the last few years (already has more than 3000 FPOs) and the major responsibility of scaling them with 10,000 new ones, is likely to fall on NABARD.

Interestingly, NCDEX has also been trying to deepen FPOs participation in markets for the last few years. However, as our analysis shows that between April 2016 and May 2018 only a tiny fraction (0.004 percent) of overall agri-futures trade at NCDEX was through FPOs. This reflects the need for gigantic steps, if FPOs have to be involved in futures trading at any reasonable scale. The need is even greater if one considers the dire necessity of having forward looking cropping patterns, where farmers' planting decisions are based on future prices rather than last year's or even earlier year's prices. Keeping this in mind, the paper identifies the constraints in first linking farmers to FPOs and second, FPOs to futures market.

Based on this research about constraints, the paper puts forward a few suggestions for the FPOs, NCDEX, as well as the government for better results: (1) Both FPOs and NCDEX need to focus initially on commodities not pereceived by the Government as 'sensitive' from food security point of view so that minimum disruption takes place in futures markets. This will help them gain confidence in the functioning of futures markets; (2) NCDEX needs to identify production centres, build delivery centres around them and encourage futures trading in these areas; (3) Resource Institutions involved in educating and hand-holding FPOs in futures trading, themselves need to upgrade their knowledge and skills about functioning of futures trading. Government policy and NCDEX both can help them in this direction; (4) Government initiatives like that of Bihar and Rajasthan can help scaling the efforts of linking FPOs to futures markets in other regions, (5) There could also be learning from small holder dominated agriculture of China, that has provided state support in linking farmers to futures, and helped customized products and reduce price distortions, (6) Government's trading arms can also be encouraged to directly participate in the futures market to give confidence to many others, including FPOs; and (7) Instruments like forwards and options have to be encouraged to invite greater participation by FPOs.

Keywords: agri-commodity futures, farmers, farmer producer organizations (FPOs)

JEL classification*: G4, G10, Q140, Q13, Q180*

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Executive Summary

Currently, farmers' share in the overall agri-futures trading in India is negligible. There could be several factors behind this ranging from their lack of understanding how futures markets work to constraints emerging from lack of liquidity or even fulfilling regulatory requirements. But linking farmers to futures markets can be mutually beneficial to both- the markets and the farmers. It can help farmers in better price discovery and hedging their price risk while taking planting decisions based on future prices rather than last year's prices, and also provide more liquidity to markets for their deepening. It is with this idea in mind that this study is undertaken to identify constraints in participation of farmers/farmer groups in futures markets, and how best to resolve them. Accordingly, it also looks at some selected Indian case studies and experiences in some other small holder economies, especially China, to learn best practices that can help increase farmers' participation in futures. This study assumes special significance in the wake of Union Finance Minister's commitment to create 10000 new FPOs in the next five years[1].

The study identifies that the first limitation in farmers' participation in futures markets is their small size of the produce itself. It is here that role of Farmer Producer Organizations (FPOs) as aggregators become crucial. FPOs can procure and aggregate the produce and ensure that both size and quality standards are met as per requirements for participation in futures markets. This would involve two steps in the process- first, link farmers to FPOs and second, link FPOs to futures markets. The study finds that the constraints in linking farmers to FPOs and the later to futures are- (1) farmers' already existing strong relationship with middlemen and traders, (2) given higher risk involved in output related activities, fewer FPOs are involved in marketing, (3) lack of capacity of FPOs, (4) management related issues of FPOs, (5) lack of trust & understanding of futures market, (6) high rejection rates, (7) reluctance in pre-harvest hedging, (8) logistic related like location of delivery centres and (9) tedious documentation and entry barriers.

National Commodity & Derivative Exchange (NCDEX), the largest agri-commodity exchange in India, has been trying to bring farmers and FPOs on board for the past few years. The first FPO futures trade happened in 2014 when Ram Rahim Pragati Producer Company, based in the Dewas region of Madhya Pradesh enrolled itself on the exchange platform and hedged soybean price risk. It is pertinent to note that formal efforts to engage directly with FPOs, by NCDEX, began only in 2016. Thus, participation of FPOs in futures trading is still at a very nascent stage, and it is not surprising that during April 2016 to May 2018, their share in overall agri-futures trade was miniscule- just 0.004 percent at NCDEX. However, from 1st FPO transacting on NCDEX in 2014, the number of FPOs increased to 69 by May 2018. They came from 11 states. But 55 of these 69 FPOs (80 percent) have traded only once. Now, that the Government of India (GoI) has realised the importance of FPOs, and announced creating 10,000 new FPOs by 2024, there is a good opportunity for NCDEX to link large number of FPOs to futures markets. An early action by NCDEX in collaborating

[1] See the Union Finance Minister's budget speech for the Financial Year 2019-20 (FY20), Ministry of Finance, GoI

with NABARD in this endeavour can bring rich dividends to farmer community as well as NCDEX in due course.

Besides the small size of the farmer's produce, other constraint has been lack of trust in free functioning of futures markets, especially by the policy makers. There have been several instances when commodities have been banned and suspended abruptly from trading in the market. These abrupt suspensions discourage private players from participating in the market depriving it of its liquidity and depth.

In this paper we discuss three case studies, viz. Ram Rahim Pragati Producer Company in Madhya Pradesh, Nari Shakti Cluster Level Federation and Samruddhi Mahila Crop Producer Company Limited in Rajasthan. Overall some broad takeaways are as follows: (1) Government support is very helpful; (2) vital role is played by resource institutions: (3) NCDEX warehouses in close vicinity to producing centre is crucial; (4) vicious cycle of farmers interlocked with traditional middlemen and traders have to be broken and (5) FPOs have to be more open about exploring futures markets.

We also study initiatives taken by Chinese agri-futures markets in this regard. Given its similarity with India in terms of dominance of small and marginal farmers, it provides some interesting lessons. China introduced several innovative schemes like- "thousand villages and tens of thousands of farmers" to link farmers to futures since 2005. Another unique scheme called futures + insurance was introduced in 2016. Some of the key takeaways from China's experience in this regard are- (1) state support for futures market is critical; (2) encouraging use of futures by farmers and consistently training and educating farmers for that; (3) easing Government protection from the commodity market by reducing the number of commodities covered under MSP-scheme and reducing MSPs for others; and (4) innovative and customized products.

The way forward for Indian agri-futures market can be as follows- (1) focus initially on commodities not protected by heavy government intervention since this helps in gaining confidence in its functioning; (2) identify production centres for those crops, build delivery centres around them and first encourage futures trading in these areas; (3) resource institutions have to be trained, (4) government initiatives like that of Bihar and Rajasthan may help in other regions, (5) learnings from China can help focus on agri-futures, reduce Govt. protection, and customize products, (6) trading agencies of the government should be encouraged to directly participate in the futures market and (7) instruments like forwards and options have to be encouraged.

Linking farmers to futures market in India

Tirtha Chatterjee, Raghav Raghunathan and Ashok Gulati

1. Introduction

Despite being over a century old, agri-futures market lacks depth and liquidity in India. There is limited association of farmers with futures market. Acreage related decisions are based on last year prices rather than on future expectation of prices. This leads to a vicious cycle of glut and lower prices followed by scarcity and high prices. The role of agri-futures is critical given that it not only aids in price discovery but also mitigates price risk by ensuring a pre-determined price. Agri-futures are financial contracts requiring the buyer to purchase an asset or the seller to sell a physical agri-commodity at a predetermined future date and price. Futures contracts give details regarding the quality and quantity of the underlying commodity; they are standardized to facilitate trading on a futures exchange. Some futures contracts may call for physical delivery of the asset, while others are settled in cash. Trading in futures market[2] ensures that both buyer and seller are ensured a fixed price at a future date for the commodity.

Linking farmers with futures market can be mutually beneficial to both - the futures market and the farmers. Farmers, when linked with a consistent, liquid and deep futures market will be able to reap benefits of efficient price discovery. While higher farmer participation will provide more liquidity to the market, helping it achieve its objective of price discovery. If farmers start finding that the markets are consistent (i.e. without abrupt interventions), reliable and accessible, their participation will also increase, making markets more liquid and deep.

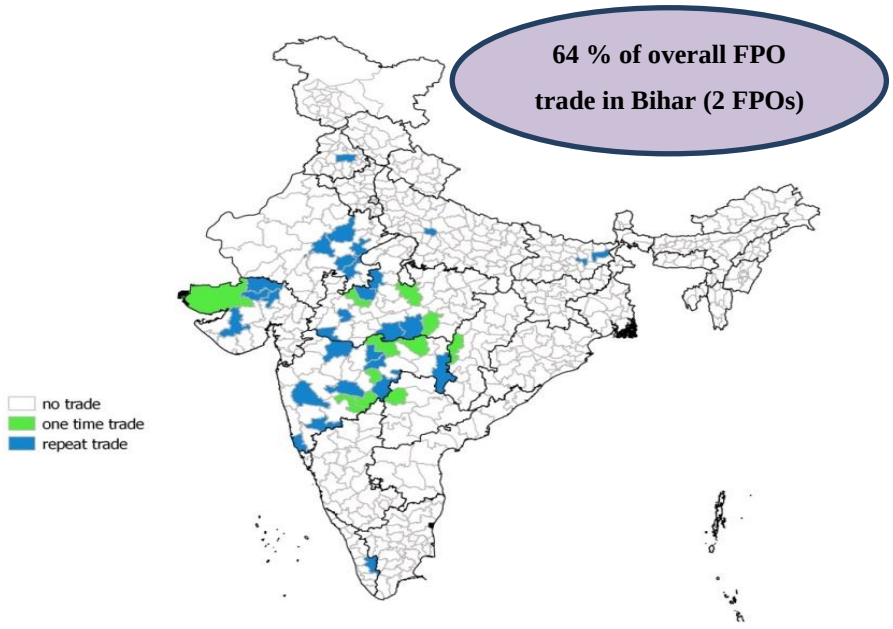
However, lack of awareness and trust among farmers belie any understanding in its working. Majority of farmers do not understand its functioning and view it with suspicion. This is also

[2] Here is an illustration of how using futures can act as hedging instrument. Imagine the case of two market participants, a buyer(A) and seller(B) of a futures contract for Maize who take a position each, ie a buy and a sell position at Rs 1500/quintal three months in advance of an oncoming harvest season. Let the price of the contract be Rs 1500/quintal or Rs 15,000/Tonne. Usually 10-20% of the contract amount is needed to enter into such a contract as determined by margin requirements. The minimum lot or contract size is usually 10Tonnes or hundred Quintals. These requirements, both the margin amount as well as contract size, are mandated by the regulators and also updated by the exchange considering various factors such as risk, volatility and market depth. So, in the above case, A and B, by depositing Rs 15000 (~10% of the total contract size which would be 10 tonnes X Rs 15,000 a tonne= Rs 1,50,000) with the exchange are able to take a buy position and a sell position on October futures in the month of say, May. Such a contract is possible because A and B expect two different outcomes for the actual or spot prices of Maize in October. A who has a buy position expects prices to increase, whereas B who has a sell position expects prices to decrease from the current futures price of Rs 1,500/quintal. In October there can be three different scenarios for prices. They may remain same ormight have increased and finally, could have decreased. In case prices remain same, the contract expires resulting in no trading loss or gain to each participant and the deposit is returned. In case price rise or decrease, the settlement can be made by exchange of goods at the contracted price or settled by cash. In case prices rise, to say Rs 1800, A makes a trading gain of Rs 300 and B, a trading loss of Rs 300. This is adjusted in the money deposited as margin with the exchange and the settlement made. In case B does not honour the contract by selling maize at Rs 1500/quintal to A in October, Rs 300/quintal is deducted from B's account and deposited into A. This means that even though A has to now procure Maize at market prices, ie Rs 1800/quintal, the trading profit of Rs 300/quintal offsets the cost of Rs 1800/quintal, ensuring that the effective buying price remains at Rs 1500/quintal. Similarly, while B can now sell in the open market at Rs 1800/quintal, the trading loss of Rs 300/quintal offsets this gain resulting in an effective selling price of Rs 1500/quintal, the contracted price. The situation is analogous in case prices fall, where the seller makes a trading profit and the buyer a trading loss, but ultimately square off vis a vis the spot market prices.

due to prevailing sentiments among local/regional bureaucracy and extension officers who see participating in futures as akin to 'satta' or gambling. To further add to the problem, majority of farmers in India are small and marginal and do not have the required size of the lot to be traded in the futures exchange. Commodity exchanges require that each agri-commodity is traded in a minimum lot size which is often not met by small and marginal farmers. Their produce may not often qualify in terms of both quantity and quality standards required to be met at the commodity exchanges. On the other hand, despite charging high commission charges, traders in the traditional marketing channels provide them with easy access to both credit and market. These factors constrain farmer participation in futures market. In this context, Farmer Producer Organizations (FPOs) play a vital role as aggregator and can link farmers with futures and derivative market. It must be noted here that although forming of FPOs is not a necessary precondition to participate in the exchange, yet it is a very enabling condition that can facilitate greater participation of farmers in the exchange. Self-Help Groups (SHGs), federations and other informal/formal institutions as bona fide aggregators and even individual farmers as sellers on the platform should help ease constraints on farmer participation. While farmers are exempt from APMC cess and other taxes levied, delivery of the Futures requires these cesses to be paid. This acts as a disincentive to use Futures platforms as a point of delivery by farmers, though they may still use this as a hedging tool, i.e. without delivering produce through the exchange platform.

National Commodity & Derivative Exchange (NCDEX), the largest agri-commodity exchange in India has been trying to bring more farmers and FPOs on board since last few years. Ram Rahim Pragati Producer Company, based in the Dewas region of Madhya Pradesh became the first such enterprise to link its farmers by enrolling itself on the exchange platform in 2014. Since then there has been a rise in FPO participation in futures market. However, the overall penetration of FPO in futures trade is extremely low. Out of overall agri-trade of Rs. 417.4 billion in NCDEX in May 2018, only Rs. 19.4 million came from FPO trade. The average share of FPO trade in total agricultural futures trade has been miniscule (just 0.004 percent) between April 2016 and May 2018. By May 2018, 69 FPOs from 11 states have traded in the futures market. The geographic distribution of FPOs is given in Figure 1. Other than only 2 FPOs trading in Bihar, rest of the 67 FPOs are in the western and central states of the country. Out of these 69 FPOs, only 14 FPOs have traded more than once.

Figure 1: Geographic distribution of FPOs in futures trade in India (April 2016-May 2018)



Source: Authors' calculation based on NCDEX data

Against this background of low depth in futures market among the farmers, the objective of this paper is to identify the bottlenecks in linking farmer to futures market and recommend ways to correct them. We first identify the reasons preventing FPOs from participating in futures market. We then draw lessons from both global and domestic examples. We discuss three cases where FPOs have traded in the futures market and global perspective has been drawn from China. Based on these examples and constraints faced by FPOs in India, we are able to suggest some recommendations and way forward in this regard.

The paper is organized as follows: The current status of FPO participation is discussed in Section 2. In Section 3, we point out the gap in connecting production centres to futures market. In Section 4, we discuss constraints in farmer participation in futures market. In Section 5, we discuss case studies on FPOs trading in the market. We identify takeaways from China in Section 6 and identify way forward for Indian futures market in Section 7.

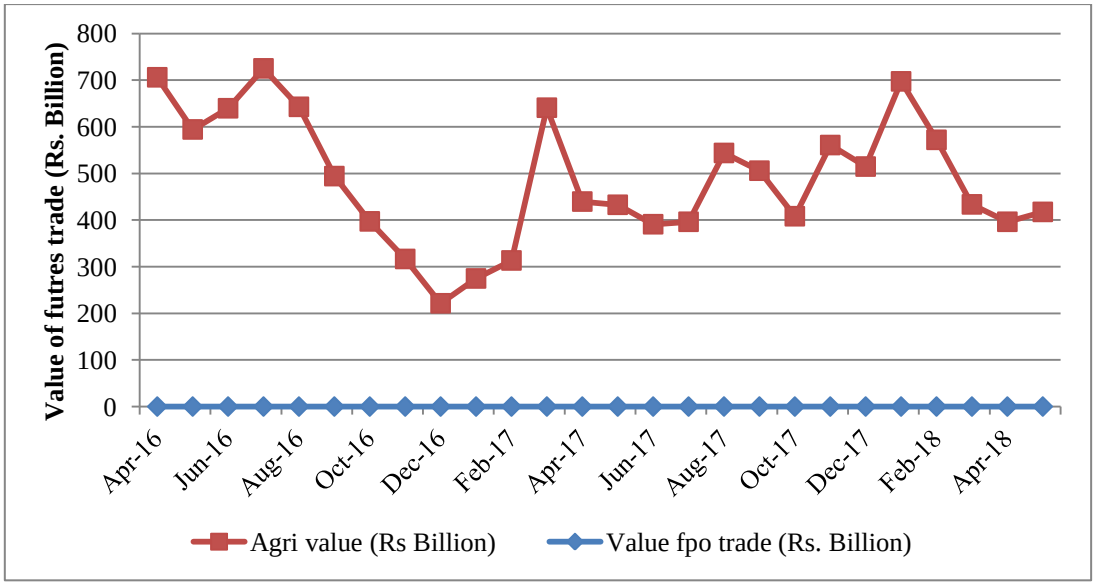
2. FPO participation in futures market in India

In this section, we discuss the extent of FPO participation in futures market in India. The value of overall agricultural futures trade (Figure 2) was Rs. 706 Billion in April-2016 and came down to Rs. 417 Billion in May 2018. The time-period[3] considered is between April 2016 and May 2018. The roller coaster nature of the plot reflects the uncertainty in overall agricultural futures trade in the country. Figure 2 shows that futures trade by FPOs (blue plot) is insignificant in comparison to value of overall agricultural futures trade (red plot) and

[3] The time frame considered is constrained because of data availability.

clearly brings out the miniscule participation by FPOs in the futures market. We plot the FPO futures trade separately in Figure 3.

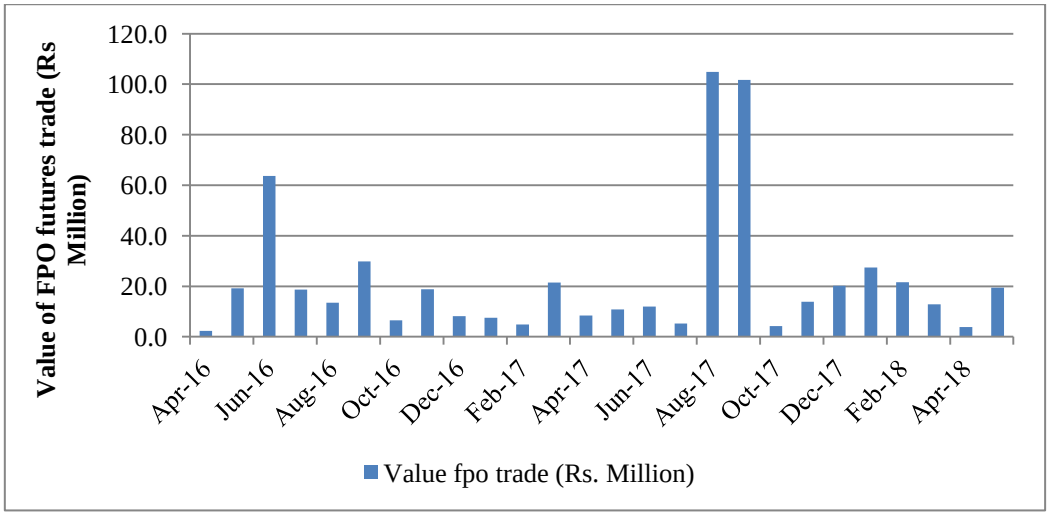
Figure 2: Value of overall futures trade in India and by FPOs in India



Source: Authors' compilation based on NCDEX data

The value of agricultural futures trade by FPOs was Rs. 2.4 Million in April 2016. It increased to Rs. 104.8 Million and Rs. 101.7 Million in August and September 2017. Since then once again it has been significantly lower. The spike in value of futures trade in August and September 2017 remains a puzzle and the reason driving the same could not be validated.

Figure 3: Value of futures trading by FPOs (April 2016-May 2018)

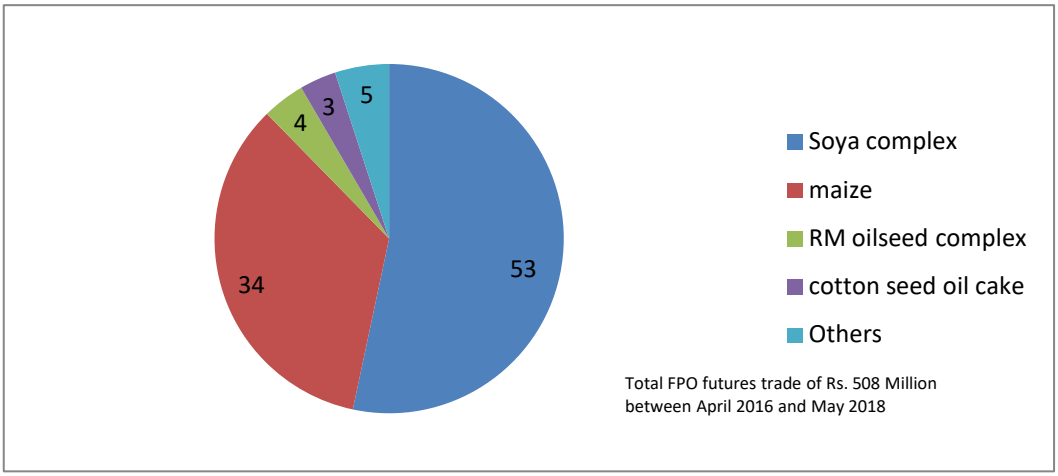


Source: Authors' compilation based on NCDEX data

Trade is highly skewed with respect to commodities traded by the FPOs. Only maize and soybean complex together form 87 percent of total FPO futures trade of Rs. 508 Million

between April 2016 and May 2018 (Fig 4a). Soya complex and maize form 53 and 34 percent share of overall agri-futures trade by FPOs. The other commodities traded by FPOs are Rape and Mustard oilseed complex (4 percent) and cotton seed complex (3 percent).

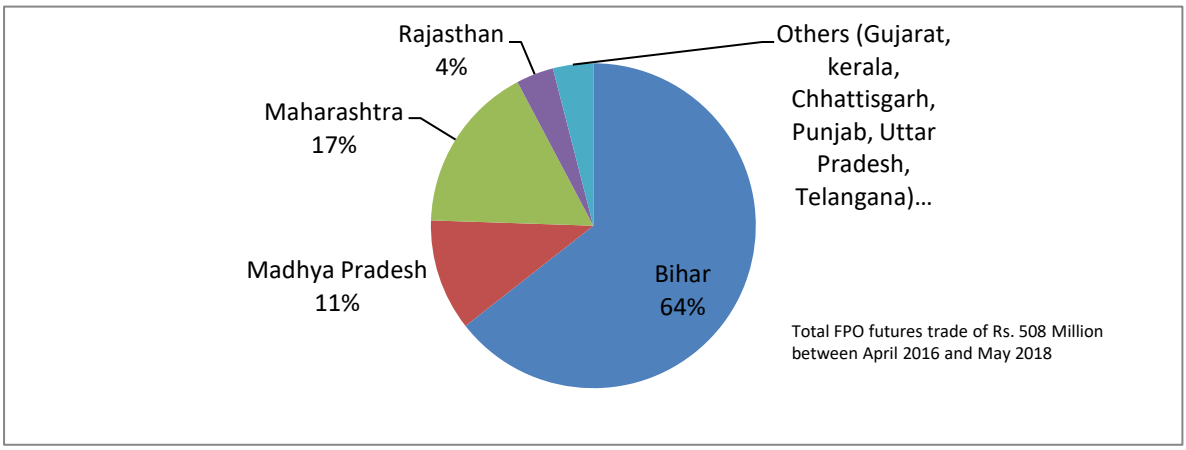
Figure 4a: Share of commodities in total FPOs futures trade



Source: Authors' compilation based on NCDEX data. Note: Others include Turmeric, Barley, Cotton, Guar Complex, pepper, jeera, chah, castor, wheat. Total trade value is Rs. 581 Million

As one can see in Figure 1, there is a huge geographic disparity in futures trade by FPOs in India. Even out of the eleven states, only three states, viz. Bihar, Maharashtra and Madhya Pradesh together account for 92 percent of the total FPOs futures trade between April 2016 and May 2018. Bihar alone accounts for 64 percent of overall FPOs futures trade recorded. Rajasthan forms just 4 percent of total FPOs trade while the rest 4 percent is formed by Gujarat, Kerala, Chhattisgarh, Punjab, Uttar Pradesh and Telangana. The distribution of futures trade across states is given in Figure 4b and number of FPOs in each state trading in the market is given in Figure 5.

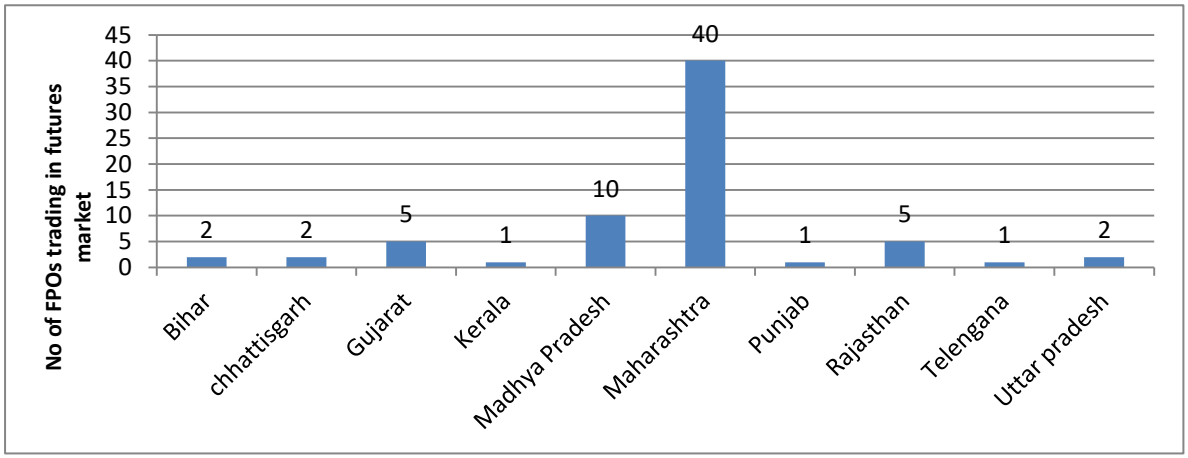
Figure 4b: Share of states in total FPOs futures trade (April 2016-May 2018)



Source: Authors' compilation based on NCDEX data

Bihar is the largest player with 64 percent share in total FPO futures trade. There are two FPOs in Bihar which trade in futures market and both have been repeats in the futures platform. Cumulative trade value by FPOs in Bihar between April 2016 and May 2018 was Rs. 374 Million. The spike in futures trade in August and September-2017 in Figure 3 is because of trade from FPOs in Bihar. However, the reason driving the abrupt spike in trade by these particular FPOs in the market for such a limited time period is not known and could not be verified. The commodities traded were castor, maize, rape and mustard seed, soybean and wheat. Maize and soybean together record 94 percent of overall FPO futures trade in Bihar.

Figure 5: Number of FPOs trading in Futures market



Source: Authors' compilation based on NCDEX data

Maharashtra, with total futures trade of Rs. 97 Million is the second largest state in terms of total value of futures trade by FPOs. It forms 17 percent of total FPOs futures trade. The largest commodities traded are – soybean (71 percent) and cotton seed oilcake (15 percent). The other commodities traded are chana, cotton, maize, rape and mustard seed cake, refined soya oil and turmeric. Figure 5 shows that in contrast to Bihar with only 2 FPOs trading in the futures market, here 40 FPOs have traded between April 2016 and May 2018, but their volume/value is still much lower than those in Bihar.

The third highest state in terms of share in value of futures trade by FPOs is Madhya Pradesh (11 percent). Total value of futures trade is Rs. 64 Million. 82 percent of total futures trade is formed of soybean. The other commodities traded are castor, chana, cotton oilseed cake, cotton, maize, rape and mustard seed and soybean meal. There are 10 FPOs in Madhya Pradesh which have traded in the futures market. Ram Rahim Pragati Producer Company Limited is the first FPO to trade in futures market. Because of its significance in the history of FPO futures trading in India, we discuss this FPO in detail later in section 4. Among the 10 FPOs trading in futures market, only 4 FPOs have traded more than once in the futures market.

The fourth largest state in terms of share in total FPOs futures trade is Rajasthan with 4 percent share. Overall Rs. 22 Million worth value of produce was traded between April 2016 and May 2018. Rape and Mustard seed is the largest commodity traded and forms 87 percent of overall FPO futures trade. The rest of the commodities traded are barley, cotton seed oil cake, soybean seeds and wheat. 4 out of 5 FPOs in Rajasthan have traded more than once in the futures market.

Gujarat forms 2 percent of overall FPOs futures trade in India. The commodities traded there are castor, cotton seed oilcake, guar seed and jeera. The highest traded commodities are jeera (41 percent) and cotton seed oil cake (35 percent). Kerala FPO has only traded pepper and the state records 1.25 percent of overall FPO futures trade in India. Punjab only forms 0.17 percent share in overall FPO futures trade and traded wheat during the period. Maize is the only commodity which was traded in Telangana which forms a mere 0.05 percent of overall FPO futures trade and wheat is the only commodity traded in Uttar Pradesh which forms a 0.24 percent of overall FPO futures trade in India. Chhattisgarh, with 0.2 percent share in overall FPO trade, only trades soybean.

The preceding discussion throws light on the low level of farmer participation in futures trade. With majority FPOs trading only once in the market, they are mostly pilot cases. Given that FPOs is generally the way the through which farmers can participate in the market, it will be interesting to understand the status of FPOs mobilized by NABARD. These FPOs can be the starting point for NCDEX to extend farmer participation in futures markets from their current extremely low levels.

2.1 Status of NABARD FPOs

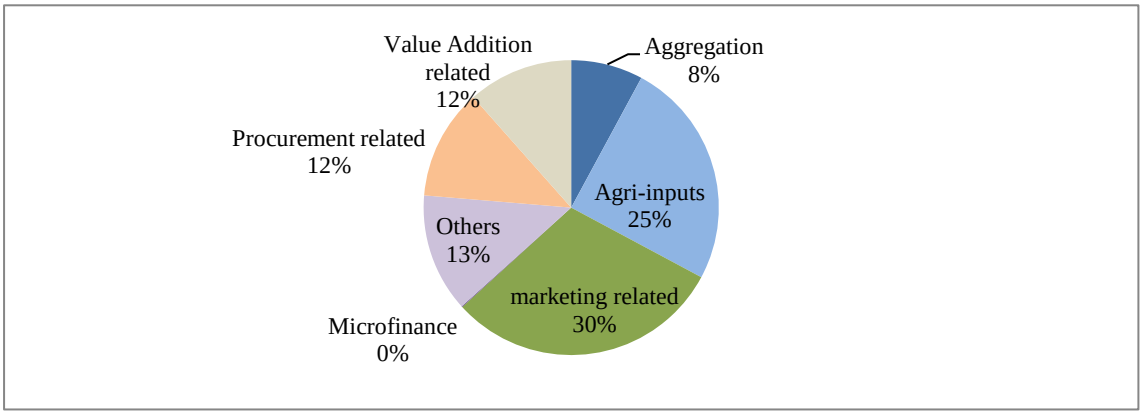
NABARD has dedicated two funds- Producers Organization Development Fund (PODF) since 2011 and Producers' Organization Development and Upliftment Corpus' Fund (PRODUCE fund) since 2014 to support FPOs on credit support, capacity building and market linkage support. PODF was created with an initial corpus of Rs. 50 crore with a sanctioning limit of Rs. 100 crore, out of NABARD's profits with effect from 1st April 2011. The objective of the Fund is to meet end to end requirements of producers organizations as well as to ensure their sustainability & economic viability. PRODUCE fund of Rs. 200 crores was created by Government of India in NABARD in 2014-15 for creating 2000 Farmer Producer Organizations (FPOs) during next two years. The aim of the PRODUCE fund is to address the initial financial requirements of the emerging FPOs, which would subsequently be able to avail of credit from financing institutions for new business activities.

Data retrieved from the FPO portal on NABARD website shows that there are at present 2064 NABARD FPOs[4]. Out of which, we find that 1025 have no specified business activities. Figure 6 gives the distribution of the FPOs on the basis of their business activities. Out of these 2064 NABARD FPOs across the country, the number of those trading at the futures market is extremely low. According to data retrieved from NCDEX, out of these 2064 FPOs,

[4] Accessed in June, 2018. Source: https://nabfpo.in/images/staticFPO.html

only 20 have traded in the market. They belong to the states of Chhattisgarh, Madhya Pradesh, Maharashtra and Punjab. The crops they trade are cotton seed oilcake, maize, soybean and wheat. Only 4 FPOs from Maharashtra and Punjab among these 20 FPOs have been repeats in the market. These low numbers reflect the lack of penetration of NABARD FPOs in terms of futures trade in India. It is plausible that one of the reasons for the slow mobilization of FPOs is the natural time required by them to attain maturity in this regard. It takes time to transgress from being an aggregator and dealing with marketing activities to trading in futures markets[5]. However, to ensure that futures markets are deepened, these FPOs must be given the necessary support such that the transition process for them to mature from being involved in simple aggregation related activities to participating in the market gets facilitated.

Figure 6: Distribution of NABARD FPOs on the basis of business activity



Source: Compiled by the authors based on NABARD and NCDEX data The % share has been computed out of a total of 1039 FPOs which have specified business activities (accessed in June, 2018).

3. Mismatch between production centres, delivery centres and futures trade

There are several factors that could drive futures trade for a commodity in a certain region. These could be, e.g., whether the region is a production centre or whether there is a significant trade flow in the region, and whether the infrastructural and logistical facilities such as roads, warehouses, etc. are conducive for futures trading in that area or not. All such factors influence the efficacy of a place to become a delivery centre for futures trading activities.

Among all these factors one of the prerequisites is presence of delivery centres near the production centres. In this paper, we focus on this aspect for choice of location of a delivery centre. Our review of regions trading in futures market show that there is disconnect between regions which are the production centres for the commodities and places where commodities are traded in the futures market. We get a flavour of the mismatch from the spatial map for

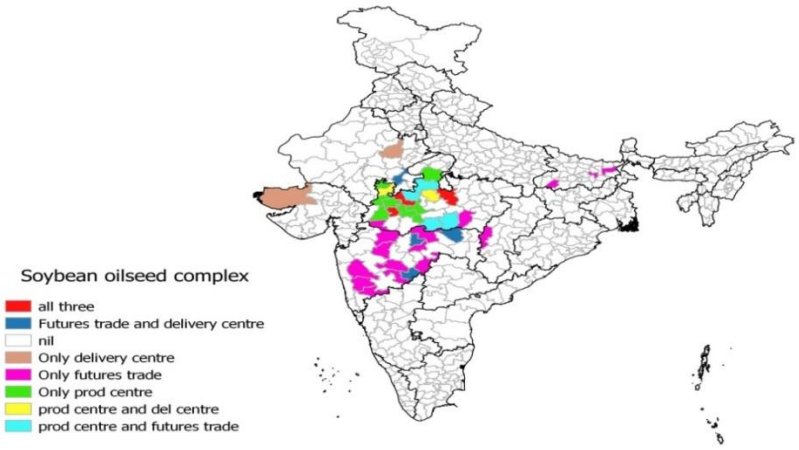
[5] We are grateful to one of the reviewers for pointing this out to us

producing and trading centre for soybean oilseed complex[6] in Figure 7. Spatial maps for some of the other major traded commodities have been presented in Figures A1 to A5 in the Annexure. The producing districts have been identified as follows-

1. First we identify states which cover 80 percent of total production of the commodity.
2. Then in these states we identify districts which cover 80 percent of area under production. The producing districts have been identified for 2014-15 since that was the latest data available for all the commodities.
3. We plot districts which are covered by these delivery centres in Figure 7 for soybean.

The intersection of delivery centre and producing centre (highlighted in yellow) can be the first focus districts to encourage and pilot futures trade. Figure 7 shows that red districts are those districts which have all three- are production districts, delivery centres and have NCDEX delivery centres for soybean oilseed complex. The yellow districts are those which are producing centres and delivery centres and must be linked first. Green districts are those which are only production centres and building delivery centres and encouraging futures trade in these districts can be the way forward.

Figure 7: Spatial map of soybean futures trade and production centres



Source: based on data from NCDEX and Directorate of Economics & Statistics, Dept. of Agri., Govt of India.

Table 1 and Figure 8 give the number of production centres, futures trading centres, delivery centres and the intersection of the three sets. The numbers in the first row which show the intersection between producing centre, futures trade and delivery centres bring out the lack of mapping between the three.

[6] Soybean oilseed complex includes soybean, oil and meal

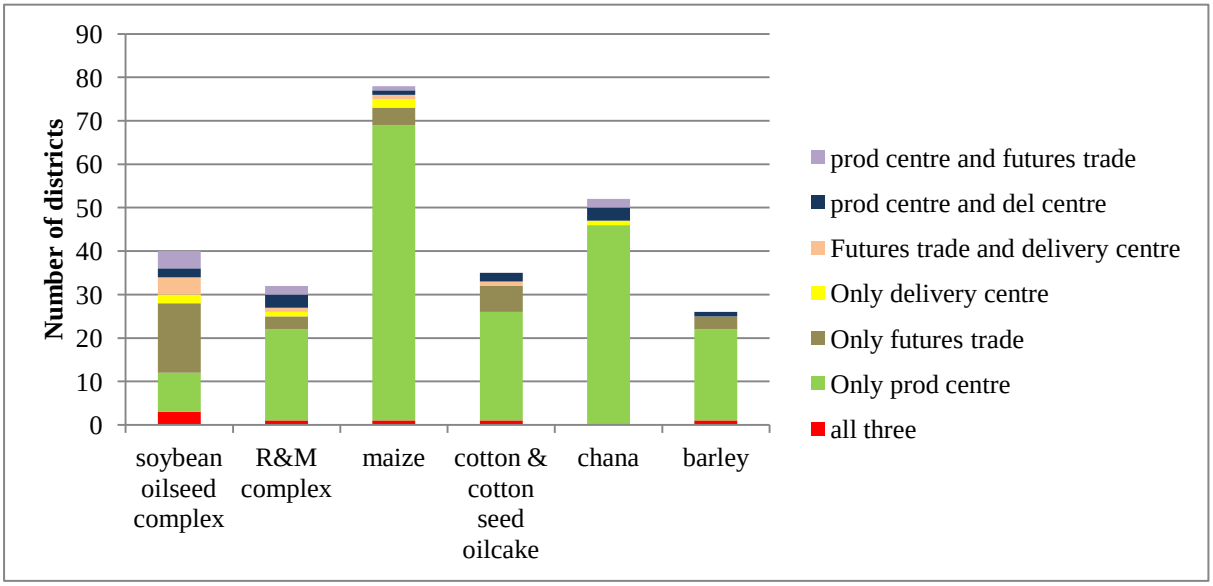
Table 1: Production districts and trading districts

	Particulars	soybean oilseed complex	R & M complex	maize	cotton & cotton seed oilcake	chana	barley
1	**all three**	**3**	**1**	**1**	**1**	**0**	**1**
2	Only production centre	9	21	68	25	46	21
3	Only futures trade	16	3	4	6	0	3
4	Only delivery centre	2	1	2	0	1	0
5	**Futures trade and delivery centre**	4	1	1	1	0	0
6	**production centre and delivery centre**	2	3	1	2	3	1
7	production centre and futures trade	4	2	1	0	2	0

Source: based on data from NCDEX and Ministry of agriculture.

For soybean, there are only 3 districts which are producing centres, have delivery centres and trade in futures market while there are 0 districts for chana which fall in the intersection zone for all three. These numbers (red area in Figure 8) show that a lot has to be done in terms of linking production centres with the futures market. Liquidity and depth of futures market can be raised only when the major production centres are linked to the market. Developing more delivery centres in the producing districts in addition to participation and encouragement by all stakeholders should aid in more farmer participation.

Figure 8: Production centre, futures trade and delivery centre (No of districts)



Source: based on data from NCDEX and Ministry of agriculture.

4. Reason for low participation

This section discusses the reasons driving low farmer participation in futures market. Gulati et al (2017) found that one of the foremost reasons for the lack of depth and liquidity of futures market are the abrupt suspensions and bans on commodities in futures market. They

find that whenever there has been a case of spike in prices, commodities have been either suspended from trade or banned from the market. These abrupt interventions reflect the lack of understanding of the functioning of the market among the policy makers in the country. It has been looked at through a lens of suspicion and has been suspected with every spike in prices. These suspensions discourage private players and genuine hedgers from participating in the market. This confusion and lack of conviction among policy makers has to be first corrected to develop futures market. With regards to farmers, they are not able to qualify in terms of lot size required for trading by exchanges and therefore there is no direct participation. In this paper, we look at farmer participation through two steps - in the first step, FPOs procure the produce from the member farmers and in the second step, FPOs sell the produce at the exchange. In this section, we identify the bottlenecks associated with these two steps.

Step 1- Linking farmers to FPOs

1. Financial constraints prove to be one of the most important bottlenecks for the FPOs. Unlike co-operatives which enjoy a joint ownership of the institution along with the government, FPOs can only depend on their farmer members or shareholders for access to capital in the form of equity. Access to debt capital or working capital in the form of loans is also constrained by the fact that banks are unwilling to recognize FPOs business models as viable and bankable. It was only in the fiscal year of 2017-18 that the Reserve Bank of India formally categorized FPOs under the priority sector lending mandate of public sector and private sector banks. All these conditions put together make for a high barrier for access to capital. Access to flexible capital in the form of joint equity, like the equity grant scheme of the government, and allowing for private investment from foundations can help meet the minimum requirement bar for direct participation in commodity exchanges and allow for a risk buffer which cannot be maintained by any debt based instrument.

2. The financial constraint has an impact on the kind of activity the FPOs perform. Most of the FPOs are engaged in business activities of aggregating and selling of inputs like seeds, fertilizer, and pesticides as against aggregation and selling of produce. While the former has low entry barriers and entails significantly lesser risk of carrying forward inventory, aggregating and holding raw produce carries severe market risks, logistical overheads of storage and transport which when not performed to its most efficient level, does not result in a profitable business. This is because risk involved in procurement and output related activities is far more than that of input side of the market. While dealing with output related risks, the FPOs have to manage risks related to price volatility, cost of storage and interest costs among many others. Given the financial constraints, FPOs are not equipped & comfortable in handling this risk.

   Only few FPO specific entities like NABKISAN, Ananya Finance, FWWB, and Avanti are proactively lending to FPOs while discussion with FPOs and Resource Institutions show that local banks/regional rural co-operatives/mainstream banks are averse to lending to FPOs. The financial constraints limit the capacity of the FPOs

and they are not able to buy all produce from the farmers. This makes the farmers go back to middle men and traders. Given the financial constraints that the farmers face, they have to resort to old buyers and traders for loans and therefore often obligated to sell them their produce. The overall lack of financial support forms the basic reason driving Indian agriculture to traditional value chains which are long and fragmented. Despite widely acknowledged nothing much has changed on ground.

3. Another issue is the management and governance related issues within FPOs. FPOs face the classical issue of the Principal-Agent problem where decisions affecting the Principal, the farmers and shareholders of the enterprise, are being taken by the agents, the management of the producer company most of whom are staff on the pay-rolls of the parent NGO. If the interests of shareholders are not aligned with that of management, due to gaps in accountability, incentives (management not being allowed to be shareholders, and being on the pay-rolls of the parent NGOs that have promoted the producer company), robust and enduring models of producer companies will be hard to find or form. This is evident in cases where gaps in decision making, for example, delaying unduly the task of hedging beforehand or failing to offload their stock once produce was procured have been noticed in multiple occasions within these firms. The fact that the losses of stored inventory would have to be borne by the producer company and is not of consequence on the employees, has influenced managerial decisions that have contributed lethargic decision-making.

4. Further, local agri-market environment are controlled strongly by a network of traders, middlemen and other rent seekers who have entrenched relationships with farmers. The relationship intensity facilitates strong networks of reciprocity and manifests as a power relationship making smallholder farmers bound to these traders in many ways. This apart, they also offer flexible lending terms, albeit at high rates of interest which interlocks the produce making it unavailable for free transactions on the market platform or for procurement by the FPO. Farmers need the credit at the time of sowing and these middlemen help them with these credit related needs which organized lending institutions often do not. Farmers are therefore not able and often not willing to let go of their relationship with these traders. FPOs, being relatively new, have not been able to displace such networks. The lack of capacity of FPOs to procure produce from all the farmers and the financial constraints and managerial issues faced by the FPOs does not make FPOs a de-facto choice for farmers to sell their produce through FPOs.

   Therefore, to summarize the constraints for the first step are- (1) Financial constraints faced by FPOs, (2) Because of higher risk involved in output related activities, fewer FPOs are involved in aggregation & marketing related activities. Majority of them are involved in input related activities, (3) Relationship with old buyers, i.e., middlemen and traders are very strong and (4) management related issues of FPOs

Step-2- Linking FPOs to futures

The second step in the process of linking farmers to futures is linking FPOs to futures. Even for those FPOs which are associated with procurement and marketing and are located near the production centres of the agri-commodities, they most often do not trade in futures market. Some reasons for low participation in futures market are as follows-

1. Lack of trust & understanding of futures market- Futures market is seen as a black box even by several policy makers in the country. There is hardly any training or knowledge sharing in the field of futures market. It is not surprising therefore, that farmers are confused about it and do not trust this platform as much as they need to. It is thought to be similar to gambling and most farmers choose to stay away from participating in this. There have been several instances where farmers have been subject to huge losses because of some miscreants. The activities of these miscreants have raised further negative beliefs about markets.

2. There are no grading and sorting facilities at the farm level. The quality of the produce procured by FPOs does not always match with the standards required by the exchange. This often leads to high rejection rates which discourage FPOs from participating in the futures market. They favour selling it in the mandis, despite high margins by traders and lower price realizations.

3. Reluctance in pre-harvest hedging. FPOs are generally risk averse and they believe that holding stock would give them a higher bargaining power. They are reluctant to lock in prices before the harvest and this often leads to huge losses since prices are likely to fall post-harvest and all the procured quantity has to be sold off at lower prices given the limited shelf life of the produce. This increases the inventory with the FPOs and squeezes out margins from the FPOs.

4. Logistic related- NCDEX delivery centre far from FPOs- Given the complex, diverse and dispersed nature of our agricultural commodity markets where varieties of crops differ from one plot to the neighbouring plot or even within the farm plots of a single farmer, the limitations of very sparse and limited number of delivery centres is an important factor that is hindering the growth of adoption of futures markets among farmers. This is compounded by the fact that, since FPOs are the only mechanism through which farmers can participate in the futures markets, an FPO may not exist near a delivery centre. While benefits of hedging can be passed onto farmers even in the case where the FPOs are not delivering on the exchange, FPOs are unwilling, for the reasons discussed above, to enter into pre-harvest hedging based contracts.

5. Tedious documentation and Entry Barriers: Since direct participation of farmers in the futures markets is not possible, farmers have to rely on FPOs for trading and delivering produce. First, farmers have to be part of registered FPOs and in turn these FPOs have to become clients of broking entities which are members of NCDEX. Thus this entails a three step process since direct membership of FPOs on NCDEX is not

feasible[7], FPOs have to rely on brokers to access the exchange. These brokers who are predominantly based only in urban areas lack the required incentives to address the needs of FPOs as they feel that the revenue earned by catering to FPOs who would only trade once or twice in a season is not worth the investment (time, money and effort). At the broker level, over 20 documents are mandated including KYC details of directors of the producer companies, some of which many times are unavailable.

6. Growth, Maturity and Objectives of the Resource Institutions and Producer Collectives: Producer organizations have various objectives, for example, dealing with inputs, microfinance among others (as given in Figure 6). Further, they are also at different stages of maturity and it is plausible that they might not have felt the need to deal with procurement and selling at futures market platform. Therefore, participation in futures market often also depends on these factors and the requirement therefore can vary depending on such circumstances.

   To summarize, constraints for the second step are- (1) Lack of trust & understanding of futures market, (2) high rejection rates due to mismatch in quality of produce needed by NCDEX and what FPOs provide, (3) reluctance in pre-harvest hedging, (4) logistic related and (5) Tedious documentation and Entry Barriers and (6) stage of growth and maturity of FPOs

5. Case studies and lessons

As discussed in Section 2, Bihar forms the largest share (64 percent) in overall FPO futures trade in India. Aranyak Agri Producer Company (AAPCL) located in Purnea, Bihar is a glorious example of an FPO trading in the future platform. Participation of AAPCL was because of a collaboration of World Bank, JEEViKA, Bihar Govt. initiative and technical partner, Technoserve. The FPO has established a farmer centric aggregation and marketing model on winter maize, which the region produces. World Bank Document[8] documents how the producer company has linked with NCDEX and benefitted through higher price realization. Their growth is extraordinary given that what started with 299 women farmers participating in 2015-16 grew to 3479 farmers in 2017-18 (almost 1000 percent) and total maize aggregated grew from 10,140 quintals in 2015-16 to 1,39,442 quintals in 2017-18 (more than 1000 percent) (Table 2).

[7] This is because of regulatory requirement that stipulate a minimum net worth as high as Rs 1 crore for membership and deposits of up to Rs 50 lakhs (for trading and clearing members) which poses a huge entry barrier for producer companies. https://www.ncdex.com/Membership/TypeofMembership.aspx

[8] Source: http://documents.worldbank.org/curated/en/298391515516507115/122290272_20180012014525/additional/122548-WP-P090764-PUBLIC-India-BRLP-Booklet-p.pdf

Table 2: Futures trade in AAPCL

Sr. No.		2015-16	2016-17	2017-18
1	No. of Women Farmers Participated in Aggregation	299	818	3,479
2	Total Quantity of Maize Aggregated (quintal)	10,140	30,640	1,39,442
3	Average Procurement Price (INR per quintal)	1,000	1,141	1,155
4	Average Cost of Operations (INR per quintal)	175	245	255
5	Average Selling Price (INR per quintal)	1,265	1,531	?
Inventory- 90,000 quintals				

Source: AAPCL, Note-Average selling price is not known since all produce was not sold during that time.

The model involved procurement from the farmers and exploring different channels to market their produce including open market sales, futures and spot exchange (NeML). Open market allows them to have greater flexibility in quality of produce, while futures market offers them price certainty. One factor that has helped in rapid scaling of the project was accessibility to Gulabagh, the delivery center for Rabi Maize which is present within a 30km radius of the villages where AAPCL is based, in Purnea.

However, sources confirmed that in the season of 2017-18 the model had a setback because of significant losses. The losses were purportedly due to issues in decision making and coordination between buying, storing and selling operations which resulted in accumulation of inventory of 90,000 quintals. As the market prices did not rise to the extent of costs (logistics+storage) it resulted in losses. It is pertinent to note that despite using a futures based model the enterprise faced market losses as until then they had not embarked on a pre-harvest hedging model, i.e. the produce bought from farmers was sold on the futures only after procurement operations had concluded. Another factor that exacerbated accumulation of inventory is that such operations entail substantial working capital requirements and since most of this was availed through Warehouse Receipts (against produce that had to be pledged) it incentivised accumulation of inventory as opposed to selling them quickly. More flexible working capital that allows collateral free loans for buying and selling operations as opposed to buying, storing and then selling would grant FPOs more operational freedom.

A more detailed study that looks at operational effectiveness and financial viability at the FPO level, skills and capacity creation to manage these complex decision making tasks at the FPO level and effects of such organized large scale procurement at the village level on stabilization of prices at the village level would have been interesting themes to explore but were outside the specific scope of this case.

In this section we discuss three other cases where futures market was successfully used by the FPOs to hedge their price risk. They are (a) Ram Rahim Pragati Producer Company in Madhya Pradesh; and (b) Nari Shakti Cluster Level Federation, and (c) Samruddhi Mahila Crop Producer Company Limited, both from Rajasthan. Ram Rahim was the first FPO to trade in the futures market, while Nari Shakti in Rajasthan involved a combination of State Government and Resource Institutions and started as pilot projects. Samruddhi Mahila Crop Producer Company Limited shows how well managed producer companies, along with an

empowered group of shareholders with proactive leadership can successfully trade in futures market.

5.1 Ram Rahim, Madhya Pradesh

Based in the tribal block of Bagli, in Dewas District of Madhya Pradesh, over 3000 women members belonging to 162 Self Help Groups with the support of Samaj Pragati Sahayog, a water and livelihoods based organization had started this enterprise in 2012. The objective was to undertake aggregation and marketing of their farm produce which included soyabean, chana, maize and wheat. Earlier the value chain was such that farmers were trapped in a vicious cycle wherein they took loans and sold their produce to informal moneylenders who also happened to be traders. However, after the FPO started procuring the produce, the role of middlemen is limited now.

In the summer of 2013, after the enterprise had aggregated bengal gram and was waiting for prices to turn favourable, markets crashed. This led to huge losses which made the enterprise realize that mere aggregation of produce did not result in better economics. Managing commodity price risk had to be a part of their activity. The next kharif season, when the enterprise had procured soya, it obtained a hedging/trading account at NCDEX by becoming a client of a member.

With the expertise provided by Samaj Pragati Sahayog, the enterprise was able to closely follow market developments and when prices reached an all-time peak May 2014, they were able to hedge on the exchange and were insulated from the price fall. Enthused by the use of such a mechanism to safeguard against price fall, Ram Rahim decided to further pursue the model.

Since 2014, the enterprise had evolved this mechanism to use the contracts to sell soya that it would purchase in October i.e. before the harvest and lock into prices, if favourable. This method of contracting of produce in advance of the season can be quite effective provided the relationship and trust between the producers and the producer company is strong as in the case of Ram Rahim. Table 3 gives the number of farmers from whom produce was procured, quantity procured and how much of it was sold to NCDEX for futures trading.

However, over the years the focus of the FPO moved towards crops which were neglected earlier like maize and pulses. They stopped aggregating soybean and moved towards pulses and maize as a step towards agri-diversification. This is the reason that farmers have moved away from soybean in 2016-17 and 2017-18 and soybean was dropped from the portfolio. The other crops procured by the FPO are pulses, maize etc. The lack of delivery centers for these crops and lack of contracts for some key pulses such as green gram and red gram is constraining the sale on NCDEX market. Maize was traded a few times but because of lack of variation in maize prices, the FPO did not find it profitable. Further, the price discovery for NCDEX maize contract takes place in Gulabbag of Bihar which does not match the interests of Ram Rahim. FPOs prefer price discovery to happen in delivery centres, geographically close to them.

Table 3: Ram Rahim futures trade

	2015-16	2016-17	2017-18
No of farmers	205	0	0
Total soybean aggregated (quintals)	178.72	0	0
Quantity sold to mandi (quintals)	0	156.31	0
To NCDEX(quintals)	7800	4800	0

Source: Samaj Pragati Sahayog, Note- Quantity sold to NCDEX is more than that procured as this reflects a mix of active hedging and carefully managed speculation- including using Soya as a proxy hedging tool for other crops.

The FPO believes that if price discovery happens in a delivery centre which is geographically closer, then this will encourage them to trade in futures market. Therefore, one of the recommendations based on this case study is having more delivery centres near the region. The FPO believes that soybean was traded successfully because delivery centres were in Devas and Indore which is geographically closer to the producing regions.

However, actual trading in the futures market mainly depends on the actual prices in a particular year and requirement of futures trading varies across years. If in a certain year, they anticipate price volatility, they might find it profitable to lock prices at the NCDEX platform, otherwise they might find trading in spot market to be more profitable.

Overall, the experience of the FPO shows that farmers already have an assured market in the form of arrangements like that of big multinationals buying from them via brokers. These alternate arrangements provide assured market to the farmers and therefore they do not feel the need to mitigate risk and futures market is therefore not indispensable. Other than these alternate arrangements, farmers have a strong relationship with traditional money lenders and traders and often are interlocked with them and not free to sell in the mandis. All these reasons make it difficult to scale futures market in the region. One of the possible way outs can be having delivery centres catering to other crops geographically close to the FPO and encourage futures trade for commodities which are now focussed by the FPO. It is interesting to note that over the years, the FPO has been using the platform for speculation as well.

Some of the constraints and bottlenecks which the pilot had to face were- (1) stiff competition from traders, (2) Limited number of delivery centres and warehouses (3) Large farmers averse to pre-harvest hedging and (4) lack of futures contracts for commodities produced by them. Some of the lessons the FPO has learnt from its experience are as follows- (1) Since number of of warehouses are not enough in the region, they are building their own, (2) Given the significance of maintaining quality standards, they are also building their own grading centre, (3) They have understood the need to add value to their produce and have started marketing non-pesticide managed produce.

5.2 Nari Shakti, Rajasthan

Rajasthan Grameen Aajeevika Vikas Parishad (RGAVP), under the aegis of Department of Rural Development, Government of Rajasthan is a flagship rural development program. A whole range of livelihood promotion activities are driven through the Cluster based approach. Here a community based democratic women institutions in the form Self Help Groups (SHGs) are created to develop capacity of rural women to initiate and expand sustainable livelihood opportunities. These SHGs are further federated into Village Organisations (VOs) which form the second level of community institutions. VOs are further mobilized into registered societies called Cluster Level Federations (CLFs) which are run and governed by women. RGAVP till date has led the formation of 352 CLFs in 157 Blocks of Rajasthan which cater to the needs of over 1 lakh SHGs.

Letz Dream Foundation (LDF), a non-profit grant making foundation has been partnering with RGAVP since July 2016 to assist the work of CLFs. The contribution of LDF in linking the CLF to futures market has been pivotal. Their objective is to increase the income of women with the help of SHG-platform and the strengthening of CLFs. LDF professionals deployed in 4 CLFs in Sangod Block developed a model where farmers could sell their produce at NCDEX platform. As a pilot, collective procurement of approx. 77 quintals of Soybean was initiated by CLFs with 63 farmers from 14 villages in kharif season in November 2016. The alternative of selling at NCDEX platform was chosen after considering the expected benefits compared to the traditional marketing channel wherein produce was sold to the middlemen since nearest mandi was kota mandi which is approximately 100 kms far from the villages. Middlemen deduct the mandi taxes and transportation costs from farmers.

LDF trained farmers about online marketing platform of NCDEX and NeML Futures trade started as a pilot project. Given that there is a large agricultural base where 70 percent of farmers are CLF members and are engaged in agricultural activity, this was suitable for the pilot. However, farmers do not sell all their produce to the CLF. It was difficult building trust between community and CLF during initial first two three years of project. Their relationship with old buyers is still strong. This is more because it was easy for them to get money from mediators at their need of time.

After comparing the prices at the futures market and the spot prices offered by middlemen at the mandi, a contract account was opened through the commodity broker, Religare. LDF started comparing the rates at which they bought from the farmers and the online rates available at NCDEX and sold the crop only based on the future market of NCDEX.

Finally, in March 2017 four such Cluster Level Federations in the Sangod Block located in Kota District kick started a program to procure mustard following a pilot project of procuring soyabean the previous season. Of the four clusters, Nari Shakti Cluster Level Federation was used as the nodal agency for procurement. The procurement chain started with procurement from farmers at the household level. Quality checks and rate finalization are done as per local mandi prices and farmers are paid accordingly. The produce is transferred to warehouses at

Kota where they are either sold at the Kota Mandi/or institutional buyers/trader/NCDEX. Table 4 gives the details regarding procurement and quantity sold to NCDEX in the year 2016-17.

Table 4: Nari Shakti futures trade

	2016-17
No of farmers in each CLF	3740
No of farmer sold at NCDEX	139
Total quantity of Soybean sold at NCDEX	77.1 quintals
Total quantity of Mustard sold at NCDEX	974 quintals
Additional profit earned by Farmers	Rs. 200 per quintal
Profit earned by each CLFs	Rs. 42,324

Source: Letz dream foundation

Some of the major bottlenecks of the pilot were as follows- (1) timely availability of warehouses, (2) making the SHG members understand and move away from the traditional middlemen of mandis (3) value addition at CLF level and (4) another issue was the high rejection because of quality issues. For example soybean procured by the CLF could not be sold at NCDEX because of quality and minimum lot size requirement of 10 tonnes as the federation had procured only 80 quintals.

5.3 Samruddhi Mahila Crop Producer Company Limited, Rajasthan

A small project to increase productivity of soya-bean farmers that began with 55 farmers, located in town of Lakheri in Bundi District in Rajasthan, in 2006, eventually took shape of a Farmers Producer Company. Today, Soya Samruddhi Mahila Crop Producer Company Limited is one of the largest producer companies in Rajasthan having a shareholder base of over 2500 women members and boasting of even its own processing unit for soya. This has enabled them to take part in marketing of their processed produce in specially created markets like farmers markets, fairs and exhibitions where they sell produce like soya biscuits and soya cake. Farmers in the semi-arid region grow urad and soya bean in the Kharif season, and mustard and wheat in the Rabi seasons. While initially the producer company focused on selling improved seed varieties and focused on crop productivity, farmers began to also demand better markets to sell their surplus. The company entered into a partnership with Bunge Limited, an American agribusiness multinational, headquartered in New York, to supply soya-beans at fair/fixed prices, the forward agreement fell through due to quality and quantity considerations.

In September 2016, the FPO experimented with futures by taking up a short/sell position on soya for 10 tonnes or one lot at Rs 3314/quintal in September for the November Contract. The enterprise thus became the first producer company to undertake a hedging based futures trade in Rajasthan. As the prices fell during the subsequent period, the enterprise sold or squared off the position and used the trading profits to give a small bonus to few farmers who had offered to sell on the platform. (Farmers sold in the local market at spot prices, which were less than Rs 2900/quintal). Before venturing into the contract the enterprise was able to

back up its position with a chosen group of farmers who agreed to sell their produce at a price pegged to the contracted price.

As the experiment turned out well, it generated the interest of other farmers who were now willing to take this process forward with the mustard crop in the subsequent Rabi season during December 2016 and January 2017. As the prices fell during harvest (February-May), the enterprise undertook delivery based trades to earn a surplus of near Rs 250 per quintal. During harvest season, the enterprise sold additional lots on the exchange platform due to a favorable price parity i.e. difference between spot and futures markets in the same month.

Samruddhi Mahila Crop Producer Company Limited was able to understand futures and also comply with the paperwork in record time as it is backed up by strong management team and SRIJAN, Self-Reliant Initiatives through Joint Action, with parent NGO with a history of promoting and nurturing grass root organizations. SRIJAN, the management and the board of the producer company along with their farmers worked in tandem to ensure that there were no slippages through documentation, the logistics of finding warehouse spaces, booking the warehouse and finally using the exchange to deliver at the contracted rate all proved challenging. SMCPCL was able to manage this by first experimenting with a contract only strategy using soya in 2016 Kharif and only then venturing to make deliveries on the platform for mustard Crop in 2017. Since there is a nebulous overlap between the FPO staff and those of the parent NGO it is hard to distinguish who were the primary agents who exercised managerial authority or decision making. But as most of FPOs are heavily reliant on support of management staff from the parent NGO we can regard their actions as indistinguishable from each other. Thus they were able to start small, build the necessary confidence and scale this by including more number of farmers and crops in the subsequent seasons.

Encouraged by the result of Soya Samruddhi, another such enterprise promoted by SRIJAN, Jaisingh Nagar Soya Samruddhi Producer Company based in Sagar District in Madhya Pradesh ventured to take part in using Soya Futures a year after Soya Samruddhi. During January and February 2018 Jaisingh Nagar Soya Samruddhi Producer Company used Soya Futures to offload 40 tonnes of soya using the exchange at prices of around Rs 3350 and Rs 3391/quintal. What is interesting to note here is that this was the year when the Bhavantar Yojna was in operation. Just a few months before, spot prices prevailed below Rs 2600/quintal while futures were at a premium. This highlights how lack of access to futures markets by farmers can pose such asymmetric prices and open arbitrage gaps that are exploited only by traders underscoring the point of why it is important and integral for farmers to have fair and free access to delivery based derivative market platforms. What is even more significant is that farmers were able to get nearly 30% higher than local market and 10% more than the MSP announced for soya that year or the ceiling price for Bhavantar Yojna.

The above experience enumerates the importance of how well managed producer companies, along with an empowered group of shareholders with proactive leadership can help in adopting and sustaining the practice of using futures contracts, both as a hedging tool and as an alternative marketplace. Both these examples show graduation of producer companies,

from being a single commodity player to a multi-commodity and multiple season exchange participant.

A key finding from the case studies discussed above is that there are different reasons for these FPOs to trade in futures market. Some are- prior losses due to market volatility, new pathway for market access, better price discovery among others. For example, in case of Ram Rahim, it was to avert holding losses and therefore they started using futures primarily as a hedging technique. For Samruddhi Mahila, it evolved as an instrument to offer support against uncertainty when they used it before harvest. And for Nari Shakti Federation, it was used in the process of discovering an alternative pathway to existing market channels for primary produce when selling through/at the Mandi did not materialize.

Further, based on the case studies discussed above, we identify that different strategies have been pursued by the FPOs while participating in the futures platform (Table 5). For Ram Rahim, it was both pre and post-harvest hedging which were pursued. Here, the FPO locks prices on the Futures exchange by taking sell positions in an advance month after it has procured produce from farmers. However, the final point of sale is not on the exchange but through some other channel, which may be at the Mandi itself, or institutional buyers. After the FPO locks into a price, it is guaranteed that price whether or not it sells on the exchange. If prices drop, then it loses value in the spot markets, but gains on futures. If prices increase, it loses on the futures markets but gains in spot market trades. This strategy is suitable where delivery centers are not close to the FPO. In case of pre-harvest hedging which Ram Rahim pursued for Kharif soya in 2015 and 2016, after having back-end agreements from farmers willing to sell their produce at a given price as indicated in the future months before harvest, the FPO can lock into prices before harvest season thus insulating farmers from price falls below this price during the harvest season, but also capping upside potential. For Nari Shakti on the other hand, it was a combination of post-harvest hedging and delivery at the exchange since produce bought from the farmers was sold at the exchange while we found that Samruddhi Mahila undertook pre-harvest hedging for Kharif soya in 2016 and pre-harvest hedging plus delivery for mustard rabi in 2017

Table 5: Showing Different Strategies Pursued By These Different Producer Companies

Sr. No	Producer Companies/Strategies Employed	Post-Harvest Hedging	Post-Harvest Hedging + Delivery on the Exchange	Pre-Harvest Hedging	Pre-Harvest Hedging+ Delivery
1	RamRahim	√ (Soya Kharif 2014)		√ (Soya Kharif 2015 and 2016	
2	Nari Shakti		√		
3	Samruddhi Mahila			√ (Soya Kharif 2016)	√ (Mustard Rabi 2017)

Source: Authors' compilation

The exact strategy for hedging- whether pre-harvest, or during harvest or post harvest after a certain amount of holding can be quantified as a model based on risk preferences. While the exact model for risk optimized hedging is beyond the scope of the paper, the following considerations usually accompany such decisions.

1. **Pre-harvest Hedging-** This is a medium risk option as there are chances that the prices can increases post-harvest
2. **During Harvest:** This is by far the safest option as one utilizes the price differential between spot markets and futures prices (arbitrage), but if the assumption that prices usually tend to be low during harvest holds, then one would have already seen the effect of the price fall. This model also makes it necessary for an accessible delivery center close to the FPC.
3. **Post-Harvest Hedging:** This model has the maximum risk as the FPC lies completely exposed to markets for as long as it remains unhedged or the extent of its holding time.

6. Lessons from Chinese experience

Despite starting as late as 1993, globally, China is the largest player in futures market in terms of number of contracts traded in the futures market. As documented by studies like Peck (2001), the genesis of Chinese futures was a deliberate and cautious attempt and was extensively based on pilot projects and experimentation. Gulati et al (2016) presents a detail review of the evolution of Chinese futures market and find that some of the lessons for Indian futures market are as follows: (1) no abrupt suspension, (2) state Govt. Participation, (3) compulsory delivery based contracts and (4) focus on commodities which are not sensitive from the perspective of food security and Government intervention.

Lessons from Chinese experience are particularly interesting given the dominance of small and marginal farmers in their agriculture like India. Despite its similarity with Indian agriculture, it is striking that there is a stark difference between the two economies in terms of deepening of futures markets. In this section, we review the initiatives taken by the commodity exchanges in China and the Government of China to encourage farmer participation in futures market.

China started encouraging farmer participation as early as 2005. Some of the initiatives by DCE and Government of China to encourage farmer participation in futures trade are given below. They have been retrieved from Dalian Commodity Exchange, their largest agri-commodity exchange.

1. 1,000 villages, 10,000 farmers- UNCTAD Report (2006)[9] documents that a broad-based farmer education programme was conducted by Dalian Commodity Exchange since 2005 called, "1,000 villages, 10,000 farmers". The programme was initially launched in the major grain production regions in northeast China including Heilongjiang Province. Farmers were trained to use futures market related information to form more accurate

[9] http://unctad.org/en/Docs/ditccom20084_en.pdf

expectations about future price development across the two crops, improving their planting, harvesting and selling decisions as a result.

2. Program of Serving the Rural Households- In 2007, DCE launched the program of serving the rural households. This involved training and educating farmers, commodity enterprise executives and cadres in rural communities about futures trading. They were trained about hedging their risks and adjust plantation structure according to price changes in futures market.
3. Government commitment in encouraging futures trading among farmers
    a. 2007- DCE signed an agreement with the cities of Wuhan and Chongqing where the government of the two cities expressed their support for assisting the exchange to introduce new products by using their local advantages
    b. 2007- Dalian Commodity Exchange （DCE）has signed strategic cooperation agreements with the provinces of Sichuan, Hubei and Chongqing to jointly foster the development of live hog contracts. Both State and the exchange made efforts to explore new futures product and mechanisms for the development, services, training as well as information sharing for the futures market.
    c. 2010- The National Development and Reform Commission (NDRC) and the Ministry of Agricultural published "Guidelines for Accelerating the Transformation of Northeast China's Agricultural Development and Constructing Modern Agriculture" which recommends timely launching new Northeastern-focused agricultural futures products at the Dalian Commodity Exchange (DCE).
    d. 2012- Dalian Commodity Exchange and Heilongjiang Provincial Agriculture Commission signed the Strategic Development and Cooperation Agreement of Services for Agriculture, Farmer and Rural Area. The idea was that both sides would extensively carried out trainings for the farmer marketing teams, add the futures content into the training programs for the farmer marketing teams. The aim was to conduct trainings for 500 marketing personnel in 2012, and increase the number up to 2,000 by 2015.
    e. Focus on futures market in No 1 Document- No.1 Document of CPC Central Committee for 2016 sets out the requirements to create and design agricultural futures products and carry out pilot for agricultural options; steadily expand the insurance + futures pilot programs. We discuss the insurance+futures program later in this section.
4. Rural Communities and families service project- The Dalian Commodity Exchange (DCE) and the Heilongjiang Province Agricultural Committee co-sponsored the "Heilongjiang Province Initial Farmer Cooperative Leader Futures Training Program". Nearly 90 community leaders from the Heihe and Suihua regions attended the training program. As of the end of September-2009, there were 7,702 registered farmers' cooperatives in Heilongjiang province, with 57% of them focused on the planting of corn and soybeans. The establishment of these specialized cooperatives has improved the level of organization of agricultural production.

5. Futures + price insurance model (2015) - This program of Futures plus insurance was introduced in China in 2016. The Chinese Government intend to move from a state controlled economy of minimum support prices towards a market determined price structure in future. In this transition, as documented by Kenderdin (2018) three means are being adopted, (1) introduction of interim provincial target price quasi market set by the provinces, (2) insurance and (3) Futures. In 2016, the Central Number one Document recommended the launch of this scheme to offer subsidies to insurance companies to offer agri-insurance policies based on futures prices. The futures companies have been required to provide the service to protect the households, family farms and rural cooperatives against the price risks through the projects of "insurance plus futures". The price data related to the insurance contracts are based on the corresponding DCE futures data.

The scheme works as follow- (1) Farmers buy insurance to ensure the minimum selling prices /earnings, (2) The insurance company make payments to compensate when commodity prices are less than agreed futures price levels, (3) The price data related to the insurance contracts shall be based on DCE futures data. (4) Reinsurance by buying options from futures brokerage companies and (5) the futures brokerage companies conduct the relevant hedging operations at DCE. The scheme is still at a pilot stage, however the pilots have been scaled up in 2017. The status of the program is given in Table 6.

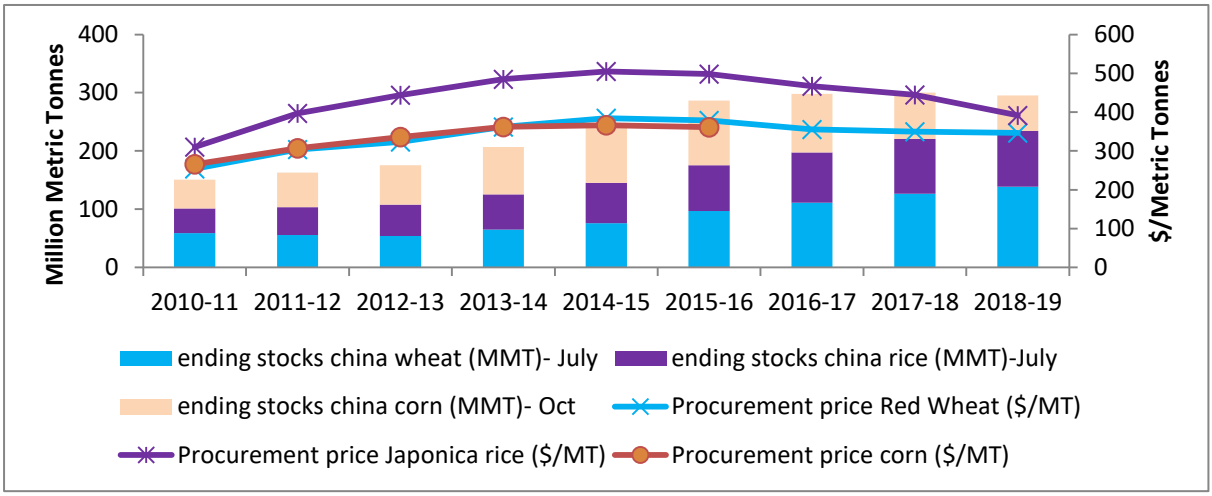
Table 6: Status of futures + insurance pilot in China

Particulars	2016	2017
No of pilots	12 pilots	32 pilot projects
Commodities	Corn (9) and soybean (3)	Corn and soybean
Provinces	Heilongjiang, Jilin, Liaoning, Inner Mongolia, Anhui and other provincial regions	Heilongjiang, Jilin, Liaoning, Inner Mongolia, Hebei, Anhui and Chongqing,
No of households	4,158 farming households	
Quantity of produce	200,000 tonnes of spot corn and soybean	678,300 tons of spot corns, 114,000 tons of spot soybeans
Claim settled	RMB 4.82 million recorded in claim settlement	No information
Area covered		2,068,700 mu of total planting area.
No of insurance companies involved	12 futures companies and 7 insurance companies	

Source: Dalian Commodity Exchange (http://www.dce.com.cn/DCE/)

Alongside developing and focussing on the agri-futures markets, another critical initiative taken by the Chinese Government is slowly freeing the commodity market from Government intervention. China was raising MSP since 2004, and ended up piling huge stocks (Figure 9) which as discussed earlier is a negative impact of higher MSPs. As a market correction measure, since 2014, it has been reducing its MSPs for rice and wheat and removed corn from the support. It is slowly moving towards a Direct Income Support (DIS) based intervention.

Figure 9: China MSP and ending stock



Source: United States Department of Agriculture, Foreign Agricultural Service, several years (https://apps.fas.usda.gov/psdonline/app/index.html#/app/advQuery)

It must be noted that the futures market cannot exist and function efficiently in isolation. Support is required from the both the Government as well as exchange to encourage participation and increase depth and liquidity. Lower market intervention will reduce distortion and futures markets will be able to discover prices more efficiently and achieve its objective. More efficient price discovery will increase trust in its functioning and encourage participation.

To summarize, some of the key takeaways[10] with regards to linking farmers to futures markets are- (1) state support and focus on futures market. The inclusion of these contents in the No. 1 Document shows that the government attaches great importance to the functions of the derivatives market and the related innovative financial services. (2) innovative and customized products according to the requirements of the farmers and other stakeholders in agricultural value chain, (3) compulsory delivery based futures contracts, (4) encouraging indirect use of futures by farmers in terms of using futures information for cropping decision and (5) lower Govt. intervention in terms of procurement and MSPs. These steps build confidence among the producers and thereby aid in both direct and indirect use of futures.

7. Concluding remarks

Farmer participation in futures trade is extremely low in India. For futures market to achieve the objectives of price discovery and risk mitigation and have an impact on Indian agriculture, it is pertinent that more farmers or FPOs participate in it. Some of the suggestions below can help FPOs' participation in futures trading.

[10] Although it might not be possible for India to exactly replicate the Chinese models, these examples show that China, despite being a large country with majority of small and marginal farmers have been able to successfully deepen their futures market.

1. To start with, FPOs need to focus on commodities that are not sensitive from the perspective of food security and Government intervention. Market interventions through schemes which ensure high MSPs, if efficiently implemented, are likely to make futures redundant since entire market risks will be covered by the Government with no risk for the farmers. From that point of view, given the current state of MSP policy, and food security concerns, FPOs should remain away from wheat and rice. Even in case of pulses, where lately government intervention has increased, FPOs will have to be careful which pulses prices to hedge.

2. Identify production centres for crops and focussed initiatives to encourage futures trading in these areas. As discussed in Section 3, there is a mismatch between production areas and districts trading in the futures markets. Focus has to be given on areas which are in the production districts for the commodities. The next focus point is building of delivery centres Delivery centres have to be built around producing districts. Since this may not be feasible for all the cases, more location based contracts should be offered. This is where the Commodity Exchange (NCDEX) can lead the way.

3. Another vital link which encourages farmer participation is the role of Resource Institutions. They are ground level organizations involved with the working of the FPOs and have to be trained, educated and made comfortable with concepts related futures markets and pre-harvest hedging. They can in return train FPOs and aid in scaling up. Given the ground presence of the resource institutions, their role is crucial in the linking process. FPOs are more likely to trust them while making these crucial decisions rather than any external body. All the case studies in Section 5 bring out the significance of resource institutions.

4. Government initiatives like that of Bihar and Rajasthan need a rigorous assessment. And if found useful, it can make a case for increasing such pilots in some other states. Government back initiatives like these demonstrate how when farmer owned institutions are given autonomy in decision making and are backed up by the competent technical expertise, can figure out novel means to ensure price support like benefits for farmers using a market based mechanism. Supporting creation of market facing farmer institutions through FPOs and exploring use of instruments like Futures and Options for providing price supports can offer innovative, market based ways of administering a MSP like support system.

5. Government bodies like NAFED, NABARD, SFAC, PACS etc. can all play a part by either providing training or participating or both in the market. The presence of Government bodies will build trust and encourage farmers towards the market and can have a role in clearing its negative image. Government and exchange aided trainings are done in other countries like China. The foremost bottleneck with respect to futures trade is lack of trust and understanding in the working of the futures market and this can be greatly corrected by Government participation in the process.

6. Indian futures market can learn lessons from China in terms of the support that the state provides to the futures market. For example- it is included in No. 1 Document, the state trades in the market, trains farmers to use futures market both directly and indirectly. The state has several joint partnerships with the exchange. They are also jointly piloting innovative and customized products to encourage use of futures. The Chinese Government is trying to correct the market distortions by lowering MSPs for rice and wheat and has dropped corn from the list of supported commodities.

7. There are other market based instruments like options and forwards which can be more appropriate for farmers. Options will allow them to mitigate price risk when it falls below that of their expected prices. The case studies discussed earlier show that FPOs prefer forwards like arrangements compared to futures as a price risk instrument. A forwards platform, if encouraged can establish a bilateral channel for farmers, FPOs and other market players to directly enter into buy-sell contracts at fixed prices at any time and any space, since forwards can be entered under reasonable and bi-laterally agreeable terms. All these together would potentially create enriched possibility for free and possibly fair trade of produce between buyers and sellers.

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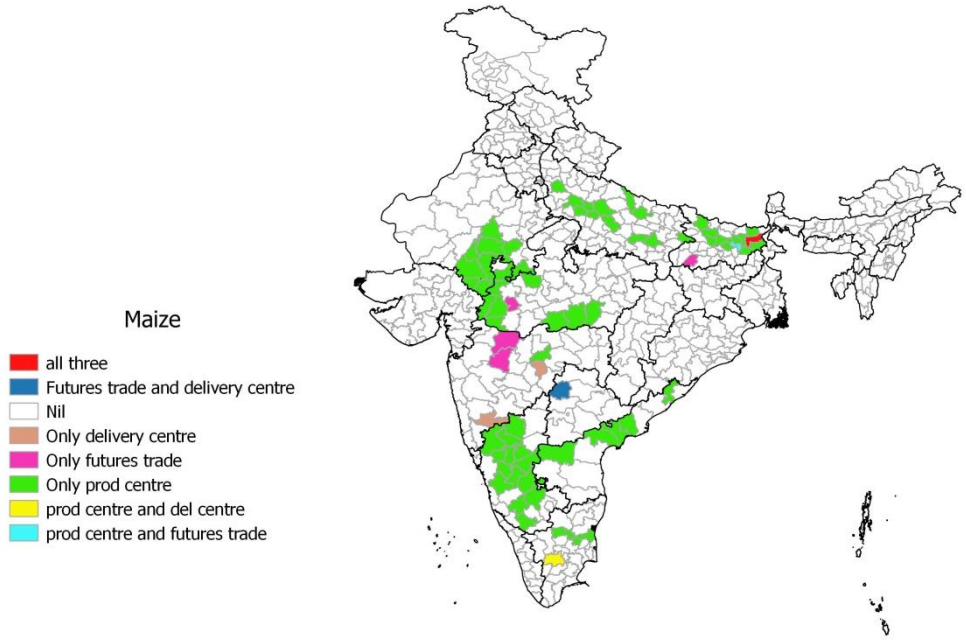
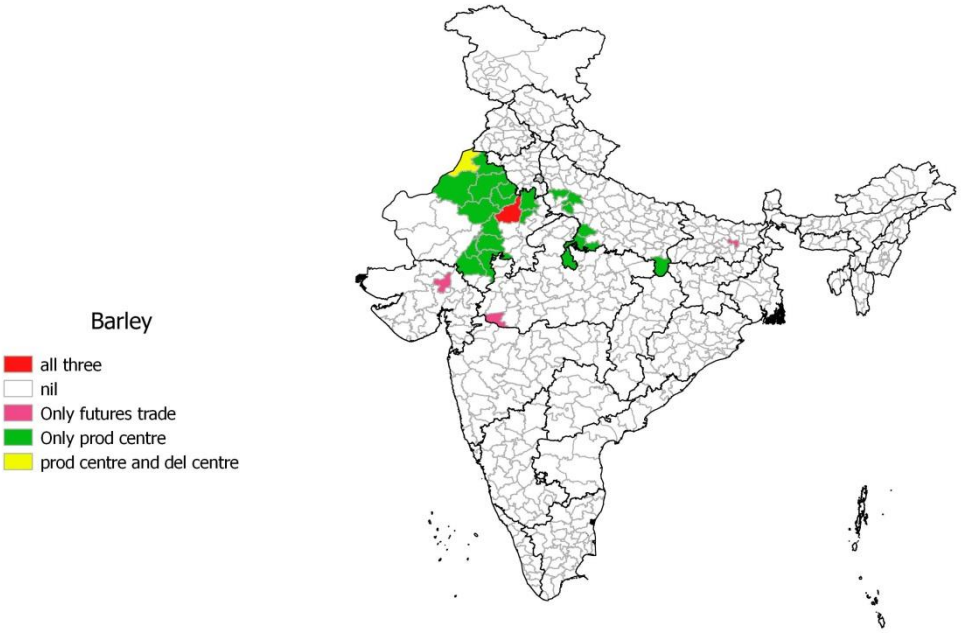
Annexure

Figure A1: Spatial map of maize producing and trading centre



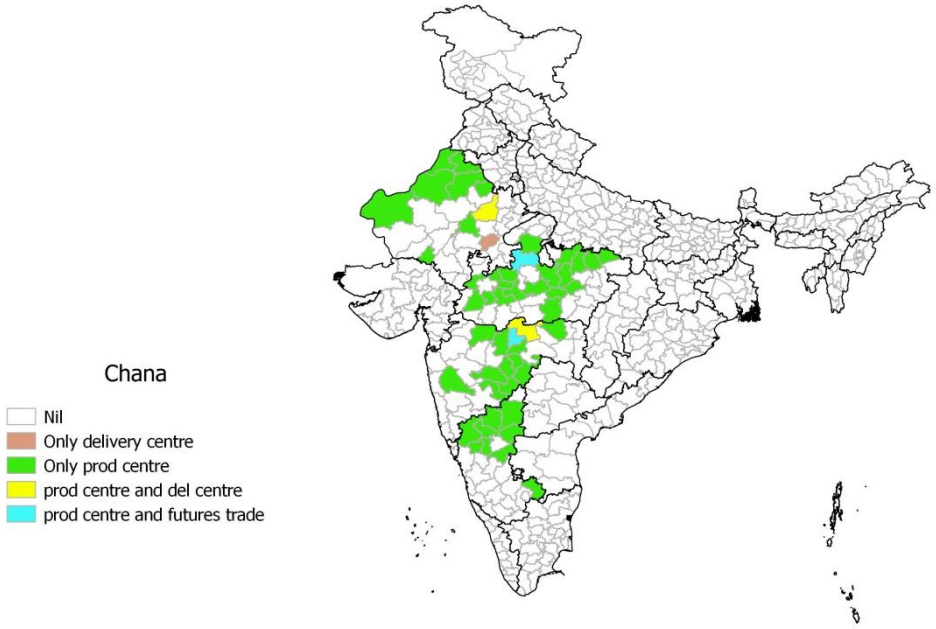
Source: based on data from NCDEX and Directorate of Economics & Statistics, Dept. of Agri., Govt of India.

Figure A2: Spatial map of barley producing and trading centre



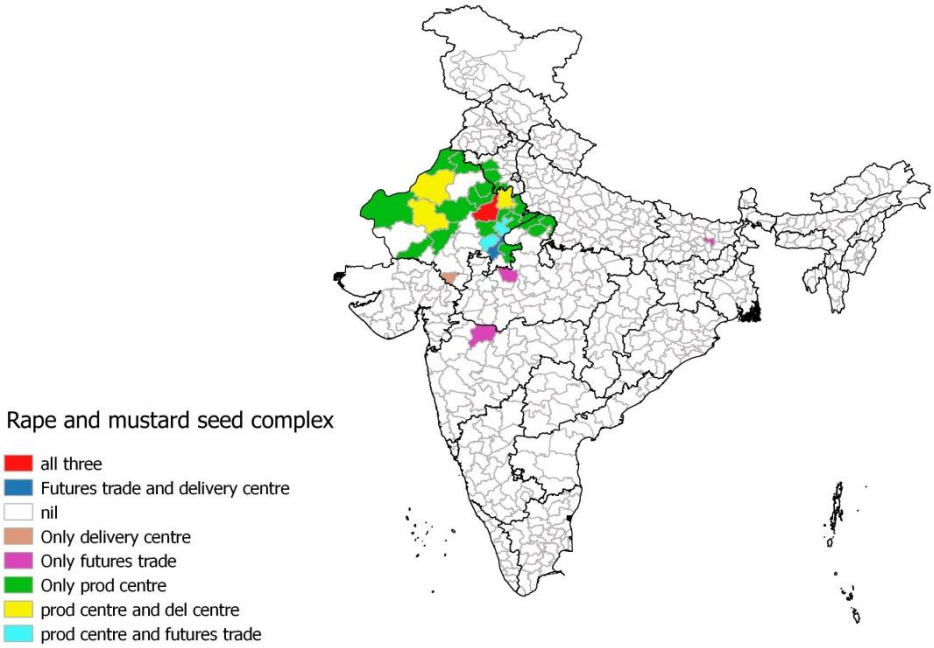
Source: based on data from NCDEX and Directorate of Economics & Statistics, Dept. of Agri., Govt of India.

Figure A3: Spatial map of chana producing and trading centre



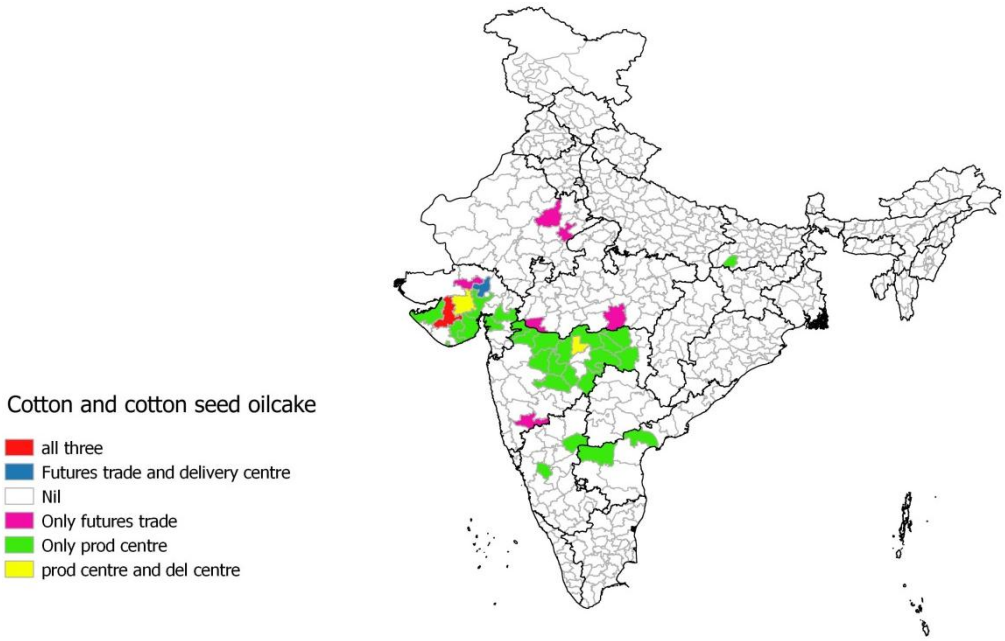
Source: based on data from NCDEX and Directorate of Economics & Statistics, Dept. of Agri., Govt of India. Note: Futures trade- Districts which are only trading in futures market and are not producing centres, Producing centre: districts are only high producing areas & Both- districts which are both producing centre & trade in futures market.

Figure A4: Spatial map of rape and mustard producing and trading centre



Source: based on data from NCDEX and Directorate of Economics & Statistics, Dept. of Agri., Govt of India.

Figure A5: Spatial map of cotton producing and trading centre



Source: based on data from NCDEX and Directorate of Economics & Statistics, Dept. of Agri., Govt of India. Note: Futures trade- Districts which are only trading in futures market and are not producing centres, Producing centre: districts are only high producing areas & Both- districts which are both producing centre & trade in futures market.

A6: Pradhan Mantri Annadata Aay Sanrakshan Abhiyan (PM-AASHA)

This umbrella scheme was announced on 12th September, 2018 with an objective of ensuring MSP announced for 2018-19 seasons to farmers. It must be noted that MSPs announced for 2018-19 kharif crops were based on the formula of 1.5 times A2+FL costs. The scheme comprises of three sub-parts-

1. Price Support Scheme (PSS),
2. Price Deficiency Payment Scheme (PDPS)
3. Pilot of Private Procurement & Stockist Scheme (PPPS).

PSS scheme will cover pulses, oilseeds and Copra, will be done by NAFED and FCI and the cost and losses will be borne by the Central Government. Under the PDPS, it is proposed that all oilseeds for which MSP is notified will be covered under the scheme. In this direct payment of the difference between the MSP and the selling/modal price will be made to pre-registered farmers selling his produce in the notified market yard through a transparent auction process. The scheme will not involve any direct procurement and entire support will be in terms of deficiency payments where the difference between the MSP price and Sale/modal price on disposal in notified market.

Under the PPPS, the involvement of private stockiest has been decided to be introduced as a pilot program to be launched in certain districts or APMC of districts for oilseeds. However, the selected private agency will be allowed to enter the market only within a specified time window and cater to only registered farmers when market prices are below the announced MSPS. A maximum service charges up to 15% of the notified MSP will be payable. Only those districts will be chosen for pilot where there is no reach of the other two schemes under the umbrella scheme.

It has been decided by the Cabinet that an additional government guarantee of Rs. 16,550 crore making it Rs. 45,550 crore in total will be given for the scheme. In addition to this, 15,053 crore has been sanctioned for the budget provision for procurement operation and implementation of PM-AASHA.

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