Parameters for Performance Review of Commodity

REFINED CASTOR OIL (First Special Grade – F.S.G)

1. Background

a. Brief about the commodity such as sample picture, lifecycle and various varieties/grade of the commodity found in India

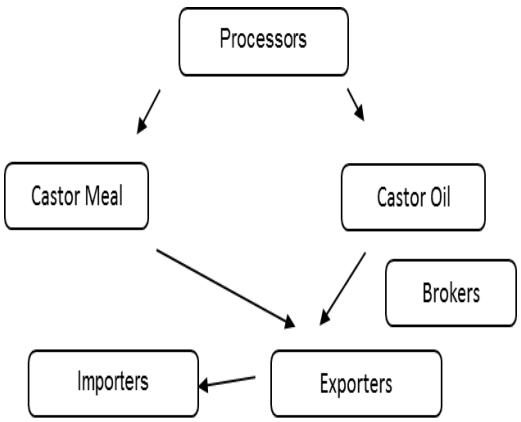
Castor Oil (Ricinus Oil), is a non-volatile fatty oil obtained from the seeds of the castor bean (Ricinus communis) of the spurge family (Euphorbiaceae). Castor Oil is the primary product obtained from Castor Seed. Castor Oil is unique among all fats and in terms of its uniformity and consistency. Castor oil of non-edible grade is renowned the world over as one of the most versatile of all oil types for industrial purposes. Some of the properties that make castor oil ideal for industrial purposes are its high specific gravity, thickness and hydroxyl value.

Castor oil has long been used commercially as a highly renewable resource for the chemical industry. Castor oil and its derivatives have wide ranging applications in the manufacturing of soaps, lubricants, hydraulic and brake fluids, paints, dyes, coatings, inks, cold resistant plastics, waxes and polishes, nylon, pharmaceuticals and perfumes. It is also used for making bio-diesel.

India, is also the largest exporter of Castor Oil in the world, accounting for more than 90% of total global exports of Castor Oil. China has been one of the biggest growth drivers for castor oil due to its demand for Sebacic acid (a basic industrial chemical compound) which is developed from this oil.

In terms of production, India is the largest producer of castor seed in the world, and thus, also of Castor oil. Global Castor oil production is concentrated primarily in a small geographic region of Gujarat in Western India. This region is favorable due to subtropical climate conditions.

Crop Cycle: Castor Oil is a processed commodity and hence does not follow any particular crop cycle.

<table>
<tr><th>Life Cycle: Value Chain of the Commodity</th><th>Major Varieties /Grade</th></tr>
<tr><td> 
</td><td>Major Varieties: Not Applicable

NCDEX: Refined Castor Oil (FSG- First Special Grade) with the following specifications

<table>
<tr><td>Refractive Index at 20°C</td><td>1.4700-1.4740</td></tr>
<tr><td>Moisture & Volatile Matter</td><td>0.22 % Max</td></tr>
<tr><td>Insoluble Impurities</td><td>0.02 % Max</td></tr>
<tr><td>Free Fatty Acid</td><td>0.9 % Max</td></tr>
<tr><td>Acid Value</td><td>2.00 % Max</td></tr>
<tr><td>Iodine Value (Wijs method)</td><td>82-90 %</td></tr>
<tr><td>Acetyl Value</td><td>140 Min</td></tr>
<tr><td>Saponification Value</td><td>177-187</td></tr>
<tr><td>Un-saponifiable Matter</td><td>0.80 % Max</td></tr>
<tr><td>Hydroxy Value</td><td>160-168</td></tr>
<tr><td>Relative Density 15 / 15.5 DC</td><td>0.954-0.960</td></tr>
<tr><td>Viscosity Gardner-Holdt</td><td>U- V</td></tr>
<tr><td>Colour, Lovibond (5 ¼” cell)</td><td>19 Yellow, 1.9 Red Max</td></tr>
</table></td></tr>
</table>

	Appearance 25 DC	Clear and free from suspended matter
	Odour	Slight, characteristic
	Ricinoleic Acid content	85% Min

Table: Reference Years for Commodities

Sl. No.	A	B	C
Crop Season	**Kharif**	**Kharif (Long Duration crop)**	**Rabi**
Crops	Paddy, Maize, Bajra, Moong, Soybean, Guar seed, Kapas, Sesame Seed	Castor seed and Turmeric	Wheat, Barley, Chana, RM Seed, Coriander, Jeera
Relevant Processed commodities	Guar gum, Soybean meal, Soy oil, Cotton, Cotton seed Oil cake, Gur, CPO	Castor Oil	-
Sowing Time	July onwards	July onwards	October onwards
Harvesting Time	Oct onwards	Jan onwards	March onwards
Reference Year Financial Year 2022-23 (Apr-Mar)			
Corresponding Years			
Production Year (PY)	2022-23 (July-Sept)	2021-22 (July-June)	2021-22 (July-June)
Marketing Year (MY)	2022-23(Oct-Sept)	2022-23 (Jan/Feb-Dec/Jan)	2022-23 (Mar/Apr - Feb/Mar)
Calendar Year (CY)	2022 (Jan-Dec)	2022 (Jan-Dec)	2022 (Jan-Dec)
Relationship b/w Various Years	Current Financial Year = Current Production Year = Current Marketing Year = Calendar Year	Current Financial Year = Previous Production Year = Current Marketing Year = Current Calendar Year	Current Financial Year = Previous Production Year = Current Marketing Year = Current Calendar Year
Example	FY 2022-23= PY 2022-23= MY 2022-23= CY 2022	FY 2022-23= PY 2021-22 = MY 2022-23= CY 2022	FY 2022-23= PY 2021-22 = MY 2022-23= CY 2022

Note: Coffee is a plantation crop; hence, it is not classified under either Kharif or Rabi season in the above table.

Explanatory Notes:

- India is a vast country and various crops are sown and harvested at different point of time. However, two major crop seasons, are there i.e. Kharif & Rabi. Apart from it, Zaid/Summer season is also there.

- Crop seasons are classified based upon sowing time. Normally Kharif season sowing starts from mid-June/July and new crop arrivals begin from Oct/Nov. However, early/late sowing/harvesting also takes place. Rabi season sowing usually takes place mainly from October/November and harvesting starts from March/April. Early/late sowing/harvesting also takes place. Summer crops/Zaid crops are short duration crops mainly sown during January-March and harvested during April-June.

- "Production Year" is considered as "July to June". With the start of monsoon rains during June/July the sowing of Kharif season starts and they are harvested during Sept/Oct. From Oct onwards the sowing of Rabi season crops starts and harvesting usually takes place during March/April. Thus, a single production cycle completes between July-Sept period covering Kharif, Rabi and Zaid crops. Thus production year remains same for all season crops and the period corresponds to July-Sept.

- "Marketing Year" for each crops starts from beginning of the harvest time i.e. from start of new crop produce arrivals in the market. Thus, for Kharif crops Marketing Year is generally considered as "October to September", while for Rabi crops Marketing Year is considered as "April to March". However, Marketing Year may vary slightly for some of the crops depending upon early/late maturity/harvesting.

- For processed commodities, their production starts after the start of new season crop arrivals of their underlying crop.

b. Commodity fundamentals and balance sheet as per the following format (to be prepared based on publicly available information on best effort basis):

Table - Fundamentals & Balance sheet (quantity)

(In Lakh Tonnes)

Global Scenario	Previous FY (2020-21)*	Current FY (2021-22)* (P)
Opening Stocks	1.37	1.91
Production	9.36	8.93
Imports	7.54	6.60
Total Supply	18.27	17.44
Exports	7.37	6.70
Domestic Consumption	9.00	9.16
Closing Stocks	1.91	1.59

Source: Video presentation by Mr. Thomas Mielke Editor, Oil World at Global Castor Conference 2022 (Feb 25, 2022); FY 2021-22 corresponds to MY 2021-22 (Oct to Sep) as per the source data.

Please refer to Table entitled "Reference Years for Commodities" to know type of years corresponding to financial year.

*Latest data for FY 2022-23 is not available in the public domain; P: Provisional.

(In Lakh Tonnes)

Indian Scenario	Current FY (2021-22)	Current FY (2022-23) (P)
Opening Stocks	1.11	0.50
Production of Castor seed	16.47	16.19
Production of Castor Oil	7.59	7.46
Imports	0.0003	0.0006
Total Supply	8.70	7.96
Exports	6.90	5.81
Domestic Consumption	1.30	1.70
Closing Stocks	0.50	7.51

Source: Castor oil Production is back-calculated based on Castor seed data sourced from the Ministry of Agriculture. Production of Castor oil is derived considering Conversion Ratio: 2.17 tonnes of Castor seed= 1 tonne Castor oil.; Imports and Export data is sourced from the Ministry of Commerce using HS code 15153090 and it is for Calendar Year (Jan-Dec); Figures for Domestic Consumption are as per market feedback; P: Provisional

(In Lakh Tonnes)

Rank	Top 10 Major Producing Countries			Top 10 Major Consuming Countries		
	Country	Previous FY (2020-21)*	Current FY (2021-22)* (P)	Country	Previous FY (2021-22)	Current FY (2022-23)
1	India	8.66	8.23	NA	NA	NA
	Others**	0.70	0.70			
	World Total	9.36	8.93			

Source: Video presentation by Mr. Thomas Mielke Editor, Oil World at Global Castor Conference 2022 (Feb 25, 2022); FY 2021-22 corresponds to MY 2021-22 (Oct to Sep) as per the source data

NA: Data is not available in the public domain; P: Provisional.

**: The share of other countries (except India) in world production is negligible. India accounts for more than 90% of the world Castor oil production.

*Latest data for FY 2022-23 is not available in the public domain.

(In Lakh Tonnes)

Rank	Top 10 Major Exporting Countries			Top 10 Major Importing Countries		
	Country	Previous FY (2020-21)	Current FY (2021-22) (P)	Country	Previous FY (2020-21)	Current FY (2021-22) (P)
1	India	7.16	6.50	China	3.62	3.00
2	Others**	0.21	0.20	EU	2.07	1.82
3	World Total	7.37	6.70	USA	0.69	0.64
4				Thailand	0.18	0.17
				Others	0.98	0.97
				World Total	7.54	6.60

Source: Video presentation by Mr. Thomas Mielke Editor, Oil World at Global Castor Conference 2022 (Feb 25, 2022); FY 2021-22 corresponds to MY 2021-22 (Oct to Sep) as per the source data

**: The share of other countries (except India) in world production is negligible. India accounts for more than 90% of the world Castor oil production.

*Latest data for FY 2022-23 is not available in the public domain; P: Provisional.

Top 10 Major producing states in India

Data not available, as it is processed commodity. Castor seed, which is the raw material for Castor oil, is mainly sown in four states in India i.e. Gujarat, Rajasthan, Andhra Pradesh and Telangana etc.

c. Major changes in the polices governing trade in the spot markets of the commodity (FY 2022-23)

Date	Major Policies governing trade and related changes
20-Dec-22	SEBI in its press release (PR No 38/2022) directs extension of suspension of futures and options trading for one more year beyond December 20, 2022, i.e., till December 20, 2023 for agricultural commodities including Paddy (non-basmati), Wheat, Chana, Mustard seeds and its derivatives (its complex), Crude Palm Oil, Moong, Soybean and its derivatives (its complex).

d. Geo political issues in the commodity and its impact on Indian scenario (FY 2022-23)

Date	Event	Key Details	Key Implications/Impact
05-Nov-22	Zero Covid Policy in China	China indicates no relaxation of restrictions to 'zero-Covid' policy. Scattered outbreaks across the country continue to prompt travel restrictions and lockdowns	Trading activities remained restricted. Castor oil demand adversely affected. China is the largest buyer of Indian Castor oil.

Date	Event	Key Details	Key Implications/Impact
11-Nov-22	Partial Relaxation w.r.t. Zero Covid Policy by Govt. of China	China announced the relaxation of some of its hardline Covid-19 restrictions on Friday (11 Nov), after authorities had vowed to stick to a zero-tolerance virus approach despite mounting economic damage. In a further sign of easing, the National Health Commission said it was abolishing the requirement to identify and isolate "secondary close contacts".	Partial relaxation of restrictions raised the hopes of pick-up export demand for China.
24-Nov-22	Re-imposition of Community lockdown in China	Doggedly persisting with its much-criticized zero-Covid policy, China slipped deeper into the corona virus quagmire, as it reported a record 31,444 infections on 24 Nov 2022 with many of its cities, including Beijing, resorting to community lockdowns to stem the virus amid worsening wintery weather.	Re-imposition of Community lockdown in China adversely impacted market sentiments in expectation of slowdown of export demand for castor oil.
07-Dec-2022	Relaxation in Covid Policy by Govt. of China	On 07 Dec 2022, China announced the most sweeping changes to its tough zero-COVID policy since the pandemic began three years ago, loosening rules that curbed the spread of the virus but had hobbled the world's second-largest economy and sparked protests.	Relaxation in Covid Policy by Chinese Govt. spurt the hopes of export demand for Castor oil resuming in a full-fledged manner amid re-building of inventories by stockist and traders in China.

2. Trading related parameter

a. Monthly and Annual traded volume (quantity in appropriate units)

Month	Year	Symbol	Traded volume (MT)
Apr	2022	CASTOROIL	542
May	2022	CASTOROIL	372
June	2022	CASTOROIL	-
July	2022	CASTOROIL	-
August	2022	CASTOROIL	-
September	2022	CASTOROIL	-
October	2022	CASTOROIL	-
November	2022	CASTOROIL	-
December	2022	CASTOROIL	-
January	2023	CASTOROIL	-
February	2023	CASTOROIL	-
March	2023	CASTOROIL	-
Annual Traded Volume (MT) (April'22 to March'23)			914

b. Annual traded volume as proportion of total deliverable supply (quantity in appropriate units)

Symbol	Traded Volume (MT)	Deliverable Supply(MT)	Proportion
CASTOROIL	914.00	746,116	0.00

c. Annual traded volume as proportion of total annual production (quantity in appropriate units)

Symbol	Traded volume (MT)	Production(MT)	Proportion
CASTOROIL	914	746,083	0.00

d. Annual average Open interest as proportion of total production

Symbol	Average Open Interest (MT)	Production(MT)	Proportion
CASTOROIL	17.71	746,083	0.00

e. Annual average Open interest as proportion of total deliverable supply

Symbol	Average Open Interest (MT)	Deliverable supply(MT)	Proportion
CASTOROIL	17.71	746,116	0.00

f. Monthly and Annual value of trade (in Rs. Crores)

Month	Year	Symbol	Traded value (in Rs. Crores)
Apr	2022	CASTOROIL	7.86
May	2022	CASTOROIL	5.69
June	2022	CASTOROIL	-
July	2022	CASTOROIL	-
August	2022	CASTOROIL	-
September	2022	CASTOROIL	-
October	2022	CASTOROIL	-
November	2022	CASTOROIL	-
December	2022	CASTOROIL	-
January	2023	CASTOROIL	-
February	2023	CASTOROIL	-
March	2023	CASTOROIL	-
Annual Traded Volume (in Rs Crores) (April'22 to March'23)			13.55

g. Monthly and Annual quantity of delivery (in appropriate units)

No delivery

h. Monthly and Annual value of delivery (in Rs. Crores)

No delivery

i. Monthly and Annual Average Open Interest (OI) (in appropriate units)

Month	Year	Symbol	Average Open Interest (MT)
Apr	2022	CASTOROIL	117.47
May	2022	CASTOROIL	64.10
June	2022	CASTOROIL	39.45
July	2022	CASTOROIL	-
August	2022	CASTOROIL	-
September	2022	CASTOROIL	-
October	2022	CASTOROIL	-
November	2022	CASTOROIL	-
December	2022	CASTOROIL	-
January	2023	CASTOROIL	-
February	2023	CASTOROIL	-
March	2023	CASTOROIL	-
Annual Average OI (MT) (April'22 to March'23)			17.71

j. Annual average volume to open interest ratio

20.56%

k. Total number of unique members and clients who have traded during the financial year

Symbol	Member Count	Client Count
CASTOROIL	24	43

l. Ratio of open interest by FPOs/farmers/Hedge/VCP positions to total open interest (Annual average as well as maximum daily value)

Annual Average	N/A
Maximum Daily Value	0.00%

m.Number of unique FPOs / farmers and VCPs/hedgers who traded in the financial year

Commodity	Count
CASTOROIL	0

Commodity wise client categorization is as per category details as provided by the members.

n. Algorithmic trading as percentage of total trading

Commodity	%
CASTOROIL	0.00%

o. Delivery defaults

Number of instances	0
Quantity involved	0
Value involved	0

3.Price Movements

a. Comparison, correlation and ratio of standard deviation of Exchange futures price vis-à-vis international futures price (wherever relevant comparable are available).

NA

b. Comparison, correlation and ratio of standard deviation of Exchange futures price vis-à-vis international spot price (wherever relevant comparable are available) and domestic spot price (exchange polled price).

NA

c. Correlation between exchange futures & domestic spot prices along with ratio of standard deviation.

Correlation			
	Futures	*Spot*	*Mandi*
Futures	1	-	-
Spot	0.940791	1	-
Mandi	-	-	-

Standard Deviation			
	Futures	*Spot*	*Mandi*
Futures	1	0.931522	-
Spot	1.073512	1	-
Mandi	-	-	-

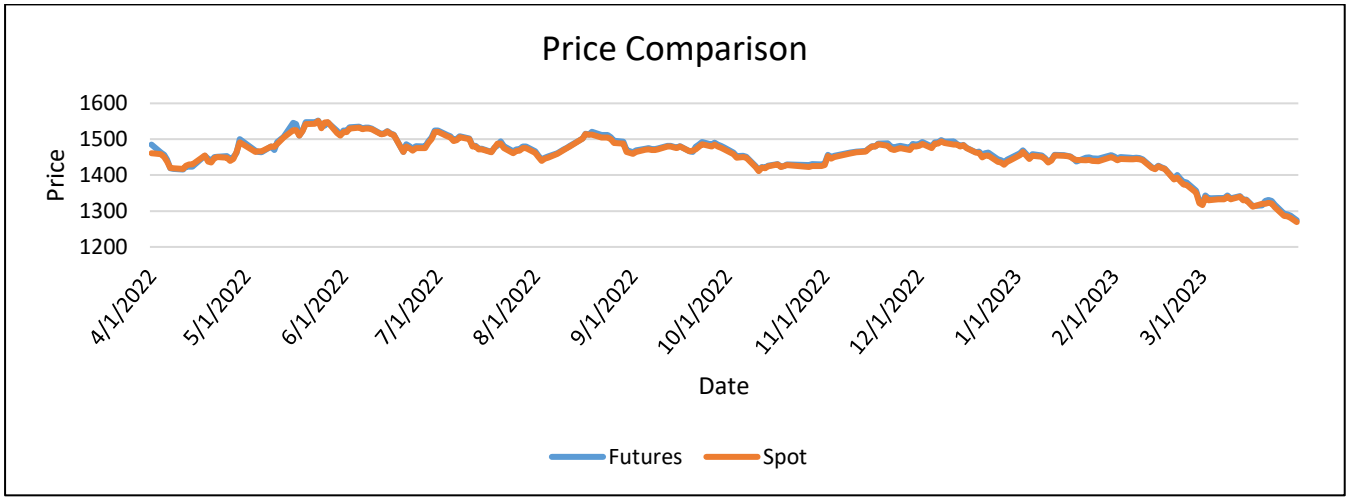
d. Correlation between international futures & international spot prices along with ratio of standard deviation (wherever relevant comparable are available).

NA

e. Comparison of Exchange polled price and mandi price (in case of agricultural commodities) /other relevant price (in case non-agricultural commodities) at basis centre.

Correlation			
	Futures	*Spot*	*Mandi*
Futures	1	-	-
Spot	0.940791	1	-
Mandi	-	-	-

Standard Deviation			
	Futures	*Spot*	*Mandi*
Futures	1	0.931522	-
Spot	1.073512	1	-
Mandi	-	-	-



Source: Spot and Future Prices: NCDEX

f. Maximum & Minimum value of daily futures price volatility and spot price volatility along with disclosure of methodology adopted for computing the volatility. (Volatility calculated by Square root of Standard Deviation of daily returns for the period from 1 April 2022 to 31 March 2023)

Value of daily futures price volatility (April 2022- March 2023)

Volatility	Month	Value
Max	May	0.011
Min	Sep	0.004

Value of daily Spot price volatility (April 2022- March 2023)

Volatility	Month	Value
Max	May	0.009
Min	Sep	0.004

g. Number of times the futures contract was in backwardation/ contango by more than 4% forthe near month contract in the period under review

Contango	0
Backwardation	0

4. Others parameters

a. Qualitative and quantitative measure for Hedge effectiveness ratio and basis Risk (Volatility of Basis) along with disclosure of methodology adopted for such calculations. (Volatility calculated by Square root of Standard Deviation of daily returns for the period from 1 April 2022 to 31 March 2023)

	CASTOROIL
Basis Volatility	2.0
Hedge efficiency	0.97

b. Details about major physical markets of the commodity vis-à-vis market reach in terms of availability of delivery centers (information to be provided state-wise and UT-wise).

State	District	Availability of delivery centers
Gujarat	Harij	NA
	Palanpur	NA
	Deesa	NA
	Kutch/ Kandla	Kandla (Basis)
	Kadi	NA
	Mehsana	NA
	Patan	NA

State	District	Availability of delivery centers
Rajastan	Barmer	NA
	Jalore	
	Jodhpur	
	Sirohi	
	Sumerpur	

State	District	Availability of delivery centers
Andhra Pradesh	Gadwal	NA
	Kurnool	
	Mahaboobnagar	
	Wanaparthy	
	Others	
	Total	

c. Details about major physical markets of the commodity and average Open Interest for each month generated from those regions.

Note – The OI for each month is classified based on the Member level. The Average OI is on gross level (Long OI + Short OI)

State	MAHARASHTRA	GUJARAT	RAJASTHAN	BIHAR
Apr-22	59	118	34	0.4
May-22	0	112	10	0.2
Jun-22	0	79	0	0

d. Details, such as number and target audience, of stakeholders' awareness programs carried out by the exchange.

Following list of Awareness programme, Stakeholder engagement programme has conducted for FY2022-23

Sr. Number	Programme	Location	Number of Participants
1	Awareness Programme	Bhiloda	51
2	Awareness Programme	Dhangadhra, Surendranager Gujarat	60
3	Awareness Programme	Radhanpur,Gujarat	52
4	Awareness Programme	Motipur, Himmatnager Gujarat	30
5	Awareness Programme	Motipur, Himmatnager Gujarat	26
6	Awareness Programme	Unjha, Gujarat	33
7	Awareness Programme	Ambaji, Gujarat	50
8	Awareness Programme	Patan, Gujarat	35
9	Awareness Programme	Patan, Gujarat	40
10	Awareness Programme	Amreli, Gujarat	50
11	Awareness Programme	Botad, Gujarat	40
12	Awareness Programme	Bhuj, Gujarat	49
13	Awareness Programme	Bhiloda,Khalwad	100
14	Awareness Programme	Shamla Ji,Village-Abhapur	100
15	Awareness Programme	Mehsana	25
16	Awareness Programme	Gandhinagar	50
17	Awareness Programme	Sami, Patan	29
18	Awareness Programme	Dasada, Surendranagar	50
19	Awareness Programme	Kadi	35
20	Awareness Programme	Ahmedabad	15
21	Awareness Programme	Manund	51
22	Awareness Programme	Kolkata	35
23	Awareness Programme	Surat	18
24	Awareness Programme	Guna, Madhya Pradesh	30
25	Awareness Programme	Anjar, Lutch, Gujarat	38
26	Awareness Programme	Raipur, Chhattisgarh	112
27	Awareness Programme	Patan, Gujarat	104
28	Awareness Programme	Nashik	200
29	Awareness Programme	Udaipur	150
30	Awareness Programme	Rajkot	100
31	Awareness Programme	Hissar	100
32	Awareness Programme	Nagpur, Maharashtra	120
33	Awareness Programme	Raipur	100
34	Awareness Programme	Gwalior, Madhya Pradesh	78
35	Awareness Programme	Bhopal , MP	54
36	Awareness Programme	Indore, Madhya Pradesh	47
37	Awareness Programme	Siliguri, West Bengal	39
38	Awareness Programme	Alipurduar, West Bengal	31
39	Awareness Programme	Meerut, Uttar Pradesh	30
40	Awareness Programme	Bhopal, Madhya Pradesh	44
41	Awareness Programme	Indore, Madhya Pradesh	80
42	Awareness Programme	Chennai, Tamil Nadu	24
43	Awareness Programme	Kanpur, Uttar Pradesh	60
44	Awareness Programme	Chindwara, MP	50
45	Awareness Programme	Seoni , MP	40
46	Awareness Programme	Kolkata	25

47	Awareness Programme	Raipur, Chattisgarh	136
48	Awareness Programme	Lucknow	177
49	Awareness Programme	Rourkela	65
50	Awareness Programme	Muzaffarnagar	70
51	Awareness Programme	Kochi	86
52	Awareness Programme	Bhilai	70
53	Awareness Programme	Thalamadla	80
54	Awareness Programme	Kolkata	45
55	Awareness Programme	Online	30
56	Awareness Programme	Online	18
57	Awareness Programme	Online	23
58	Awareness Programme	Odisha	9
59	Awareness Programme	Odisha	15
60	Awareness Programme	Karnataka	5
61	Awareness Programme	Bihar	18
62	Awareness Programme	West Bengal	6
63	Awareness Programme	Andhra Pradesh	29
64	Awareness Programme	Online	11
65	Awareness Programme	Online	7
66	Awareness Programme	Online	21
67	Awareness Programme	Online	6
68	Awareness Programme	Online	9
69	Awareness Programme	Online	14
70	Awareness Programme	Online	82
71	Awareness Programme	Online	28
72	Awareness Programme	Online	25
73	Awareness Programme	Online	50
74	Awareness Programme	Online	30
75	Awareness Programme	Online	25
76	Awareness Programme	Online	5
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78	Awareness Programme	Online	7
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80	Awareness Programme	Online	16
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83	Awareness Programme	Online	17
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88	Awareness Programme	Online	10
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93	Awareness Programme	Online	20
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115	Awareness Programme	Online	13
116	Awareness Programme	Online	15
117	Awareness Programme	Online	25
118	Awareness Programme	Online	25
119	Awareness Programme	Online	26
120	Awareness Programme	Online	18
121	Awareness Programme	Online	52
122	Awareness Programme	Online	16

e. Steps taken / to be undertaken to improve hedging effectiveness of the contracts as well asto improve the performance of illiquid contracts.

- Creating an awareness about the Hedge Policy to bona fide hedger
- Awareness programme in Major trading centre's as well as remote locations to increase hedging participation from the value chain participants.
- One to one meetings with the market participants to create awareness about the new developments / new initiatives at exchange level.

5. Any other information to be disclosed as deemed important by the exchange or as suggested by the PAC

N.A

ANNEXURE I

Qualitative and quantitative measure for Hedge effectiveness ratio

Methodology

Regression analysis is carried out between near month futures returns and NCDEX polled spot pricesreturns of the FY2022-23.

The R-Square value of the Regression analysis represents the "**Hedging**

Efficiency".Note: -

Date for which spot prices were not available is not used for analysis.

Weekly returns are used for performing Regression Analysis.

The method used to calculate Hedging Efficiency does not consider liquidity risk because of this reason illiquid commodities can have high hedging efficiency.

References:

Ghosh, Ph.D, Nilanjan & Dey, Debojyoti & Moulvi, Nazir & Jain, Niteen & Sinha, Neha & Rachuri, Sarika. (2013). Hedging Efficiency—Measures and Empirical Study.