Commodity Derivatives and Risk Management
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Lecture 33
Agri commodities Price Risk, Seasonality, Crush Spread Futures.

Welcome to the 33rd lecture on Commodity Derivatives and Risk Management. And today we are going to discuss with various aspect of Agri-Commodity Price Risk which we were continuing from the last session. In addition, we will also be discussing two interesting aspects of Agricultural commodity price risk that is the seasonality and cross spread futures contract. Now, let us continue with what we were discussing in the previous session related to Agri-Commodity Price Risk Management available, price risk management avenues available to different traders in Indian context. Please recall that in India we have two commodity exchanges, National Commodity Derivative Exchange which is popularly known as NCDEX. We also have multi commodity exchange, these two commodity derivative exchanges are offering various kinds of contracts and predominantly National Commodity Derivative Exchanges focuses on offering Agri-Commodity Derivatives. And coming to NCDEX, NCDEX offers contracts on a wide array of Agri-Commodity Derivatives which are not available anywhere else in the world. Regarding the diverse nature of our food habit and Agricultural practices, NCDEX offers derivative contracts and very interesting commodities such as guar gum, guar seed, jeera, cotton seed oil cake which is popularly known as cocoon, and we also have futures contract on turmeric and isabgol etcetera. In addition to this Agri-Commodity contracts at NCDEX, multi commodity exchange also offers contracts on crude palm oil, cotton rubber and Mentha oil. And in addition to many corporate hedgers, NCDEX contracts are extensively used by farmer producer organizations. So, we will be discussing about how FPOs are benefiting from the commodity derivative trading in little greater detail and FPOs are nothing, but your farmer producer organizations. Now even though National Commodity Derivative Exchange is focusing on very interesting and innovative Agri-Commodity Derivative contracts, but over the period of time average daily traded value that is ADTV is going down predominantly because government of India has been banning many Agri-Commodity Derivatives specifically commodities which are part of the essential commodities act. So, as you can see from this particular table different commodity Agri-Commodity Derivatives have been banned at different point in time and the latest one to be banned by the government of India has been the 10-commodity futures contract at one go in December 2021. So, this significantly dented the futures trading volume in the Indian commodity exchange that is your NCDEX. Now coming to

our discussion related to how farmer producer organizations are using National Commodity Derivative Exchange, let us discuss little bit more on what are farmer producer organizations. So, in India we have currently about 6000 farmer producer organizations which have been registered and these farmer producer organizations are facilitated by organization called S-FAC (Small Farmers Agri-Business Consortium), NABARD and many other NGOs. So, what these units are doing is that they are helping groups of farmers to create a farmer producer organization and this farmer producer organizations are being incorporated as a company under Indian companies act. And what are the objective of this farmer producer organizations, predominantly the main important objective is to bring small and marginal farmers to a common group and by doing so, this farmer producer organization will be able to aggregate the farm produce to achieve a better price and bargaining power as a bulk seller. Please note that in India all majority of farmers are either small or marginal farmers and the amount of Agri commodity they produce is very small and hence they do not have a bargaining power, when somebody is coming and approaching them to sell the commodity farmers are not in a position to get a better price because each of them have a very low quantity of Agri produce available with them. So, through farmer producer organization so, the farmers are able to aggregate the total produce so that they will be able to negotiate a better price. In addition to getting a better price for Agri commodity which they are producing, farmer producer organizations are also in a better position to negotiate a better price for farm inputs such as seed, fertilizer, farm equipment, irrigation support units as a bulk buyer. So, instead of individually buying a small amount when a group of farmers create a farmer producer organization and collate their total farm equipment for seed procurement, they will be able to negotiate a better price. And in addition to these benefits, farmer producer organizations have also started hedging the price risk at the national commodity derivative exchange. So, this snapshot which I have taken from the NCDEX website this shows the total number of farmer producer organizations which have traded, how many states they belong to, what kind of a commodities they have traded. So, all this detail is available from the available at the NCDEX website and I have also taken a snapshot for your reference. Now let us come to discuss an example of how farmer producer organization have been able to use the NCDEX platform to mitigate the price risk. In this context let us understand the journey of a particular farmer producer organization. This J.C Nagar Soya Samriddhi producer company limited is a farmer producer organization from Madhya Pradesh and this particular FPO has about 1000 soybean farmers as members. And during October 2027 this particular farmer producer company bought about 275 quintals of soybean from the member farmers at a price of 2885 rupees per quintal. And what the FPO did immediately is that it stored that particular amount of soybean at the NCDEX accredited warehouse. And with this the FPO was not in a hurry to sell because once the commodity is in under safely kept in a hygienic manner in a in a proper warehouse the farmers or farmer producer organization

is not in a compulsion to sell to anybody because they do not have an enough storage space. Now what this particular farmer producer organization did subsequently is that it used NCDEX platform to enter into short futures contract and deliver the soybean after the contract expiry. Now they are long on the underlying asset, they are holding the soybean as a commodity, and they are fearing that price may go down and they entered into a short futures contract. And what exactly they did let us understand from this particular panel. Please note that in the month of October 2017, the farmer producer organization entered into a short futures contract which is for December 2017 expiry. And on the contract expiry date this particular FPO delivered about one lot of futures contracts which is equivalent to 100 quintal and realized price of 3262 rupees for quintal. Please note that this particular FPO was bought at 2885 and realized the price of 3262 rupees per quintal and the total profit for this one quintal came to about 37,700. Similarly, again during October 2017, it entered into a contract for January 28 delivery and sold soybean at 3464 rupees quintal, sold in the sense delivered the futures delivered one lot of soybeans which is a 100 quintal of soybean at a price of 3464 and benefited by 57900 rupees. And it sold the remaining 75 quintal in the open market because the lot size was less than one lot which is for 100 quintals. As per the NCDEX contract specification minimum lot size is 100 quintals if somebody is buying or selling or wanting to deliver the soybean or take delivery that lot side has to be 100 quintals. So, this is a clear-cut example of how the farmer producer organization benefited from hedging the price risk at NCDEX. And in addition to the significant profit generated by this particular farmer producer organization, what is so interesting about this case study is that there was no distress sale the farmer producer organization did not have to sell the underlying commodity at the throw away price depending upon whoever is the seller whoever is the buyer available. So, there was no distress sale and knowledge about quality standard required for the exchange delivery. So, by storing the underlying contract at underlying commodities at NCDEX approved warehouse they came to know about what the quality standard is how the soybean have to be packed how the soybean have to be stored all this knowledge was percolated to the farmer producer organization. And more importantly they also understood the benefit of hedging and then the skill set to hedge, how to hedge, how to pay the mark to market margin, how to settle the contract all these are very important skill set for any farmer producer organizations to have. And better returns from the NCDEX hedging platform is attracting many hedgers or many farmer producer organizations to its platform. As you can see this is the list of the number of farmer producer organizations who have entered into derivative contracts at NCDEX. The maximum number of FPOs which have traded at NCDEX was for soybean, it is more than the 120 number. Similarly other commodities which have attracted maximum number of FPOs are Channa, soybean chana and your mustard seed contracts and castor seed oil cake contracts or which is popularly known as cocoon contract maize castor seed etcetera. And it is very unfortunate to know that the government of India banned

commodity derivatives in 10 commodity which includes soybean chana and mustard oil. And when these commodity derivative contracts are banned the farmers farmer producer organizations or farmers do not have any mechanism to mitigate the price risk. And I am hoping that government of India will be looking into this particular aspect very soon and the ban will be revoked. Now coming back to price risk management by consumers and other value chain partners. In the previous session or previous slide, we discussed how farmer producer organizations or producers are able to mitigate the risk by entering into short futures contract. And please note that the price risk management by farmers or producers will always belong on asset, farmers will always be producing soybeans. So, they will always belong on asset, price reduction is a risk, if price goes down in future, they will be receiving lesser realization for the selling the farm produce. So, they will be mitigating the risk by taking short futures position or a long-put option and they will become a short hedger. Similarly, the buyers who are a buyer of soybean they will always be short on the underlying and price increases a risk for them, if price goes up, they will be paying higher amount of money to buy the same amount of soybean or any other underlying commodity. And to mitigate that risk they enter into a long futures position or a long call option and by doing so, they become a long hedger. And in this context, it is also very important to understand that exchanges are allowing a higher open interest limit for hedgers. And hedgers will be applying to the exchange, exchange will see the extent of physical activity they are doing and if their physical activity is a very high proportion they should not be restricted or limited by a lower open interest limit as set by the exchange for all kinds of traders. So, to motivate hedgers to come to the platform and benefit from hedging the risk exchanges are allowing higher open interest limit for hedgers depending on their actual physical business activity. Again, this particular table is a snapshot which I have taken from NCDEX, and this snapshot shows for different commodities for different hedgers what is the open interest limit permitted open interest higher open interest limit is available and up to what period of time this limit is applicable. And in this context as you know that this hedger 1 and hedger 1 and hedger 1 is mentioned they are not the same company they are different companies. Here the national commodity derivative exchange has must this particular information that which company or which firm or producer organization or who is the hedger that they do not want to share that information, but they are they do not want to share the exact name of the company or the hedgers detail, but in general they are informing to the market at a large that if a particular hedger has a higher hedging requirement they can approach the commodity derivative exchange and commodity derivative exchange will be giving them a higher open interest limit. Now, in addition to a commodity producer and a commodity consumer there are also whole lot of value chain partners who operate in a Agri commodity. Now, let us understand how exactly these value chain partners are able to mitigate the risk. Please note that depending on their prevailing inventory position they can either be a short hedger or a long hedger. Please note that the farmers will always be

short hedgers, bulk buyer or bulk consumer of a Agri commodity will always be long hedger, but wholesaler and traders are any other value chain partners they will be either they will be they will be either short hedger or a long hedger depending upon the physical inventory position. Let us understand then how exactly a trader or wholesaler when a trader or wholesaler will be a short hedger and when a trader or a wholesaler will be a long hedger. Now, coming back to let us take an example to understand how a wholesaler or a trader or an export house can be a short hedger or a long hedger. Let us take the example of an export house which has already bought the soybean, but yet to find any customer. It is it has bought the soybean after the harvest season, and it will be slowly exporting the same to the foreign countries. Now, in the interim period if the price of soybeans falls this particular export house is going to incur a significant amount of loss. Because its purchase price is more than the price at which it will be selling soybean, and its loss is also going to increase depending upon the length of the time this particular export house is storing the soybean. So, depending upon the storage grading and packaging cost its loss may be significantly higher if the soybean price continues to fall. So, how the sort how the export house will be able to mitigate the price risk? In this case the export house can enter into a short futures contract or a long-put position to mitigate the price risk. Please note that by buying the underlying and holding the underlying in the inventory it has become a long asset, and it will be able to mitigate the same risk by entering into a short futures position or a long-put position. Similarly, let us take the say case of the same export house, but in another situation, it will be a long hedger. So, what would be the different situation? Let us say the export house does not hold any inventory, but it has already committed to exports who have been at a fixed price. Now, to fulfill the export commitment it has to buy soybean and in the entering period if soybean price has gone up then in that case it will be incurring significant amount of loss. So, how the export house will be able to mitigate the risk? The export house will be able to do so by entering into a long futures position or a long call contract. So, in this situation the export house is going to be a long hedger. In a previous condition, previous situation the export house was a short hedger. So, depending upon the amount of inventory a particular export house is holding and whether it has already identified a customer or not it is going to be deciding whether it is going to be a short hedger or a long hedger. Now coming back to that how a particular commodity producer, consumer or a value chain partner how they will be able to get an idea what is going to be the future price or what is going to be the spot price, where the spot price is going to go up or go down or I mean what is going to be the trend of the spot price. This is very easier said than done. It is like gauging into a crystal ball it is very it is not so easy to identify what is going to be the future price. So, the factors which influence a price of Agricultural commodity is very wide and very diverse. What is it could be global production and consumption, acreage of planting I am sorry there is a spelling mistake it is going to be acreage of planting not plating. And another aspect which is significantly influences the

Agricultural commodity prices is associated with the seasonality in production and consumption. What is the extent of inventory available and also another aspect which influences the price of Agricultural commodities is the price inventory production consumption details of substitute commodities. So, if substitute commodities are amply available obviously, the price of this particular commodity will be going down and vice versa. Also in a country to what extent does this particular commodity have export and import linkage and of course, geopolitical and government policy environment in major producing and consuming countries. If a particular country's government all of a sudden ban the export of this particular commodity obviously, the global price is going to go up. So, the geopolitical and government policy environment in major producing and consuming countries is going to be of significant importance to the price of a commodity. Of course, regulatory factors such as tariffs and custom duty levied by different governments is also going to be of significant importance. So, as you can see, a host of factors which influence commodity prices. So, it is not so easy to forecast what is going to be the prevailing spot price and a lot of analysis lot of data collection is done by people who are tracking a specific commodity to get an idea what is going to be the price of the underlying commodity. In this context because we are discussing related to soybean let us understand which are the major producer of soybean. So, you have United States, Brazil, Argentina, China, India these are your major countries which are producing soybean. And even though these are the major producers of the soybean, but which countries exports soybean meal Argentina, Brazil, USA, India, European Union are a major exporter of soybean meal and major exporting nations of soy oil is US, Argentina and Brazil. Please note that India, China does not feature in terms of exporting the soy oil because India's and China's domestic consumption related to soy oil is very high. Even though they are producing soybeans the domestic consumption of soybean is done and they do not export soy sorry domestic consumption of soy oil is done significantly. Hence these two countries do not export any soy oil. And please note that when we are talking about the price of soybeans, we cannot talk about the price of soybean alone because the price of soybean will also be influencing the price of soy meal and soy oil or vice versa price of soy oil and soy meal will also be influencing the price of soybean with this. So, please recall that we discussed that seasonality has a significant influence on commodity prices. In this context let us understand how do we measure the seasonality of a commodity prices and that we can do through a concept called a seasonal index. And seasonal index measures the price of any given month related to the annual average price and how do we calculate this seasonal index? Seasonal index is calculated by average price for a season divided by average price over time into 100. Let us take a simple example to understand this concept of seasonal index. Let us say we have a company which generates different numbers of sales in different quarters. So, for the year 2001 it has 4 different sales values for quarter 1, quarter 2, quarter 3, quarter 4 similarly for the other 2 years. Now we can average and find out the total sales or average sales for Q 1,

that is quarter 1 across 3 years which is coming to your 248.7 million. Now we can average all these 12 values which is your 4-quarter data for a given year into 3 years. So, that is coming to your grand average is coming to your 281.5. Now if we want to find out what is the seasonality associated with quarter 1 that we can do so by formula as given here. So, seasonality index for quarter 1 is going to be 248.7 divided by 281.5 into 100 which is coming to your 0.88. Finally, we can find out the seasonality index associated with the other 3 quarters and the same data which is mentioned here I have just plotted it as a heat map and as you can see the lowest value is having a 0.88 and highest value is 1.16. So, that means quarter 4 on an average company generates a higher number of higher number of sales as compared to quarter 1. Now with this concept let us understand the seasonal index associated with the soybean spot and the future price. Please note that this detail will be available. So, all these details will be available for the NPTEL participants. I am not going into all this detail calculation exactly the total calculation associated with the index seasonal index monthly seasonal index is available in this. So, this is the heat map which I have generated for the seasonal index associated with the spot price and the seasonal heat map associated with the near month future price traded at CME and this detail as I mentioned just now this detail will be available to all of you and you can explore how exactly the this indexes have been calculated and the formula for the calculation all this detail will be available to all of you. And coming back to the seasonal index as you can see that the March month has a very high price this is the highest seasonal index for both the spot and the futures market and similarly you as you can see the month of September August and August September are the in fact, July August September these 3 months are the where you have a the value which has a lowest value and from analyzing this heat map we can say that this is the pre harvest period for the soybean hence the prices have gone up on average. Hence, we are able to see a higher index value in case of this period we have a lower index value means prices is lower than the average hence the index value is less than 1 in this case the index values are higher than 1 and please note that in this case sum total of the index value has to be 12. And in case of this soybean spot seasonal index the spot price which I have downloaded from the Bloomberg database that is relates to the number 1 yellow soybean spot price with FOB Chicago Illinois. So, this is the price FOB stands for an Incoterm which we have briefly discussed in earlier time that is a free on board. So, this free on-board Chicago Illinois price for number 1 yellow soybean price has been used to calculate the seasonal index and of course, the CME near month CME future price has been used to calculate the seasonal index for the futures price. So, with this we will come to an end to today's discussion we will be continuing with more on this seasonality aspect as well as cross spread futures contract in the subsequent section. So, thank you all of you and I look forward to eagerly look forward to interacting with all of you in the next session.