Parameters for Performance Review of Commodity
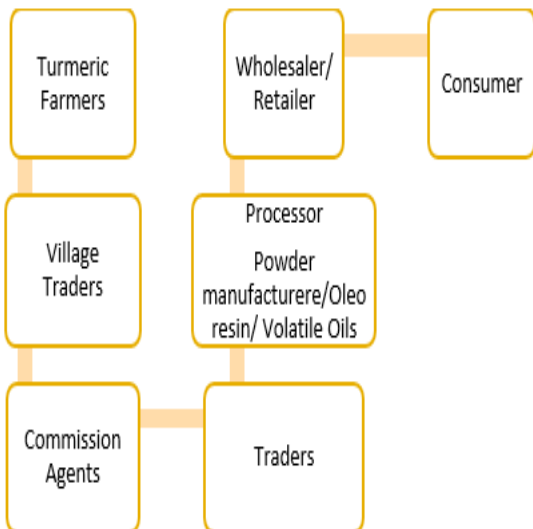
TURMERIC

1. Background

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

Turmeric is one of the most important spices as well as medicinal agent and is grown during Kharif season in India. The commercial part of Turmeric is rhizome or underground stem. Its active ingredient is curcumin. It is used as a spice in curries and other South Asian and Middle Eastern cuisine, for dyeing, and to impart color to mustard condiments. Turmeric oleoresin, which is obtained by solvent extraction of the ground spice, is used in brine pickles and to some extent in mayonnaise and relish formulations, non-alcoholic beverages, gelatins, butter and cheese etc. Indian Ayurvedic and Chinese medicines are found to be using turmeric for the treatment of inflammatory and digestive disorders since ages. Turmeric has been considered as an excellent natural cosmetic.

It requires a hot and moist climate and hence can be grown on different types of soil under irrigated and rainfall conditions and has crop duration of 7-9 months. Sowing period varies from June to August while harvesting takes place between Dec-March. Important producing states are Telangana, Andhra Pradesh, Tamil Nadu and Maharashtra.

Crop Cycle (India)											
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	Sowing			Harvesting							

Life Cycle: Value Chain of the Commodity	Major Varieties /Grade
	Major Varieties Alleppey Finger (Kerala) and Erode and Salem turmeric (Tamil Nadu), Rajapore and Sangli turmeric (Maharashtra) and Nizamabad Bulb (Andhra Pradesh). In Tamil Nadu NCDEX: Quality Parameters (Unpolished Fingers) Inferior quality should not be more than 2.25% - Length: Fingers that are broken/those less than 15mm should not be more than 3.0%; Fingers less than or equal to 3 cm in length should not be more than 15% - Damage due to moisture (i.e. Lokhandi) or over boiling (i.e. Kadh) should not be more than 1.2% - Unboiled or less boiled (Gajarthod) Turmeric should not be more than 0.3% - Foreign matter: 0.75% Max - Bulbs should not be more than 3% - Moisture: 12% max - Turmeric should be free from fungus - Turmeric should not be artificially colored with dyes or chemicals

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 (2018-19)*	Current FY (2019-20)*
Opening Stocks	NA	NA
Production	NA	NA
Imports	1.35	0.95
Total Supply	NA	NA
Exports	1.48	1.26
Domestic Consumption	NA	NA
Ending Stocks	NA	NA

Source: UN Comtrade (April 2020); HS code used is 091030;
*Data is only available for Calendar Year (Jan-Dec); Thus Previous Year is 2018 (Jan-Dec) and Current Year is 2019 (Jan-Dec).
NA: Data is not available in the public domain

(In Lakh Tonnes)

Indian Scenario	Previous FY (2018-19)	Current FY (2019-20)
Opening Stocks	NA	NA
Production	9.30	NA
Imports	0.31	0.26
Total Supply	NA	NA
Exports	1.39	1.10
Domestic Consumption	NA	NA
Ending Stocks	NA	NA

Source: Production: Spice board of India and Import/Export: Ministry of Commerce;
For 2019-20, import and export data is available only for period of Apr 2019 to Jan 2020 (HS code 091030);
NA: Data is not available in the public domain

(In Lakh Tonnes)

Rank	Top 10 Major Producing Countries			Top 10 Major Consuming Countries		
	Country	Previous FY	Current FY	Country	Previous FY	Current FY
	NA			NA		

Data is not available in public domain. As per market feedback, India is considered as the largest producer, consumer and exporter of Turmeric in the globe contributing over 80% of the world production. Other major producers of Turmeric in Asia are China, Myanmar, Bangladesh, Pakistan, Sri Lanka, Taiwan, Burma and Indonesia, etc. Turmeric is also produced in the Caribbean and Latin American countries like Jamaica, Haiti, Costa Rica, Peru and Brazil.

India holds key position in world trade of Turmeric. India exports less than 10% of its total produce but still remains the biggest exporter of Turmeric to the world.

(In Lakh Tonnes)

Rank	Top 10 Major Exporting Countries			Top 10 Major Importing Countries		
	Country	Previous FY*	Current FY*	Country	Previous FY*	Current FY*
1	India	1.22	1.20	EU	0.19	0.23
2	USA	0.01	0.01	India	0.31	0.23
3	United Kingdom	0.01	0.01	USA	0.10	0.10
4	EU	0.01	0.01	UK	0.07	0.09
5	Spain	0.01	0.01	Japan	0.04	0.05
6	Belgium	0.00	0.00	Egypt	0.02	0.03
7	Thailand	0.00	0.00	South Africa	0.02	0.02

Rank	Top 10 Major Exporting Countries			Top 10 Major Importing Countries		
	Country	Previous FY*	Current FY*	Country	Previous FY*	Current FY*
8	Poland	0.00	0.00	Spain	0.02	0.02
9	Latvia	0.00	0.00	Poland	0.01	0.01
10	Peru	0.02	0.00	Kazakhstan	0.00	0.01
	Others	0.20	0.02	Others	0.57	0.16
	World total	1.48	1.26	World total	1.35	0.95

Source: UN Comtrade (April 2020); HS code used is 091030; *Data is only available for Calendar Year (Jan-Dec); Thus Previous Year is 2018 (Jan-Dec) and Current Year is 2019 (Jan-Dec); Countries are arranged in descending order based on the figure in Current FY

(In Lakh Tonnes)

Top 10 Major producing states in India			
Rank	States	Previous FY	Current FY
1	Telangana	2.95	3.19
2	Karnataka	1.23	1.28
3	Tamil Nadu	0.73	0.90
4	Andhra Pradesh	0.80	0.86
5	West Bengal	0.45	0.45
6	Orissa	0.44	0.44
7	Maharashtra	0.39	0.37
8	Mizoram	0.30	0.30
9	Assam	0.21	0.22
10	Gujarat	0.16	0.17
	Others	1.00	1.13
	Total	8.63	9.30

Source: Spice Board of India; Previous FY is 2017-18 and Current Year is 2018-19
State-wise Production data for the 2019-20 is not available in the public domain.
The latest data available is for the year 2018-19.
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c. Major changes in the polices governing trade in the spot markets of the commodity (FY 2019-20)

Date	Major Policies Governing Trade and related Changes
27-Mar-20	The Govt. exempted mandis, procurement agencies, farm operations, agri machinery hiring centres as well as intra- and inter-state movement of farm implements from the lockdown rules.

d. Geo political issues in the commodity and its impact on Indian scenario (FY 2019-20)

Date	Event	Key Details	Key Implications/Impact
20-Jan-20	China declared an emergency about corona virus attack.	Outbreak of Corona virus that was first reported from Wuhan, China, on 31 December 2019.	World Trade with China set to diminish. Trade disruptions resulted into reduced demand affecting export growth and overall business prospects.
11-Mar-20	COVID-19	WHO declared COVID 19 as a pandemic	Economic Slow Down
19-Mar-20 and thereafter	Lockdown in Indian States	Indian PM urged countrymen to observe Janta Curfew on 22nd March. It is followed by nation-wide lock-down for 21 days effective from Mar 25.	Physical Market activities started getting adversely impacted due to movement restrictions and closures of physical markets.

2. Trading Parameters

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

Monthly Traded Volume	
Month	Traded volume (MT)
Apr-19	144,365
May-19	213,905
Jun-19	126,075
Jul-19	185,045
Aug-19	113,910
Sep-19	122,805
Oct-19	104,845
Nov-19	71,170
Dec-19	84,875
Jan-20	50,735
Feb-20	35,560
Mar-20	44,565
Yearly Traded Volume	1,297,855

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

Traded volume (MT)	Deliverable supply(MT)	Proportion
1,297,855	1,125,000	115.36%

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

Traded volume (MT)	Production(MT)	Proportion
1,297,855	1,108,000	117.13%

d. Annual average Open interest as proportion of total production

Avg Open Int (MT)	Production(MT)	Proportion
15,675	1,108,000	1.41%

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

Avg Open Int (MT)	Deliverable supply (MT)	Proportion
15,675	1,125,000	1.39%

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

Monthly Traded Value	
Month	Traded Value(in Cr.)
Apr-19	943
May-19	1,478
Jun-19	844
Jul-19	1,247
Aug-19	779
Sep-19	789
Oct-19	628
Nov-19	431

Monthly Traded Value	
Month	Traded Value(in Cr.)
Dec-19	518
Jan-20	321
Feb-20	213
Mar-20	255
Yearly Value of Trade	**8,444**

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

Monthly Delivery Quantity	
Month	Total Delivery(MT)
Apr-19	560
May-19	785
Jun-19	3,400
Jul-19	2,100
Aug-19	470
Sep-19	800
Oct-19	1,065
Nov-19	425
Dec-19	1,585
Jan-20*	NA
Feb-20*	NA
Mar-20*	NA
Yearly Delivery Quantity	**11,190**

Future contracts expiring in the month of January, February and March are not available.

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

Monthly Delivery Value	
Month	Value in Rs Cr
Apr-19	4
May-19	5
Jun-19	22
Jul-19	14
Aug-19	3
Sep-19	5
Oct-19	6
Nov-19	3
Dec-19	10
Yearly Delivery Quantity	**71**

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

Monthly Average OI	
Month	Avg Open Int (MT)
Apr-19	22,078
May-19	24,249
Jun-19	24,200
Jul-19	20,190
Aug-19	16,771
Sep-19	17,283
Oct-19	13,710
Nov-19	12,178
Dec-19	12,164

Jan-20	10,038
Feb-20	9,120
Mar-20	6,876
Yearly Average OI	**15,675**

j. Annual average volume to open interest ratio

Avg of traded Volume (MT)	Average of Open Interest (MT)	traded to Open interest
5,254	15,675	33.52%

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

Member Count	Client Count
207	2732

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

	VCPs/ Hedger	Proprietary traders	Others
Annual Average	2.81%	23.25%	73.94%
Maximum Daily value	9.81%	0.17%	90.02%

It is calculated on the day when commodity has highest open interest during the year.

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

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

Commodity	Count
TMCFGRNZM	17

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

n. Algorithmic trading as percentage of total trading

Commodity	%
TMCFGRNZM	2.63%

o. Delivery defaults

Number of Instances	1
Quantity involved (MT)	10
Value Involved (Cr)	0.07

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).**
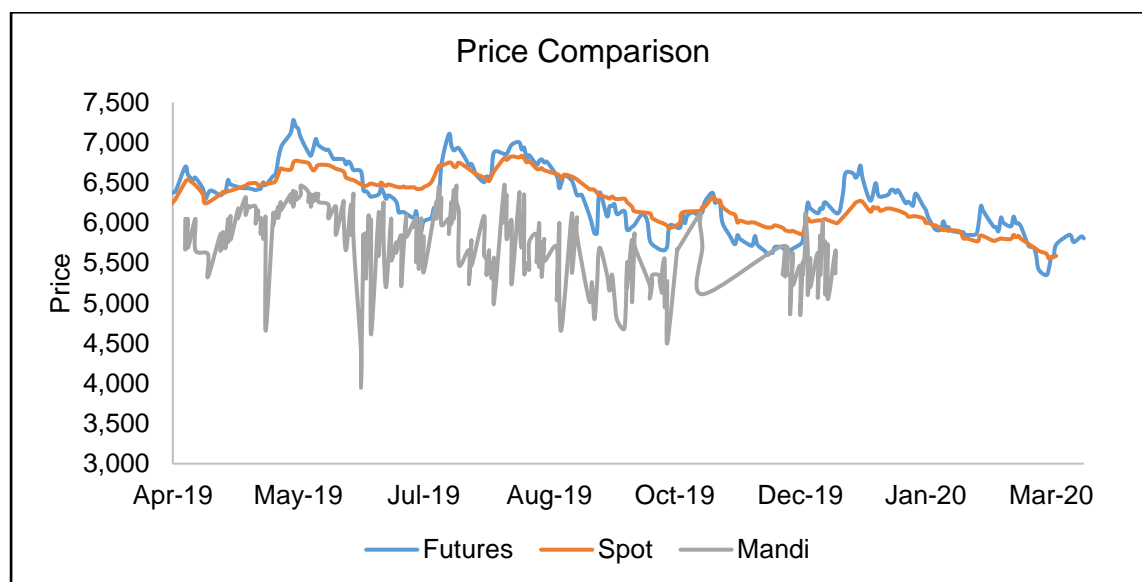
NA

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	0.39
Standard Deviation	2.25

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	0.03
Standard Deviation	0.09

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 2019 to 31 March 2020)**

Volatility	Futures		Spot	
	Month	**Value**	**Month**	**Value**
Max	Sep	0.027	Apr	0.012
Min	Jun	0.010	Dec	0.003

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

|	
Contango	36
Backwardation	0

4. **Other Parameters**

a. **Qualitative and quantitative measure for Hedge effectiveness ratio (Methodology in Annexure I) 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 2019 to 31 March 2020)**

Basis Risk (Volatility of Basis) - 4.649

Period	TURMERIC	
	Hedge Ratios	Hedge Efficiency (in percentage)
Week 1-4	0.4	52.86
Week 5-8	0.61	65.31
Week 9-12	0.52	-523.09
Week 13-16	0.48	45.42
Week 17-20	0.54	63.09
Week 21-24	0.54	-33.16
Week 25-28	0.54	80.16
Week 29-32	0.52	4.09
Week 33-36	0.42	47.5
Week 37-40	0.37	88.94
Week 41-44	0.41	-239.57
Week 45-48	0.4	33.55

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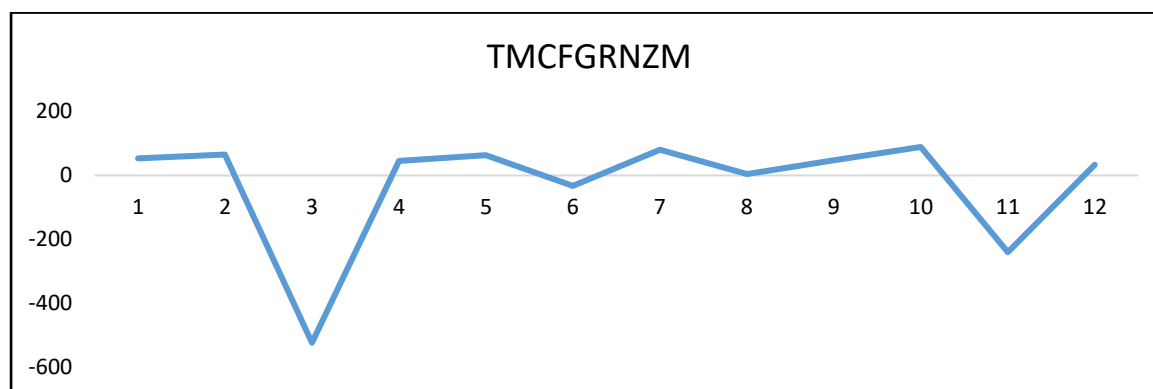
b. **Details about major physical markets of the commodity vis-à-vis market reach in terms of availability of delivery centres (information to be provided state-wise and UT-wise).**

State	Major Physical Markets	Availability of NCDEX Delivery center
Telangana	Nizamabad	Basis
	Warangal	
	Ksamudram	
	Vikarabad	
Maharashtra	Sangli	ADC
	Hingoli	
	Basmat	ADC
	Nanded	
	Jalgoan	
Tamil Nadu	Erode	ADC
	Salem	
	Coimbatore	
Andhra Pradesh	Cuddapah	
	Duggirala	

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

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	ANDHRA PRADESH (in MT)	MAHARASHTRA (in MT)
Apr-19	1,372	14,161
May-19	1,408	16,902
Jun-19	1,176	21,982
Jul-19	863	16,545
Aug-19	704	14,513
Sep-19	799	14,263
Oct-19	696	9,396
Nov-19	565	7,569
Dec-19	326	10,603
Jan-20	113	8,236
Feb-20	103	6,954
Mar-20	144	6,496

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 FY 2019-20.

IEP/RS	Location	Category	Actual Participant
Investors Education Programme	Parbhani, Maharashtra	Hedger, Processor, Traders	45
Investors Education Programme	Karanja (Washim), Maharashtra	FPO & Farmers	73
Investors Education Programme	Nizamabad, Telangana	Traders, Farmers and Clients	35
Investors Education Programme	Nanded, Maharashtra	Hedger, processor, traders	40
Investors Education Programme	Hyderabad, Telangana	Traders and Clients	17
Investors Education Programme	Nanded, Maharashtra	FPO & Farmers	40
Investors Education Programme	Erode, Tamil Nadu	Farmers and Traders	60
Investors Education Programme	Amravati, Maharashtra	Members, Hedger, processor, traders	36
Investors Education Programme	Hubballi, Karnataka	Deshpande Foundation FPO Team members of Karnataka & Telangana state	11
Investors Education Programme	Chamrajnagar, Karnataka	Farmers	48
Investors Education Programme	Sangli, Maharashtra	Members, Hedger, processor, traders	43

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

- Creating awareness about hedging and targeting the major Masala processors/ Traders/ Stockiest
- Awareness Programme in major trading centres as well as remote location
- One to one meeting with market participants and hedgers

ANNEXURE I

Qualitative and quantitative measure for Hedge effectiveness ratio

Methodology

$$Hedge\ Efficiency = 1 - \frac{Var\ (hedged\ portfolio)}{Var\ (unhedged\ portfolio)}$$

Unhedged portfolio is portfolio comprising of spot commodity, and hedged portfolio is a portfolio comprising of spot commodity and short futures.

If there is no variance reduction, i.e.

$$Var\ (hedged\ portfolio) = Var\ (unhedged\ portfolio)$$

Then,

$$Hedge\ Efficiency = 1 - 1 = 0$$

If spot is completely hedged using futures, then

$$Var\ (hedged\ portfolio) = 0$$

$$Hedge\ Efficiency = 1$$

Position is spot commodity and in futures is not initiated at 1:1. The fraction of position size in futures contract to the position size in spot commodity is called 'Hedge Ratio'.

So, in this analysis, we are calculating:

$$Hedge\ Efficiency = 1 - \frac{Var\ (spot\ return - hedge\ ratio * futures\ return)}{Var\ (spot\ return)}$$

Weekly returns are used for the analysis. The hedge ratio is calculated based on previous 30 weeks' data. For example, for week 1 to week 4 of FY19-20, we use last 30 weeks' data of FY18-19 to compute hedge ratio which had highest hedge efficiency in those 30 weeks. This hedge ratio is then used to compute hedge efficiency for Week 1 – Week 4 of FY 19-20. So, hedge ratio is derived from 30-week rolling basis.

Negative hedge efficiency imply variance has increased by taking position in futures contract. Some of this can be attributed to the fact that spot price is not precisely available at the time of futures closing. So, the timing of generation of these 2 data is different.