

Constraints and Driving Factors for Farmers' Participation in the Futures Market: An Empirical Analysis

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Abstract

The governments at central and state level have taken several steps to improve the market linkages for small farmers. More focus has been placed on improving small-scale farmers' access to markets and managing risks since the beginning of the 2000s. Commodity futures and forward markets have developed as a result of this market-oriented strategy. For welcoming advantages, an important proportion of small-scale farmers must participate in derivative markets, either directly or indirectly. Though agricultural producers, individually and in groups, can benefit from the the futures market's price discovery effectiveness in a variety of ways, they are typically hesitant to engage in derivative market activity perceiving it as risky. With this background, the current study was designed with the goal to identify the crucial elements that limit or motivate the engagement of Farmer Producer Organization (FPO) members within the market for commodity futures. Field investigation was carried out in the Nabarangpur district of Odisha. A multi-stage random sampling technique was used in the investigation and a total of 400 responses from farmer members were collected through a structured schedule. Statistical techniques like descriptive analysis, exploratory factor analysis, Pearson's correlation analysis have been used to test the hypotheses of the study. The results of study revealed that all the respondents are aware about the futures market and the two FPO offices are the major source of information on commodity futures market. The exploratory factor analysis discovered that the speculative trading information, spot and futures price discrepancy, minimal intervention of exchange officials for illegal transactions and insufficient contracts and delivery centres mainly obstruct participation of farmers in the futures market. Similarly, stable market for risk management, low transaction cost, availability of storage structure and structured financing with reasonable interest rate are the factors those motivate farmers to engage in the futures market. Finally, it is proved that the correlation between the problems faced by farmers for participating in the market for commodity futures and their respective socio-economic status is statistically insignificant. However, their socio-economic status is significantly correlated to the factors driving them to take part in the commodity futures market. The study's conclusions will undoubtedly provide guidance to lawmakers and regulators on how to proceed with significant changes aimed at enhancing farmers' involvement in the futures market through FPOs.

Keywords: FPOs, Futures Market, Socio-economic, Exploratory Factor Analysis. Pearson's Correlation.

1. Introduction

For many years, enhancing the marketing of agriculture and lowering the risk of price volatility for India's marginal and small-scale agricultural producers has been considered a top priority on the policy radar. With the exception of support prices, the government has worked very hard to strengthen the marketing connections for smallholders, but the actual benefits—particularly in terms of pricing and risk control have not been materialized. Little produce, minimal marketed surplus, inadequate revenue potential, and a lack of education among marginal and small-scale producers are the main issues. The National Agriculture Policy (NAP), enacted in 2000, is intended to close the gap between small-scale farmers and the value chain of agriculture while safeguarding small-scale producers from market hazards and adverse effects. The goal of the strategy was to encourage producer involvement in commodities trading in a number of ways. One might observe the aggregation endeavours through projects that are officially funded as a consequence. Apart from a handful of initiatives, farmers' involvement in commodity-based futures trading in India has been negligible, and the aggregator model has frequently proven unsustainable. It is discovered that very few small growers are making use of the futures market. Numerous factors, including abundant subscription costs, massive lot or contract in terms of size, substantial margin money, subpar technology, and adaptability, are frequently blamed for this. Indirect producer participation may be improved by using farm marketing assistance that cover the price of commodities and market data. With this background, the present study aims to assess the participation of maize farmers in Indian futures markets with special reference to Nabarangpur district of Odisha. It focuses on the constraints and inspiring factors of farmers to get involved in futures trading and also enhances their degree of knowledge about the market in the research region.

Farmers represent a diverse group, and their socio-economic status can range from relatively affluent to economically disadvantaged. The socio-economic status of farmers can vary widely depending on several factors, including geographic location, the type of farming they are engaged in, land ownership, education, access to resources, and the economic conditions in their region. There are various types of risks associated with agriculture and individual risk is one of them, (Pinto, Smith et.al, 2020). The risk bearing capacity of farmers is mainly analysed from the distance of the farm to main market, off-farm income, age, farming experience and access to extension agent. Generally, farmers with low socio-economic status find it hard to sell their produce in formal markets as compared to farmers with high socio-economic status, (Nxumalo, Oduniyi et.al, 2019). Adamu, Abebe (2022) also stated that adopting poor hygiene practices as well as self-recommended pesticide application affects the environmental health of the produce. According to Nooghabi, Azadi et.al (2022), farmers are mainly vulnerable to three factors i.e., social, economic and environmental. The prime factor affecting vulnerability is the social factor (farm management) followed by environmental vulnerability factor (Sunn pest and heat) and economic vulnerability factor (the costs of fertilizer, equipment, and machines and their maintenance). A futures market is a financial marketplace where standardized contracts for the future delivery of a specified quantity of a commodity, financial instrument, or asset are bought and sold. Futures markets offer farmers a valuable tool to manage and reduce price risk, stabilize revenues, and enhance their financial planning, ultimately contributing to the long-term sustainability of their agricultural businesses. According to (Egbetokun, Shittu, 2017), there are certain determinants that drive the farmers to participate in futures market such as gender, age, marital status, household size, farming experience, educational level and membership of association/group. Factors that hinder farmers to participate in futures market are bad road infrastructures, lack of access to credit facilities, inadequate extension officers, poor storage facilities and lack of production inputs,

(Omotayo, Olugbenga et.al, 2020). As far as various studies are concerned, some farmers adopted futures market and are quite succeeding in it. As per Yan, Tao (2021) agricultural production and risk management strategies positively influenced farmers' self-efficacy. As per Perez, Frijns (2021) profit margin hedging can increase the survivability of farms by lowering financial distress risk. But for some farmers, adopting futures market was not an easy solution. As per Coulter, Onumah, (2002) high transaction costs, imperfect information and incomplete markets contributed to inefficiency in agricultural markets in Africa, implying the need for strong non-market institutions to promote fluid and efficient exchange. Commodity price risk affected the returns on stocks yet commodity hedging reduced the exposure, (Carter, Rogers et.al, 2017). Although few farmers perceive futures market as a sustainable solution to farming, it is not widely followed among small farmers due to lack of basic financial knowledge and awareness (Yadav, Dr. Tripathi et.al, 2017). Venkatragavan, Sivasakkaravarthi (2022) further argued that all the farmers were not involved in active trading. It was further observed that complexities were involved in derivative trading which pulled the farmers back from involving in active trading.

There are quite limited empirical studies with regards to the engagement of farmers in the futures trading particularly in developing countries like India. Farmers' involvement in futures markets in India is negligible. This could be partially due to the absence of financial literateness amongst farmers and depth and/or liquidity of market, in common. The scope of farmers' taking part in commodity futures market through Farmer Producer Organizations (FPOs) may be direct or indirect i.e., through middlemen (commodity brokers). To fill this gap in the literature, this study was carried out in Nabarangpur district of Odisha because it is home to the two sample FPOs that are engaged in NCDEX futures trading. The scope of the study is limited to the problems and possibilities of farmers' participation in the Indian Commodity Futures market with a focus on maize farmers of Nabarangpur district of Odisha.

OBJECTIVES OF THE STUDY

Primary Objectives

1. To study the socio-economic status of FPO farmer members in the study area.
2. To study the awareness level of FPO farmer members towards commodity futures market in the study area.
3. To determine the key elements that affect and/or enrich participation of FPO farmer members in the commodity futures market in the study context.

Supplementary Objectives

1. To study the relationship between social status and problems that FPO farmer members face in participating in commodity futures market.
2. To investigate the relationship between economic status and problems that FPO farmer members face in participating in commodity futures market.
3. To study the relationship between social status and the motivating factors behind FPO farmer members' participation in the commodities futures market.
4. To investigate the relationship between economic status and the motivating factors behind FPO farmer members' participation in the commodity futures market.

HYPOTHESES OF THE STUDY

H₀₁: There is no significant relationship between the social status and problems that FPO farmer members face in participating in commodity futures market.

H02: There is no significant relationship between economic status and problems that FPO farmer members face in participating in commodity futures market.

H03: There is no significant relationship between social status and the factors driving FPO farmer members to participate in the commodity futures market.

H04: There is no significant relationship between economic status and the factors driving FPO farmer members to participate in the commodity futures market.

2. sDATA SOURCE AND METHODOLOGY

2.1 Source of data collection

The study is based on primary data. The field study was conducted in Odisha state of India. The Nabarangpur district of Odisha was specifically chosen for the study because it is home to two Farmer Producer Organizations (FPOs) that are engaged in NCDEX futures trading. Primary data was gathered by a well-structured schedule, composed through personal interviews. For this research purpose, the data was gathered over two months' time-period i.e., from the middle of September 2022 to the middle of November 2022.

2.2 Population and Sample

The study made use of a multi-stage random sampling method. The two chosen FPOs namely *Pendrani Krushak Producer Company Limited* and *Mauli Maa Maize Mandi Producer Company Limited* are situated in Raighar and Umerkote, two distinct blocks of Nabarangpur. From each block, 5 Gram Panchayats (GP) were selected and from each GP two villages were selected. In Raighar block the selected GPs were Debagaon, Kacharapara, Kumuli, Kurabeda, and Timanpur. Similarly, in the Umerkote block, the selected GPs were Badabharandi, Bamini, Badokumari, Khanda, and Murtama. Further, from each village, 20 farmer respondents were chosen based on random sampling, who are the members of sample FPOs. Each block's 200 farmers were represented in the survey, for a total sample size of 400 farmers (N=400).

2.3 Tools and Techniques

The framework was created for the assessment of farmers' involvement in the futures trading. It covered the socio-economic and demographic aspects of farmers. The schedule also helped to determine the awareness level of farmers on the futures market. Emphasis has also been given to identify various influential factors as well as the issues that farmers face in the futures market trading. To accomplish the objectives of the study, the following tools have been used for analysis of responses so collected:

1. Charts, graphs, and cross-tabulations were used to present the data.
2. 5-Point Likert scale was used to measure opinions and behaviour of sample respondents.
3. Exploratory factor analysis was used to recognize important factors that affect or enrich participation of FPO farmer members of Nabarangpur district of Odisha in the commodity futures market.
4. Multiple correlation analysis was used for hypothesis testing. The aim of using the multiple correlation analysis was to study the relationship between the social status/economic status and problems/influential factors that constrain/ drive the FPO farmer members from/for participating in the commodity futures market.

3. EMPIRICAL ANALYSIS

3.1 Social profile of sample farmers

400 farmers were questioned, and their answers were documented on a schedule. The study attempted to categorize the farmers based on their age, education, size of the family, source of income, etc., in light of

the possibility that the overall profile of the interviewed farmers may be required for relevant study. All 400 data were gathered from farmers who were participants in the futures market directly or indirectly and were members of the two sample FPOs.

Table no. 1: Social features of the sample

		Frequency	Percentage	
Age	Below 30	92	23	
	30 – 40	147	36.8	
	40 – 50	125	31.3	
	50 and above	36	9	
Qualification	Illiterate	212	53	
	Upto Matriculation	177	44.3	
	Higher Secondary	8	2	
	Graduation	3	0.7	
Source of Income <i>Primary (N=400)</i>	Agriculture	399	99.75	
	Teacher	01	0.25	
	Agriculture	01	0.25	
	Business	06	1.5	
	Driver	11	2.75	
	<i>Secondary (N=400)</i>	Labour	357	89.25
		Mechanic	02	0.50
		Pension	01	0.25
		Shopkeeper	02	0.50
		Trading	11	2.75
None		09	2.25	
Head of household	Yes	283	70.8	
	No	117	29.3	
No. of family members	0 – 5	84	21	
	5 – 10	302	75.5	
	10 – 15	11	2.75	
	15 and above	3	0.75	

Source: Based on survey results

According to the sample farmers' social profile, the farmers are relatively evenly distributed among all age groups, but 36.8% of the sample farmers are between the ages of 30 and 40. It shows the young farmer's enthusiasm to participate in commodity futures trading. Although 44% of the sample farmers have completed their education up to matriculation, it is still very despondent to notice that about 53% of the farmers are illiterate. From the income source, it is observed that 399 sample farmers have agriculture as their primary source of income, except one farmer. Being a graduate, his primary source of income is teaching. For their daily livelihood, apart from agriculture, farmers are also engaged in other secondary sources of income such as labour, business, transport services, mechanics, etc. The highest percentage (89.25%) is found in labour category. Further, it is observed that, about 75.5% of farmers have a family size ranging from (5–10) and about 70% of the sample farmers are found to be the head of the household.

3.2 Economic profile of sample farmers

In addition to social characteristics, the profiling of farmers based on economic factors is crucial. These factors include annual income of family, annual income from farming, ownership of farm machinery, sources of irrigation, etc. The economic factors of sample respondents are presented below.

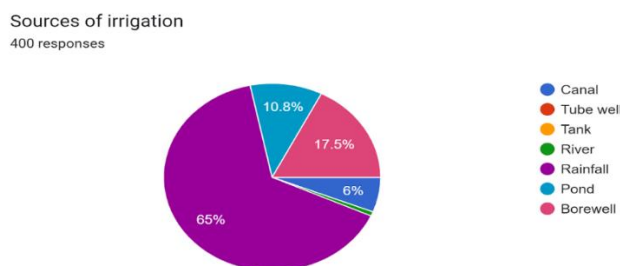
Table no. 2: Economic profile of sample farmers

Farmer’s Category (Based on Landholdings)	Percentage of Sample Farmers (%)	Agriculture as Primary Source of Income (%)	Annual Income of Family	Annual Income from Farming	Ownership of Farm Machinery (%)	
					Yes	No
Landless & Marginal (<1ha)	4.75 (19)	100	10,000 - 1,00,000	5000 – 80,000	10.52	89.47
Small (1-2 ha)	16.5 (66)	100	10,000 – 1,50,000	5000 – 1,50,000	12.12	87.87
Medium (2-10 ha)	47 (188)	99.47	6,000 – 3,00,000	4000 – 1,50,000	15.96	84.04
Large (>10 ha)	31.75 (127)	100	40,000 – 5,20,000	30,000 – 5,00,000	47.24	52.76

Source: Based on survey results

As depicted in table no. 2, among the 400 sample farmers, the majority of the farmer members of FPO (47%) are medium farmers with a landholding size of 2ha-10ha. Large farmers are 31.75% of the total sample with a landholding size of more than 10 ha. Landless, marginal, and small farmers together constitute around 21.25% of the total collected sample. Being the farmer members of FPO, the source of primary income for all the farmers is agriculture, except for one medium farmer. Being a graduate, his primary source of income is teaching, but his secondary source of income is agriculture. The range of annual income from farming as well as of family varies with different types of farmers based on their landholdings. Regarding the ownership of farm machinery, the highest percentage is seen in case of large farmers, i.e., 47.24%. Meaning that 52.76% of sample farmers still don't own any farm machinery. Further, it is observed that about 89.47% of landless and marginal farmers and 87.87% of small farmers don't own any farm machinery. In the medium category, only a little percentage (15.96%) of farmers own farm machinery. So far as the sources of irrigation is concerned, the sample farmers depend on canal, tube well, pond, borewell, rainfall etc. at varying percentage which can be clearly understood from figure no. 1 below.

Figure no. 1: Sources of Irrigation



Source: Based on survey results

Maize is a kharif season crop in Nabarangpur district as most of the farmers from different categories do its sowing in monsoon. The reason is that a majority of farmers (65%) are dependent on rainfall as their main source of irrigation. Only 17.5% of farmers have borewell and 10.8% of farmers have pond facilities. Hardly, 6% of farmers have canal facilities to irrigate their land.

3.3 Farmer’s Awareness on Futures market

After discussing the social and economic profile of the sample respondents, the study tries to focus on the level of farmers’ awareness along with their sources of information on futures market. Through the prepared schedule, farmers’ responses have been gathered in support of certain characteristics connected with their level of awareness and sources of information on futures market and presented in table no.3 to 5 below.

Table no. 3: Is the futures market something you have heard of?

Response	Frequency	Percent
Yes	400	100.0
No	00	00

Source: Based on survey results

It is evident from table no. 3 that all the sample farmers have heard the concept of futures market. Being a member of the FPO, they all are well aware of the futures market as the FPO has already taken position in one of the national commodity exchanges i.e., NCDEX.

Table no. 4: Have you ever participated in the futures market?

Response	Frequency	Percent
Yes	400	100
No	00	00
Total	400	100

Source: Based on survey results

From table no. 4, it is clearly evident that all the respondents have participated in the futures market. From the discussion with the farmers in the field, it was known that they have not participated individually, but as members of the sample FPOs. Thus, it can be said that an impressive percent of farmers’ participation in futures market could be possible in the study area through the two sample FPOs.

Table no. 5: Do you know about the "Price Dissemination Project"?

Response	Frequency	Percent
Yes	279	69.8
No	121	30.3
Total	400	100.0

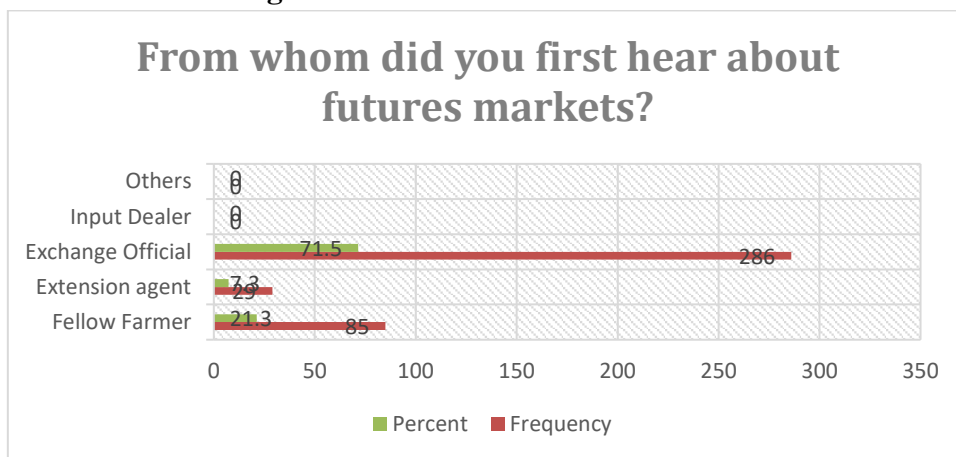
Source: Based on survey results

From table no.5, it is observed that around 70% of the respondents are aware about the price dissemination project in the market yards. Therefore, it can be claimed that the farmers in the research area are aware about the ticker board concept for getting price information of different commodities periodically.

Unfortunately, the ticker board in the study area is not found to be in functional form. So, the sample farmers have to depend on their producer companies to get the timely information on price fluctuations. The overall futures market literacy of farmers in the research area is seen to be very impressive and it could be possible due to the intervention of commodity exchanges and FPOs in enhancing farmers’ awareness level and concerns for involvement in the futures market. On the question of attendance of farmers in the workshops, training programmes or sponsored seminars by commodity exchanges, all the respondents answered “yes”. Hence, it could be resolved that commodity exchanges are putting regular efforts to boost farmers’ indirect or direct participation in futures markets.

Consequent to the farmers’ awareness on the futures market in the study area, questions were also asked on their sources of information. Figure 2 to 5 disclose the information source of farmers regarding the futures market and the prevailed spot price of various commodities on different spot markets across the country.

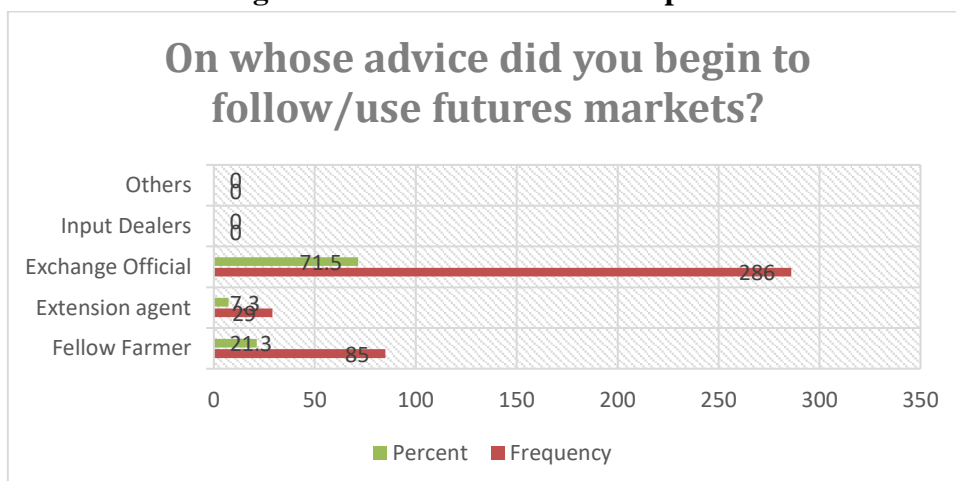
Figure no. 2: Sources of Information



Source: Based on survey results

From figure no. 2, it is seen that 286 farmers out of 400 first came to know about futures market through “Exchange Officials”. Whereas for 85 farmers, the first information source of futures market was “Fellow Farmers” and for rest 29 farmers the first source was “Extension Agent”. It can be said that the exchange officials, in particular took a major step in making the farmer members aware of the futures market. This has been possible after the FPO started trading in futures market.

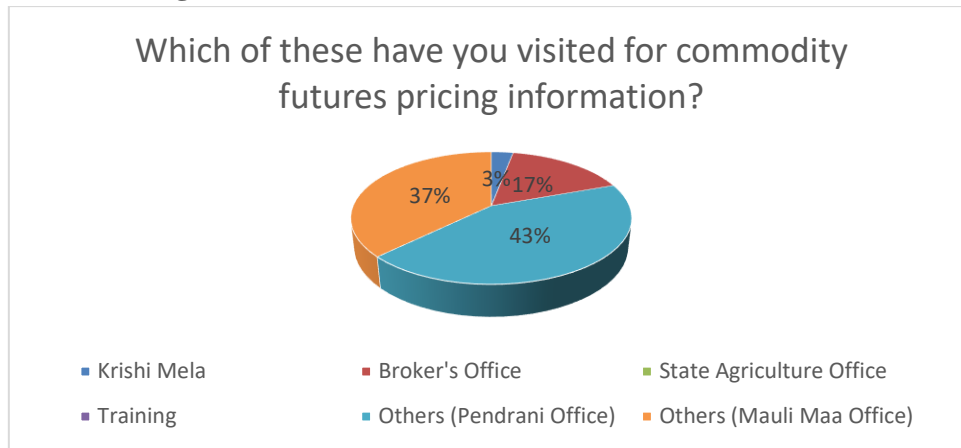
Figure no. 3: Advisor for Participation



Source: Based on survey results

From figure no. 3, it is seen that farmers started following/using futures market on the advice of their sources of information on futures market. i.e., for 286 farmers the advising source is ‘Exchange Official’. For 85 farmers, the advisory source is “Fellow farmer” and for rest 29 farmers, the advisory source is “Extension Agent”. It can be said that farmers had complete faith and belief on their sources of information, which led to penetrate them in the futures market.

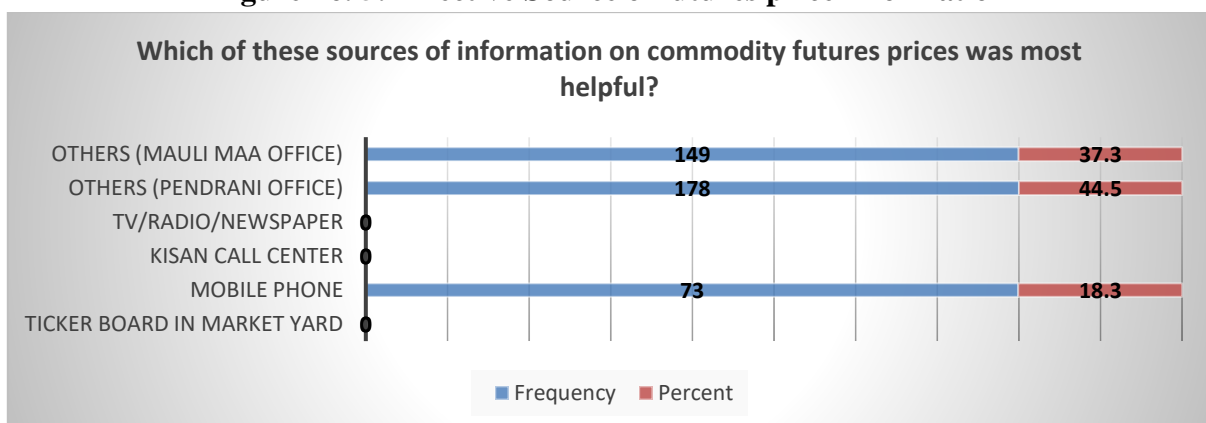
Figure no. 4: Sources of Futures Price Information



Source: Based on survey results

Figure no. 4 shows a pie-chart classification of commodity futures pricing information that the sample farmers have visited. It shows that the majority of the farmers (43%) had visited Pendrani Office (FPO office in Umerkote block of Nabarangpur) for commodity futures pricing information followed by 37% farmers who had visited Mauli Maa Office (FPO office in Raighar block of Nabarangpur) for the same. Around 17% farmers visited Broker’s Office for commodity futures pricing information. It can be said that FPO office is efficient enough in keeping its farmer members updated by providing essential and timely information on commodity futures pricing as compared to other sources such as Krishi Mela, Broker’s Office, Training institutions and State Agricultural Office.

Figure no. 5: Effective Source of futures price information



Source: Based on survey results

Figure no. 5 justifies figure no. 4. As it is already understood that the majority of the farmers visit their FPO office namely Pendrani office and Mauli Maa office for commodity futures pricing information, in figure 5, it is cleared that these sources of information were most helpful as well. Further, it is seen that mobile phone was also one of the useful sources of information for 18% farmers in getting the updated information on commodity futures price.

3.4 Factors Constraining Farmers’ Participation

The indirect and direct involvement of farmers in the futures markets is improved during last five years by the intervention of FPOs (NCDEX Annual Report). The involvement of FPOs intended to develop participation on team basis, through gaining access to futures price statistics from a trustworthy place or by hedging. This section of the study throws light on the problems and opportunities associated with participation of farmers in futures market by way of FOP. The schedule was administered at 5-point- scale (5 – Extremely dangerous and 1 – None) for problems encountered and 5 as highly significant and 1 as highly insignificant for factors influencing the farmers engagement in futures trading through FPOs in the study area. Responses of farmer members of two sample FPOs namely *Mauli Maa Maize Mandi Producer Company Limited* and *Pendrani Krushak Producer Company Limited* were collected with regard to problems encountered by them for adoption of futures prices/ markets elementwise and then their factor scores were found out by means of factor analysis. The outcomes of exploratory factor analysis are presented in Table no. 6 below.

Table no. 6: Factor’s score and model statistics

Factors	Component Score (β)	Model Statistics	Coefficient
Speculative trading information	0.654	Cronbach’s alpha	0.942
Price discrepancy	0.754	Kaiser-Meyer-Olkin’s sampling adequacy score	0.887
Minimal intervention for illegal transaction	0.815	Bartlett’s test of sphericity (χ^2)	108.196**
Insufficient contracts and delivery centres	0.644	Variance explained (%)	69.330

** at the 1% level of significance

From table no. 6, it is evident that speculative trading information (0.654), spot and futures price discrepancy (0.754), Minimal intervention of exchange officials for illegal transactions (0.815) and insufficient contracts and delivery centers mainly obstruct farmer’s involvement in futures market. The model factors have expounded around 70% of variance of the restraint to farmers’ participation by reliability testing, Cronbach’s alpha of 0.942, and sampling adequacy (KMO’s) score of 0.887. There is statistically significant goodness of fit at 1% significance level with the chi-square valuing at 108.196. In addition, other problems such as middlemen barrier and inappropriate market infrastructure demarcate the possibility of farmers’ engagement in the futures trading.

3.5 Factors Influencing Farmers’ Participation

An exploratory factor analysis has been done on various items framed to check the factors influencing the choice of entering into the futures market. This study collected responses of farmers supportive of administered matters that ultimately, assisted in factor extraction. The factors’ model statistics is presented in table no. 7 below.

Table no. 7: Factor’s Score and Model Statistics

Factors	Component Score (β)	Model Statistics	Coefficient
Stable market for risk management	0.662	Cronbach’s alpha	0.823

Low transaction cost and brokerage	0.853	Kaiser-Meyer-Olkin's sampling adequacy score	0.779
Availability of storage structure	0.496	Bartlett's test of sphericity (χ^2)	1507.705**
Commodity based structured financing with reasonable interest rate	0.947	Variance explained (%)	76.274

** at the 1% level of significance

Table no. 7 reports that stable market for risk management (0.662), Low transaction cost (0.853), availability of storage structure (0.496) and structured financing with reasonable interest rate (0.947) clarify around 76% of model variance with Cronbach's alpha of 0.823. The model is statistically significant at 1% significance level with sampling adequacy score of 0.823 and Chi-square value of 1507.705.

3.6 Social status and problems encountered by FPO farmer members

After identifying the topmost 5 difficulties encountered by farmer members with regard to participation in the futures markets, the study has attempted to examine the relationship between these problems and the social status of farmer members.

Table no. 8: Assessing correlation between farmers' social status and the problems encountered by them in participating in commodity futures market

Ratings on the basis of Score	Problems	Correlation with		
		Age	Education	No. of family members
1	Less stable market	-0.011	0.026	.022*
2	Middlemen create a substantial barrier	-0.035	-0.044	.228**
3	Services and infrastructure are not up to the mark in market areas	-0.034	-0.019	-102*
4	Price discrepancy between projected future spot and reported futures prices	-0.031	0.011	-.017
5	Insufficient contracts and delivery centres	-0.088	0.026	.079

Note: *** = 1 percent significance, ** = 5 percent significance, * = 10 percent significance

It was discovered that there exists no significant relationship among the age and educational level of farmers and the problems encountered by them when participating in futures markets. However, the family size in terms of number of family members does have a significant relationship with problems like less stable market, middlemen barrier and inadequate infrastructure and services on futures market. The intervention of the FPOs, of which the farmer respondents are members, may have made such a result possible.

3.7 Economic status and problems encountered by FPO farmer members

The study tries to find out the relationship between the economic status and problems that FPO farmer members face in participating in the commodity futures market. Table no. 9 below depicts the correlation between top 5 participation problems and the economic status of FPO farmer members.

Table no. 9: Assessing correlation between top 5 problems and the economic status of farmers

Ratings on the basis of Score	Problems	Score out of 2000	Correlation with				
			Size of landholding	Annual income of family	Annual income from farming	Farm machinery held	Sources of Irrigation
1	Less stable market	1997	0.040	.094	.114*	-0.017	0.024
2	Middlemen create a substantial barrier	1803	0.442***	.232**	.300**	0.024	-0.063
3	Services and infrastructure are not "up to the mark" in market areas	1624	-0.119**	-.012	.006	0.010	0.050
4	Price discrepancy between projected future spot reported futures prices	1599	-0.014	-.084	-.065	0.010	0.025
5	Absence of physical delivery	1594	0.078	.108*	.198**	0.003	-0.075

Note: *** = 1 percent significance, ** = 5 percent significance, * = 10 percent significance

Farmers were asked about numerous challenges they faced in the futures market, and their comments are provided in Table 9, which categorizes them based on their economic status. The top five issues identified by farmers as barriers to futures market participation are listed based on the sum of their response scores. While 'less stable market' ranked first with a score of 1997, 'absence of physical delivery' ranked fifth with a score of 1594. Table 9 also shows the relationship among the topmost 5 difficulties and farmer land size. It is clear that difficulties such as fewer stable markets, price disparities between estimated future spot prices and futures prices, and the absence of a physical market have no meaningful association with the amount of farmers' land holdings. However, "middlemen as a significant barrier" and "services and infrastructure not up to standard" are strongly related to farmers' land holdings. This means that the role of intermediaries in farming practises, trading services, and infrastructure amenities for farmers varies according to the extent of the land they hold. Further, middlemen barrier and absence of physical delivery

are also found to have significant relation with the annual income of the farmer members. Holding of farm machinery and sources of irrigation are found to have no significant correlation with the problems encountered by farmers in participating in the futures market.

3.8 Social status and factors influencing participation in the futures market

This section of the research tries to find out the correlation between the social status of FPO farmer members and the factors influence them to take part in the futures trading. Table no. 10 below presents the correlation among the superior 5 influential factors and the social status of farmer members.

Table no. 10: Assessing correlation between farmers’ social status and the driving factors for their participation in the commodity futures market

Ratings on the basis of Score	Influential Factors	Score out of 2000	Correlation with		
			Age	Education	No. of family members
1	Customized contracts	1835	.097	.025	.190**
2	Stable futures markets	1791	.064	-.070	-.154**
3	Low transaction cost and brokerage	1781	-.124*	.132**	.196**
4	Availability of storage structures	1776	.102*	-.040	-.145**
5	More campaigns to raise futures market awareness	1748	-.101*	.136**	.193**

Note: *** = 1 percent significance, ** = 5 percent significance, * = 10 percent significance

Table no. 10 shows the top five factors influencing farmers to take part in futures markets, scored from 1 to 5 on the basis of the sum of their response scores. 'Customized contracts' rated first with an aggregate score of 1835 out of 2000, while more awareness campaigns' ranked fifth with an aggregate score of 1748. Two influential factors namely “low transaction cost and brokerage” and “more campaigns to raise futures market awareness” are found to have significant correlation with all the social factors of the respondents. Further, it is observed that all the top 5 influential factors have significant relation with the family size of the respondents.

3.9 Economic status and factors influencing participation in the futures market

Table 11 below depicts the association among the top 5 driving factors and economic status of farmers. Economic status of farmer members is analysed with regard to their landholding size, annual income, ownership of farm machinery and sources of irrigation.

Table No. 11: Assessing correlation between economic status and the factors driving FPO farmer members’ participation in the commodity futures market

Ratings on the basis of Score	Influential Factors	Score out of 2000	Correlation with				
			Size of landholding	Annual income of family	Annual income from farming	Farm machinery held	Sources of Irrigation
1	Customized contracts	1835	-0.392***	.239**	.294**	.091	-.039
2	Stable futures markets	1791	0.437***	-.186**	-.278**	-.114*	.138**
3	Low transaction cost and brokerage	1781	-0.566***	.282**	.385**	.113*	-.183**
4	Availability of storage structures	1776	0.329***	-.178**	-.243**	-.061	.048
5	More campaigns to raise future market awareness	1748	-0.494***	.299**	.392**	.133**	-.182**

Note: *** = 1 percent significance, ** = 5 percent significance, * = 10 percent significance

From table no. 11, it is evident that all the top 5 influential factors are significantly correlated with size of landholding, annual income from farming and annual income of family at 1% and 5% significance level respectively. Similarly, sources of irrigation and farm machinery ownership have significant correlation with 3 out of 5 influential factors. Thus, it is clear that all of the parameters have a substantial association with the economic status of farmer members with their involvement in the futures market trading.

3.10 Summary of the results of hypotheses

Table no.12 below summarizes the hypotheses on correlation between the farmer members participation in the futures trading and their corresponding socio-economic status. The hypotheses summary sheet clearly depicts that the correlation between problems faced by farmers for taking part in the commodity futures market and their social status is statistically insignificant. However, their economic status is significantly correlated to the factors driving them to take part in the commodity futures trading.

Table no 12: Summary of the results of hypotheses

Null Hypothesis	Statement	Decision
H₀₁	There is no significant relationship between the social status and problems that FPO farmer members face in participating in commodity futures market.	Accepted
H₀₂	There is no significant relationship between economic status and problems that FPO farmer members face in participating in commodity futures market.	Accepted
H₀₃	There is no significant relationship between social status and the factors driving FPO farmer members to participate in the commodity futures market.	Rejected
H₀₄	There is no significant relationship between economic status and the factors driving FPO farmer members to participate in the commodity futures market.	Rejected

4 CONCLUSION

The primary goal of the current study was to identify the important factors that affect/enrich the engagement of farmers in the commodity futures market. Further, the study tried to examine the correlation between the socio-economic condition of farmers with the factors that constrain/ enhance their participation in the commodity futures market. To arrive at a decision, the opinion of 400 farmer members of two sample FPOs namely Pendrani Krushak Producer Company Limited and Mauli Maa Maize Mandi Producer Company Limited from the Nabarangpur district of Odisha were collected and thoroughly evaluated. To begin with, the study has analyzed all the socio-economic characteristics of the respondents. Second, the awareness level of farmers on commodity futures market has been examined and found out that all the respondents are aware about the futures market. It is also observed that the two FPO offices are the major source of information on commodity futures market for their respective farmer members. To identify the constraining and driving factors for commodity market participation of farmers, the study had applied exploratory factor analysis. The analysis discovered that the speculative trading information (0.654), spot and futures price discrepancy (0.754), minimal intervention of exchange officials for illegal transactions (0.815) and insufficient contracts and delivery centres mainly obstruct participation of farmers in the futures market. Similarly, stable market for risk management (0.662), low transaction cost (0.853), availability of storage structure (0.496) and structured financing with reasonable interest rate (0.947) were the factors those motivate farmers to take part in futures trading. Finally, the four hypotheses framed to examine the correlation between farmers’ socio-economic status and the constraining/driving factors for their futures market participation are statistically tested and proved that the correlation between problems faced by farmers for participating in futures trading and their subsequent socio-economic status is statistically insignificant. However, their socio-economic status is significantly correlated to the factors driving them to be a part in commodity futures trading.

The findings of the current study must be seen in the context of a number of limitations that will aid in future research. The study included 400 responses from two FPOs of one district of Odisha only. Thus, future research could use a larger sample size and cover a larger geographic area. Furthermore, the data was collected using a structured schedule with limited questions. Therefore, future research could include additional methodologies of collecting data such as personal interviews, focus group discussion to obtain a more precise understanding of farmers' participation in the commodity futures market.

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