

Performance Review of Commodity

BAJRA-FEED GRADE

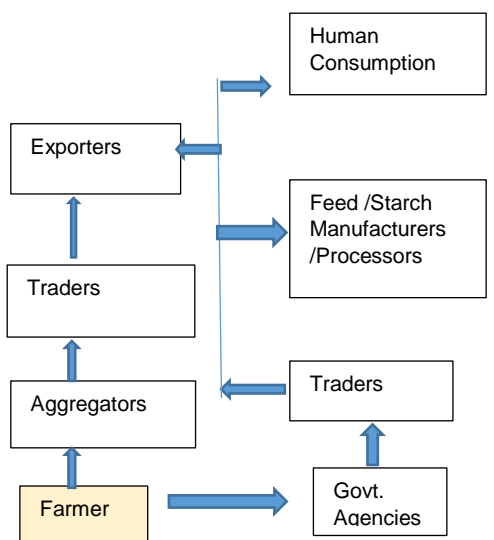
1. Background

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

Pearl millet/Bajra is the most widely grown type of millet. (Millets are a group of highly variable small-seeded grasses, widely grown around the world as cereal crops or grains for human food and as fodder. Millets include Pearl Millet, Finger Millet, Foxtail Millets and other small millets). Pearl millet goes by several common names, including Bulrush millet, Babala, Ddukun (in the Sudan), and Bajra (in India). It has been grown in Africa and on the Indian subcontinent since prehistoric times. Bajra is the major cereal crop grown in the hottest, driest areas of the world where, rainfed agriculture is practiced. Bajra is not just a resilient and dependable source of energy, but also a good source for other dietary needs, especially micronutrients. It is also mainly consumed as cattle/poultry feed in India apart from its consumption for food purpose. In India, major producers are Rajasthan, Uttar Pradesh, Haryana, Gujarat and Maharashtra. Bajra is largely grown as a rainy season crop (Kharif Crop) under rainfed conditions in Asia and Africa. Bajra has the smallest crop cycle of 80 to 85 days only, sowing starts from June and extends till August and harvesting starts from September and extends up to November.



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								
	<p>Major Varieties:</p> <p>RHB-58, Pusa-444, PAC-903, RHB-154, Jawahar Bajra Variety-2, GHB-558, Pusa- 605, Nandi-32, Ananta, GHB-526, Saburi, Nandi-35, Nandi-32, GK-1004, Proagro No 1, Avika Bajra Chari</p> <p>NCDEX: Quality Parameters</p> <table border="1"> <tbody> <tr> <td>Moisture</td> <td>12% basis, accepted upto 13% with moisture adjusted weight (MAW) of 1:1</td> </tr> <tr> <td>Foreign Matter</td> <td>2% Max</td> </tr> <tr> <td>Damaged, Immature/Shriveled grains</td> <td>5% Max</td> </tr> <tr> <td>Other edible grains</td> <td>2 % Max</td> </tr> </tbody> </table>	Moisture	12% basis, accepted upto 13% with moisture adjusted weight (MAW) of 1:1	Foreign Matter	2% Max	Damaged, Immature/Shriveled grains	5% Max	Other edible grains	2 % Max
Moisture	12% basis, accepted upto 13% with moisture adjusted weight (MAW) of 1:1								
Foreign Matter	2% Max								
Damaged, Immature/Shriveled grains	5% Max								
Other edible grains	2 % Max								

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)

Global data for Bajra (Pearl Millet) is not available. However, as per FAO, Pearl millet accounts for about 50% of the total global production of millets. The following Tables show data for Millets.

(In Lakh Tonnes)

Global Scenario	Previous FY (2018-19)	Current FY (2019-20) (P)
Opening Stocks	6.87	3.23
Production	290.24	284.91
Imports	0.00	0.00
Total Supply	297.11	288.14
Exports	0.00	0.00
Domestic Consumption	293.88	282.91
Ending Stocks	3.23	5.23

Source: USDA (April 2020); P= Provisional

Note: Data relates to all Millets which is inclusive of Pearl Millet.

(In Lakh Tonnes)

Indian Scenario	Previous FY (2018-19)	Current FY (2019-20) (P)
Opening Stocks	6.87	3.23
Production	102.36	109.00
Imports	0.00	0.00
Total Supply	109.23	112.23
Exports	0.00	0.00
Domestic Consumption	106.00	107.00
Ending Stocks	3.23	5.23

Source: USDA (April 2020); P= Provisional

Note: Data relates to all Millets which is inclusive of Pearl Millet.

(In Lakh Tonnes)

Rank	Top 10 Major Producing Countries			Top 10 Major Consuming Countries		
	Country	Previous FY	Current FY	Country	Previous FY	Current FY
1	India	102.36	109.00	India	106.00	107.00
2	Niger	38.47	38.00	Niger	38.47	38.00
3	China	22.00	23.00	China	22.00	23.00
4	Nigeria	21.19	20.00	Nigeria	21.19	20.00
5	Mali	18.40	14.50	Mali	18.40	14.50
6	Burkina	11.89	11.00	Burkina	11.89	11.00
7	Ethiopia	10.00	11.00	Ethiopia	10.00	11.00
8	Sudan	20.00	10.00	Sudan	20.00	10.00
9	Senegal	8.97	8.50	Senegal	8.97	8.50
10	Chad	7.56	7.00	Chad	7.56	7.00
	Others	29.40	32.91	Others	29.40	32.91
	World Total	290.24	284.91	World Total	293.88	282.91

Source: USDA (April 2020); P= Provisional

Note: Data relates to all Millets which is inclusive of Pearl Millet.

(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	Uganda	0.05	0.87	Kenya	0.06	0.87
2	USA	0.58	0.82	Indonesia	0.28	0.40
3	India	0.76	0.73	Germany	0.27	0.29
4	Ukraine	0.94	0.73	Iran	0.17	0.27
5	Russia	0.71	0.69	Belgium	0.26	0.25
6	Azerbaijan	0.07	0.16	UAE	0.19	0.18

Rank	Top 10 Major Exporting Countries			Top 10 Major Importing Countries		
	Country	Previous FY*	Current FY*	Country	Previous FY*	Current FY*
7	France	0.13	0.16	Spain	0.09	0.15
8	Austria	0.06	0.08	UK	0.15	0.14
9	Poland	0.03	0.06	Republic of Korea	0.13	0.14
10	China	0.05	0.06	Canada	0.10	0.13
	World	3.77	4.77	World	3.84	4.83

Source: FAO (May 2020). *Latest data for Major exporters/imports is not available in public sources. Thus Previous FY corresponds to Year 2016 (Jan-Dec) and Current FY corresponds to Year 2017 (Jan-Dec). Note: Countries have been arranged in descending order of imports for the year 2017.

(In Lakh Tonnes)

Top 10 Major producing states in India			
Rank	States	Previous FY*	Current FY*
1	Rajasthan	41.55	37.53
2	Uttar Pradesh	17.36	17.95
3	Gujarat	9.31	9.65
4	Madhya Pradesh	6.81	7.55
5	Haryana	9.64	7.21
6	Maharashtra	8.00	6.69
7	Karnataka	2.55	2.87
8	Tamil Nadu	1.02	1.44
9	Andhra Pradesh	0.72	0.93
10	Telangana	0.15	0.10
	Others	0.19	0.19
	India	97.30	92.09

Source: Ministry of Agriculture, *Latest available data for state wise production is available only till 2017-18. Thus, in the above Table Previous FY corresponds to 2016-17 and Current FY corresponds to 2017-18; States are arranged in descending order based on the figure in Current FY

c. Major changes in the policies governing trade in the spot markets of the commodity (FY 2019-20)

Date	Major Policies governing trade and Changes
03-July-19	MSP increased by 2.6% to Rs 2000 per qtl for Marketing year 2019-20 from Rs 1950 per qtl. in the previous year.
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 novel coronavirus (2019-nCoV) that was first reported from Wuhan, China, on 31 December 2019.	Expectation of decline in international trade leading to weakening of the market sentiments.
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 nationwide 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 related parameter
a. Monthly and Annual traded volume (quantity in appropriate units)

Month	Year	Symbol	Traded volume (MT)	Annual Traded Volume (MT) (April 19 to March 20)
Dec	2019	BAJRA	180	960
Jan	2020	BAJRA	700	
Feb	2020	BAJRA	80	

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

Symbol	Traded Volume (MT)	Deliverable Supply(MT)	Proportion
BAJRA	960	8,510,000	0.01%

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

Symbol	Traded volume (MT)	Production(MT)	Proportion
BAJRA	960	8,510,000	0.01%

d. Annual average Open interest as proportion of total production

Symbol	Average Open Interest (MT)	Production(MT)	Proportion
BAJRA	78	8,510,000	00.00%

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

Symbol	Average Open Interest (MT)	Deliverable supply(MT)	Proportion
BAJRA	78	8,510,000	00.00%

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

Month	Years	Symbol	Traded Value (in Cr.)	Annual Value of Trade (In Cr.)
Dec	2019	BAJRA	0	1
Jan	2020	BAJRA	1	
Feb	2020	BAJRA	0	

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

Expiry Month	Years	Symbol	Total Delivery(MT)	Annual quantity of Delivery (MT)
Jan	2020	BAJRA	190	310
Feb	2020	BAJRA	120	

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

Expiry Month	Years	Symbol	Value in Cr	Annual value of delivery (in Cr)
Jan	2020	BAJRA	0	0.59
Feb	2020	BAJRA	0	

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

Month	Years	Symbol	Average Open Interest (MT)	Annual Open Interest (MT)
Dec	2019	BAJRA	81	120
Jan	2020	BAJRA	160	
Feb	2020	BAJRA	120	

j. Annual average volume to open interest ratio

Symbol	Average of traded volume(MT)	Average of Open Interest (MT)	Traded to Open interest
BAJRA	14	136	9.95%

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

Symbol	Member Count	Client Count
BAJRA	15	21

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 of ratio of open interest by FPOs/farmers/Hedge/VCP positions to total open interest

Symbol	VCPs/ Hedger	Proprietary traders	Others
BAJRA	6.19%	12.40%	81.41%

Maximum daily value of ratio of open interest by FPOs/farmers/Hedge/VCP positions to total open interest

Symbol	VCPs/ Hedger	Proprietary traders	Others
BAJRA	0	17.88%	82.12%

*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
BAJRA	0

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

n. Algorithmic trading as percentage of total trading

Commodity	%
BAJRA	00.00%

o. Delivery defaults

Number of instances	0
Quantity involved	0 MT
Value involved	00.00 Cr.

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.

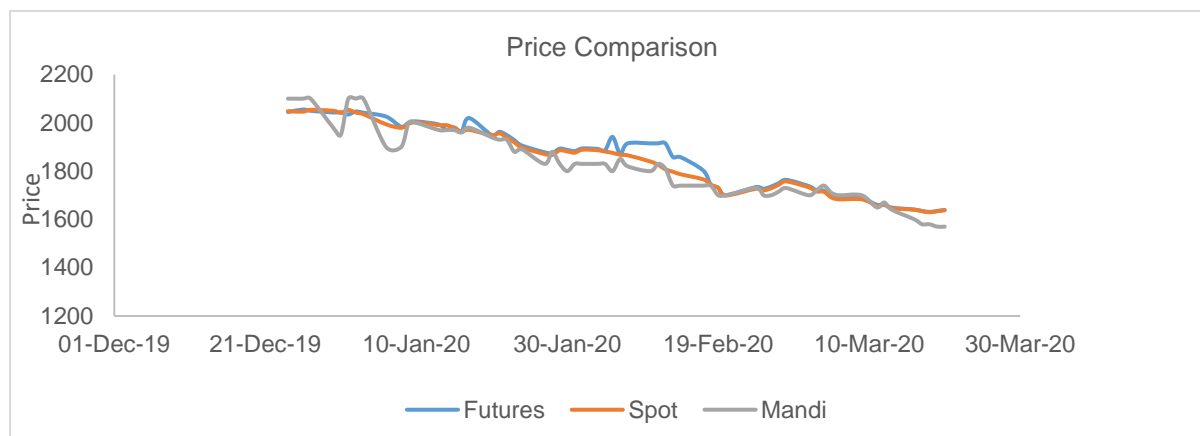
Correlation			
	Futures	Spot	Mandi
Futures	1		
Spot	0.602196	1	
Mandi	0.159757	0.475290	1

Standard Deviation			
	Futures	Spot	Mandi
Futures	1	0.598602	1.853451
Spot	1.670559928	1	3.096301
Mandi	0.539534068	0.322966	1

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.



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)

Value of daily futures price volatility (April 2019- March 2020)

Volatility	Month	Value
Max	Mar	0.017976
Min	Jan	0.003820

Value of daily Spot price volatility (April 2019- March 2020)

Volatility	Month	Value
Max	Feb	0.008575952
Min	Dec	0.003231891

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

No single instance futures contract was in backwardation / contango by more than 4% for the near month contract in the period for April 2019- March 2020.

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 2019 to 31 March 2020)

Basis Volatility	5.975727
------------------	----------

Period	Hedge Ratios	Hedge Efficiency (in Percentage)
Week 1-4	Not Available	Not Available
Week 5-8		
Week 9-12		
Week 13-16		
Week 17-20		
Week 21-24		
Week 25-28		
Week 29-32		
Week 33-36		
Week 37-40		
Week 41-44		
Week 45-48		

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).

	District	Availability of exchange delivery centers
Rajasthan	Alwar	ADC
	Dausa	ADC
	Jaipur	Basis center
	Bharatpur	
	Sikar	
	Karauli	
	Swai Madhopur	
	Barmer	

	District	Availability of exchange delivery centers
Uttar Pradesh	Badaun	N.A.
	Aligarh	
	Agra	
	Hathras	
	Etah	
	Firozabad	
	Etawah	
	Muradabad	

	District	Availability of exchange delivery centers
Gujarat	Banaskantha	N.A.

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)

Month	GUJARAT (Avg Qty (MT))	RAJASTHAN (Avg Qty(MT))
Dec-19	2	2
Jan-20	110	36
Feb-20	41	18

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.

Sr. Number	Programme	Location	Number of Participants
1	Awareness Programme	Jaipur	25
2	Awareness Programme	Alwar	30
3	Awareness Programme	Dausa	35

e. Steps taken / to be undertaken to improve hedging effectiveness of the contracts as well as to 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 location to increase hedging participation from the value chain participants.
- One to one meetings with market participants create awareness about new development / new initiatives at exchange level.

ANNEXURE I

Qualitative and quantitative measure for Hedge effectiveness ratio

Methodology

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

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.

$$\text{Var}(\text{hedged portfolio}) = \text{Var}(\text{unhedged portfolio})$$

Then,

$$\text{Hedge Efficiency} = 1 - 1 = 0$$

If spot is completely hedged using futures, then

$$\text{Var}(\text{hedged portfolio}) = 0$$

$$\text{Hedge Efficiency} = 1$$

Position in 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:

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

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 implies 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.